

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

LITHOLOGIC AND GEOPHYSICAL LOGS OF SEVEN HOLES DRILLED IN 1975
IN THE YAMPA AND DANFORTH HILLS COAL FIELDS,
NORTHWESTERN COLORADO

By Sean Conroy Muller

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This report has not been edited for conformity
with Geological Survey editorial standards or
stratigraphic nomenclature

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LITHOLOGIC AND GEOPHYSICAL LOGS OF SEVEN HOLES DRILLED IN 1975
IN THE YAMPA AND DANFORTH HILLS COAL FIELDS, NORTHWESTERN COLORADO

By Sean Conroy Muller *

Introduction

Under Contract No. 14-08-0001-15026 awarded by the U.S. Geological Survey, the Colorado School of Mines Research Institute coordinated the drilling and logging of six rotary drill holes in the Yampa coal field and one core hole in the Danforth Hills coal field, Moffat County, Colo. (fig. 1). The purpose of the project was to obtain information on the thickness and grade of coal beds in certain parts of the two coal fields. The drill-hole locations and maximum depths were selected by the U.S. Geological Survey; appropriate permission for access was obtained, and post-drilling reclamation met U.S. Bureau of Land Management specifications. Lithologic logging, by Muller, was based on inspection of rotary drill cuttings from the Yampa field holes and of core from the Danforth Hills hole. Geophysical logs were made of all holes. (Owing to malfunction, no resistivity logging was possible for hole Y-2.) Seven selected samples of coal from the Danforth Hills hole were analyzed (exhibit 8); five of these samples were from the thickest coal seam penetrated, at depth 456-472 feet. Drill-hole locations, elevations, and depths are summarized in the following table.

* Colorado School of Mines Research Institute, Golden, Colo.

Drill-hole locations, elevations, and drilling and logging
depths

Hole No.	Location	Surface elevation	Total depth drilled	Total depth for geophysical logging
Rotary drilling (total 5,903 ft)--Yampa coal field				
Y-1A	SW $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 25, T. 8 N., R. 94 W.	6621	1117	1090
Y-2	SW $\frac{1}{4}$ NE $\frac{1}{4}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 21, T. 8 N., R. 93 W.	6558	1380	1125
Y-3	SE $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 15, T. 8 N., R. 93 W.	6542	1200	1118
Y-4	SE $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 6, T. 6 N., R. 93 W.	6418	757	740
Y-5	SE $\frac{1}{4}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 32, T. 7 N., R. 93 W.	6670	620	614
Y-6	NW $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 26, T. 8 N., R. 93 W.	6956	829	820
Core drilling--Danforth Hills coal field				
D-1	NE $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 7, T. 3 N., R. 92 W.	7222	1102	1070

Note: Drill hole Y-1A was the second drilled at that location; drill hole Y-1 was drilled to 430 feet and abandoned because of poor penetration rate in claystone. Drill hole Y-6 had to be drilled twice because bentonite expansion inhibited conventional logging and accumulation of drilling mud in the drill rods inhibited slim hole probing.

Metric conversion and abbreviations

All depths stated herein are in feet; to convert feet to metres, multiply by 0.3048. The principal abbreviations used in the lithologic logs are:

brach -----	brachiopod	ox -----	oxidized
bent -----	bentonite	qtzt -----	quartzite
carb -----	carbonaceous	s&p -----	salt and pepper (appear- ance)
cgl, cong----	conglomerate	sh -----	shale
contm -----	contaminated	sltst -----	siltstone
F.U. -----	Fort Union Formation	ss -----	sandstone
gast -----	gastropod		
gr -----	grained		
intbd -----	interbedded		

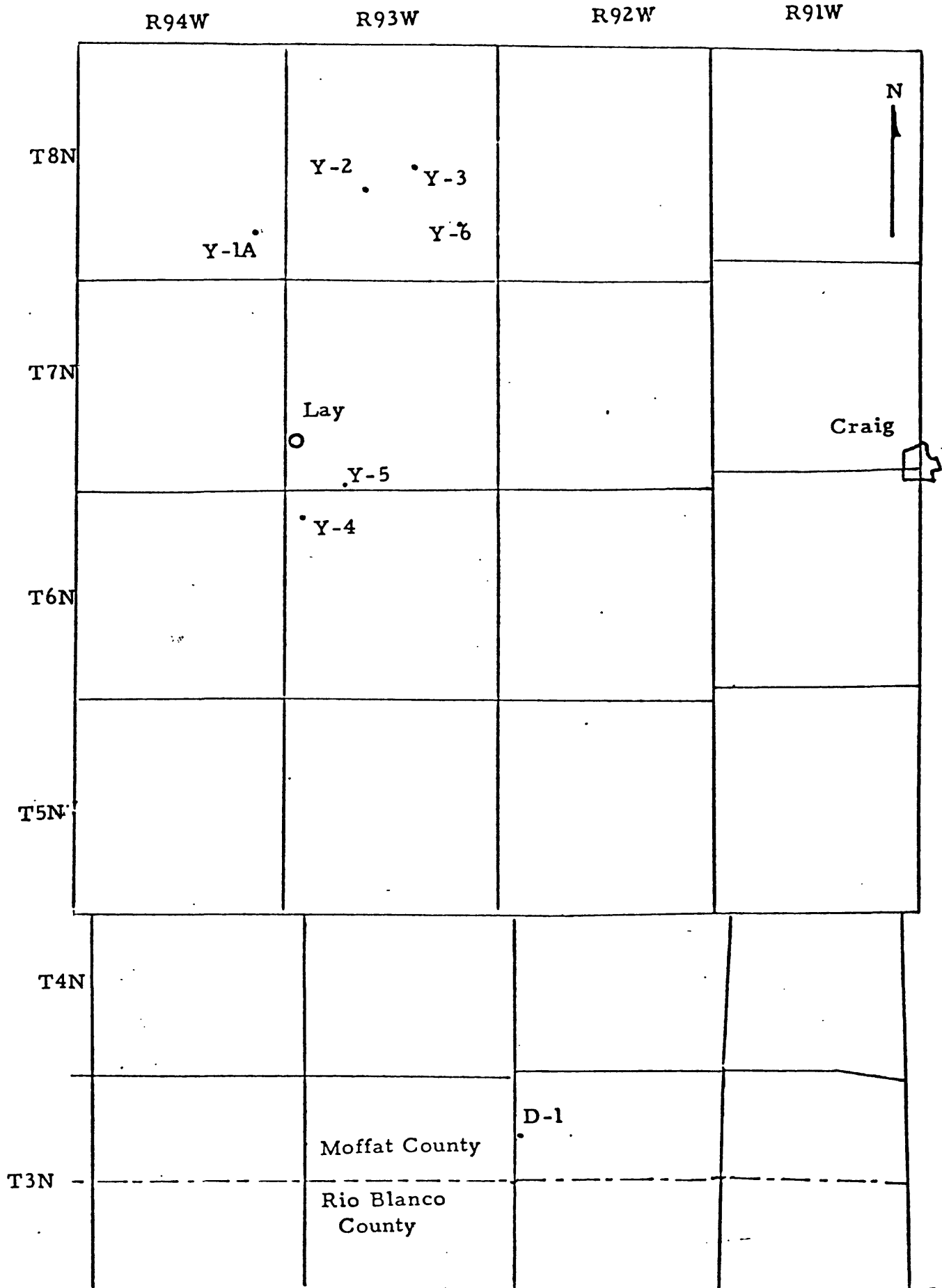


Figure 1.--Drill-hole location map

0 5 miles

Project No. H50146

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE

EXHIBIT 1 LITHOLOGIC LOGDate 09-26-75Hole No. 1-1A Elev. 6621' Total Depth 1117' Location SW 1/4, SW 1/4, NW 1/4, SEC 25, T2N, R10W Property BLMCounty MOFFAT State COLORADO Sponsor USGS Drilling Co. BOYLES DRILLING Geologist S.C. MULLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING		SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL						
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0	Angular	Subangular		Subrounded	Rounded	Quartz	Feldspar	Mafic	Clay	Pyrite	Others	TOTAL %	Sed.	Meta.	Ign.	Most abund.	TOTAL %	Vitrain	Clarain	Durain
OVERBURDEN ↑ 0 10 20 30 40 50 60 70 80	ALLUVIUM - SILT, TAN	x																								
			x																								
		CLYST, LT BLUE-GREY, BENT																									
		SS, LT YELLOW-BROWN	x	x	x				x	POOR	70		10	10			10	x	x		CHT						
			x	x	x				x	POOR	70		10	10			10	x	x		CHT						
		"	x	x	x				x	POOR	70		10	10			10	x	x		CHT						
			x	x	x				x	POOR	70		10	10			10	x	x		CHT						
		"	x	x	x				x	POOR	70		10	10			10	x	x		CHT						
			x	x	x				x	POOR	70		10	10			10	x	x		CHT						
		"	x	x	x	x			x	POOR	70		10	10			10	x	x		CHT						
			x	x	x	x			x	POOR	70		10	10			10	x	x		CHT						
		CLYST, DK GREY, SANDY	x	x					x	MED	30		5	65													
			x	x					x	MED	30		5	65													
		"	x	x					x	MED	30		5	65													
			x	x					x	MED	30		5	65													
	"	x	x					x	MED	30		5	65														
		x	x					x	MED	30		5	65														
	"	x	x					x	MED	30		5	65														
		x	x					x	MED	30		5	65														

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE
EXHIBIT 1 LITHOLOGIC LOG

Project No. H50146 Date 09-26-75
Hole No. Y-1A Elev. 6621' Total Depth 1117' Location SW 1/4, SW 1/4, NW 1/4, SW 1/4, SEC 25, T8N, R94W Property BLM
County MOFFAT State COLORADO Sponsor USGS Drilling Co. BOYLE'S BROS Geologist SC. MULLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING			SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL			
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0	Angular	Subangular	Subrounded		Rounded	Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed. Meta. Ign.	Most abund.	TOTAL %	Vitrinite	Clarinite	Durinite
PRODUCED MINOR WATER ↓ POOR RECOVERY ↓ 160	80	CLYST, DK GREY, SANDY	x	x					x		Med	30		5	65										
		COAL	x	x					x			3			10						87	x		x	
	90	CLYST, DK GREY, SANDY	x	x					x		Med	30		5	65										
		"	x	x					x		Med	30		5	65										
		"	x	x					x		Med	30		5	65										
	100	"	x	x					x		Med	30		5	65										
		SS, LT GREY	x	x					x		Med	80		19				2	x	x	CHT				
		CLYST, DK GREY, SANDY																							
	110	"																							
		"																							
	120	"																							
		SS, S & P	x						x		Well	60		33	3	1		3	x	x	CHT				
			x						x		Well	60		33	3	1		3	x	x	CHT				
	130	"	x						x		Well	60		33	3	1		3	x	x	CHT				
			x						x		Well	60		33	3	1		3	x	x	CHT				
	140	"	x						x		Well	60		33	3	1		3	x	x	CHT				
150		CLYST, DK GREY, CARBI(?)													80						10			x	
		"													80						10			x	
	{ ?	CLYST (?)																							

Project No. H50196

Date 09-26-75

Hole No. Y-1A Elev. 6621' Total Depth 1117'

Location SW 1/4, SW 1/4, NW 1/4, SW 1/4, SEC 25, T6N, R94W

Property BLM

County MOFFAT

State COLORADO

Sponsor USGS

Drilling Co. BOYLES BROS

Geologist S.C. MULLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING			SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL				
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0	Angular	Subangular	Subrounded		Rounded	Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed.	Meta.	Ign.	Most abund.	TOTAL %	Vitrain	Clarain
POOR RECOVERY - SAMPLES QUESTIONABLE	160	CLYST (?)																								
		?																								
	170	"																								
		?																								
	180	"																								
		?																								
	190	"																								
		?																								
	200	"																								
		?																								
210	"																									
	?																									
220	"																									
	?																									
230	"																									
	?																									
240																										

POOR RECOVERY - SAMPLES QUESTIONABLE

Project No. H50M46

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE

EXHIBIT 1 LITHOLOGIC LOGDate 09-26-75Hole No. Y1A Elev. 6621' Total Depth 1117' Location SW 1/4, SW 1/4, NW 1/4, SW 1/4, SEC 25, T8N, R94W Property BLMCounty MOFFAT State COLORADO Sponsor USGS Drilling Co. BOYLES BROS Geologist S.C. MULLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING Angular Subangular Subrounded Rounded	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL									
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed.	Meta.	Ign.	Most abund.	TOTAL %	Vitrain	Clarain	Durain	Fusain				
POOR RECOVERY — SAMPLES QUESTIONABLE	240	CLYST (?)																											
	?																												
	250																												
	?																												
	260																												
	?																												
	270																												
	?																												
	280																												
	?																												
	?																												
	?																												
290	SS, S & P		x	x	x				x		Med	50					2		48	x			CHT						
			x	x	x				x		Med	50					2		48	x			CHT						
			x	x	x				x		Med	50					2		48	x			CHT						
300			x	x	x				x		Med	50					2		48	x			CHT						
			x	x	x				x		Med	50					2		48	x			CHT						
310			x	x	x				x		Med	50					2		48	x			CHT						
			x	x	x				x		Med	50					2		48	x			CHT						
320			x	x	x				x		Med	50					2		48	x			CHT						

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE

Project No. H50146 EXHIBIT 1 LITHOLOGIC LOG Date 09-26-75
 Hole No. Y-1A Elev. 6621' Total Depth 1117' Location SW 1/4, SW 1/4, NW 1/4, SW 1/4, SEC 25, T8N, R94W Property BLM
 County MOFFAT State COLORADO Sponsor USGS Drilling Co. BOYSS BROS Geologist S.C. MULLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL			
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed. Meta. Ign.	Most abund.	TOTAL %	Vitrain	Clarain	Durain	Fusain
320	.	SS, s&p	x	x	x			x	Med	50				2		48	x	CHT					
330			x	x	x			x	Med	50				2		48	x	CHT					
340	.	"	x	x	x			x	Med	50				2		48	x	CHT					
350			x	x	x			x	Med	50				2		48	x	CHT					
360	---	CLYST, DK GREY - PURPLE - GREEN w/ MINOR SS, s&p INTBD	x					x	Well	25			75										
370			x					x	Well	25			75										
380	---	"	x					x	Well	25			75										
390			x					x	Well	25			75										
400	---	"	x					x	Well	25			75										
			x					x	Well	25			75										

Project No. H50146

 Date 09-26-75

 Hole No. Y-1A Elev. 6621' Total Depth 1117' Location SW 1/4, SW 1/4, NW 1/4, SW 1/4, SEC 25, T8N, R9W Property BLM

 County MOFFAT State COLORADO Sponsor USGS Drilling Co. BOYLE'S BROS Geologist S.C. Mueller

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING	SORTING (poor, med., well)	TOTAL PERCENT MECASCOPIIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL			
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed. Meta. Ign.	Most abund.	TOTAL %	Vitrain	Clarain	Durain	Fusain
HOLE Y-1 WAS ABANDONED AT THIS INTERVAL	400	CLYST, DK GRAY-PURPLE-GREEN w/ MINOR SS, & P INTBD	x					x	WELL	25			75										
			x					x	WELL	25			75										
	410		x					x	WELL	25			75										
			x					x	WELL	25			75										
	420		x					x	WELL	25			75										
			x					x	WELL	25			75										
	430		x					x	WELL	25			75										
			x					x	WELL	25			75										
	440		x					x	WELL	25			75										
			x					x	WELL	25			75										
	450	COAL									15								85				x
		CLYST, DK GRAY											100										
													100										
	460	COAL									20								80				x
											20								80				x
		CLYST, DK GRAY											100										
													100										
	470	COAL w/ CLYST, DK GRAY INTBD									45								55				x
		CLYST, DK GRAY											100										
													100										
	480												100										

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE

EXHIBIT 1 LITHOLOGIC LOG

Project No. H50146 Date 09-26-75
 Hole No. Y-1A Elev. 6621' Total Depth 1117' Location SW 1/4, SW 1/4, NW 1/4, SW 1/4, SEC 25, T8N, R9W Property BUM
 County MOFFAT State COLO Sponsor USGS Drilling Co. BOYLES BROS Geologist S.C. MULLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL			
			.06-.125	.125-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed. Meta. Ign.	Most abund.	TOTAL %	Vitrain	Clarain	Durain	Fusain
980		CLYST, DK GREY																					
490		COAL w/ CLYST, ^{DK} GREY INTBD											25						75				x
		CLYST, DK GREY											100										
500		COAL w/ CLYST, ^{DK} GREY INTBD											25						75				x
		CLYST, DK GREY - PURPLE - GREEN w/ MINOR SS, GREY & SLTST, LT BROWN INTBD	x					x	well	30			70										
			x					x	well	30			70										
510		"	x					x	well	30			70										
			x					x	well	25			75										
520		"	x					x	well	25			75										
			x					x	well	30			70										
530		"	x					x	well	30			70										
			x					x	well	20			80										
540		"	x					x	well	20			80										
			x					x	well	20			80										
550		"	x					x	well	20			80										
			x					x	well	20			80										
560		"	x					x	well	20			80										

Project No. H50146 EXHIBIT 1 LITHOLOGIC LOG Date 09-26-75
Hole No. V-1A Elev. 6621' Total Depth 1117' Location SW 1/4, SW 1/4, NW 1/4, SW 1/4, SEC 25, TEN, R94N Property BLM
County MOFFAT State COLORADO Sponsor USGS Drilling Co. BOYLES DRILLING Geologist S.C. MULLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL					
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed.	Meta.	Ign.	Most abund.	TOTAL %	Vitrinite	Clarinite	Durinite	Fusinite
560		CLYST, GREY-DK GREY w/ MINOR SG, GREY & SILTY, LT BROWN INTBD	x					x	Well	20			80												
			x						x	Well	20			80											
570		"	x					x	Well	20			80												
			x						x	Well	20			80											
580		"	x					x	Well	20			80												
			x						x	Well	20			80											
590		COAL											20								80	x			
		SH, DK GREY, CARB												80								20			x
600		COAL											5	1							96	x			
														5	1							96	x		
		"												5	1							96	x		
															5	1							96	x	
610		SH, DK GREY, CARB											80								20			x	
														80							20			x	
620		SH, GREY, SILTY w/ SH, DK GREY CARB & MINOR COAL INTBD	x					x	Well	25			50								25	x		x	
			x						x	Well	25			50								25	x		x
		"	x					x	Well	25			50								25	x		x	
			x					x	Well	25			50									25	x		x
630		COAL	x					x	Well	10			10								80	x			
		SH, DK GREY, CARB & SILTY	x					x	Well	25			45								30			x	
		COAL	x					x		5			10								85	x			
		SILTST, LT BROWN w/ SH, GREY-GREEN, BENT & MINOR COAL INTBD	x					x	Well	40			40								20	x		x	
x						x	Well	40			40									20	x		x		
640																									

Project No. H50146

 Date 09-26-79

 Hole No. Y-1A Elev. 6631' Total Depth 1117' Location SW 1/4, SW 1/4, NW 1/4, SW 1/4, SEC 25, T8N, R94W Property BLM

 County MOFFAT State COLO Sponsor USGS Drilling Co. DOYLE'S BROS Geologist SC. MURPHY

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING Angular Subangular Subrounded Rounded	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL				
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafica	Clay	Pyrite	Others	TOTAL %	Sed. Mcta. Ign.	Most abund.	TOTAL %	Vitrain	Clarain	Durain	Fusain	
690	SLTST, LT BROWN w/ SH, GREY-GREEN, BENT & MINOR COAL INTBD	x					x	Well	40			40								20	x		x
			x					x	Well	40			40								20	x		x
650		x					x	Well	40			40								20	x		x
			x					x	Well	40			40								20	x		x
	" "	x					x	Well	40			40								20	x		x
660		" "	x					x	Well	40			40								20	x		x
		SH, DK GREY, CARB w/ MINOR COAL INTBD											75								25	x		x
													75								25	x		x
670													75								25	x		x
		" "											75								25	x		x
680		" "											75								25	x		x
													75								25	x		x
690	SH, GREY w/ SLTST, LT BROWN & MINOR COAL INTBD	x					x	Well	25			50								25			x
		" "	x					x	Well	25			50								25			x
		x					x	Well	25			50								25			x
700		" "	x					x	Well	25			50								25			x
			x					x	Well	25			50								25			x
710		COAL, LIGNITIC w/ SH, DK GREY, CARB INTBD											55								45	x		x
720	SH, GREY-GREEN w/ SLTST, LT BROWN, SANDY INTBD	x					x	Well	40			60											

Project No. H50146 EXHIBIT 1 LITHOLOGIC LOG Date 09-26-75
Hole No. Y1A Elev. 6621' Total Depth 1117' Location SW 1/4, SW 1/4, NW 1/4, SW 1/4, SEC 25, T8N, R99W Property BLM
County MOFFAT State COLO Sponsor USGS Drilling Co. BOYLES BROS Geologist S.C. Munnick

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL					
			.06-.125	.125-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed.	Meta.	Ign.	Most abund.	TOTAL %	Vitrain	Clarain	Durain	Fusain
720		SH, GREY-GREEN w/ SLTST, LT BROWN, SANDY INTBD	x					x	WELL	40			60												
		"	x						x	WELL	40			60											
730		SS, GREY w/ SH, GREY & CLYST, GREEN INTBD	x					x	WELL	55			45												
		"	x						x	WELL	55			45											
740		"	x					x	WELL	55			45												
		"	x						x	WELL	55			45											
750		"	x					x	WELL	55			45												
		"	x						x	WELL	55			45											
760		SH, GREY w/ CLYST, BROWN-GREEN & MINOR SS, GREY & COAL	x					x	WELL	15			60								25	x		x	
		"	x						x	WELL	15			60								25	x		x
770		"	x					x	WELL	15			60								25	x		x	
		"											80									20	x		x
780		COAL											4	1							95	x			
		"												4	1							95	x		
790		"											4	1							95	x			
		"												4	1							95	x		
800		SH, BLACK, CARB											60								40	x		x	
		COAL											6	1							93	x		x	

Project No. H50196

 Date 09-26-75

 Hole No. Y1A Elev. 6621' Total Depth 1117' Location SW 1/4, SW 1/4 NW 1/4, SW 1/4, SEC 25, T8N, R17W

 County MOFFAT State COLO Sponsor USGS Drilling Co. BOYLES BROS Geologist S.C. MULLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL			
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed. Meta. Ign.	Most abund.	TOTAL %	Vitrinite	Clarinite	Durinite	Fusinite
800		SS, GREY, SILTY W/ SH, GREY INTBD	x					x	well	40			60										
810		"	x					x	well	40			60										
820		COAL											10	1					89	x		x	
		SH, DK GREY, CARB											70						30			x	
		"											70						30			x	
830		SS, GREY, SILTY W/ SH, GREY INTBD	x					x	well	40			60										
		"	x					x	well	40			60										
		"	x					x	well	40			60										
840		SH, DK GREY-BROWN, BENT											100										
850													100										
860													100										
870		SS, LT GREY W/ MINOR SH, GREY & COAL (FIN) INTBD	x					x	well	65			20						15			x	
		"	x					x	well	65			20						15			x	
880			x					x	well	65			20						15			x	

SLOW DRILLING

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE

Project No. H50146

EXHIBIT 1 LITHOLOGIC LOG

Date 09-26-75

Hole No. Y-1A Elev. 6621' Total Depth 1117' Location SW 1/4, SW 1/4, NW 1/4, SW 1/4, SEC 25 T8N, R94W Property BLM

County MOFFAT State COLO Sponsor USGS Drilling Co. Boyer's Bros Geologist S.L. MILLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL			
			.06-.125	.125-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafic	Clay	Pyrite	Others	TOTAL %	Sed. Meta. Ign.	Most abund.	TOTAL %	Vitrain	Clarain	Durain	Fusain
880		SS, LT GREY w/ MINOR SH, GRAY & COAL (THIN) INTBD	x					x	well	65			20						15				x
			x					x	well	65			20						15				x
890			x					x	well	65			20						15				x
		" "	x					x	well	65			20						15				x
900			x					x	well	65			20						15				x
		" "	x					x	well	65			20						15				x
910			x					x	well	65			20						15				x
		" "	x					x	well	65			20						15				x
920			x					x	well	65			20						15				x
		" "	x					x	well	65			20						15				x
930			x					x	well	65			20						15				x
		" "	x					x	well	65			20						15				x
940			x					x	well	65			20						15				x
		" "	x					x	well	65			20						15				x
950		COAL w/ SH, DK GREY, CARB INTBD											55						45	x			x
		SH, DK GREY, CARB											80						20				x
960		SH, DK GREY, CARB w/ COAL INTBD											65						35	x			x

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE

EXHIBIT 1 LITHOLOGIC LOG

Project No. H50146

Date 09-26-75

Hole No. V-1A Elev. 6621' Total Depth 1117' Location SW 1/4, SW 1/4, NW 1/4, SW 1/4, Sec 25, T8N, R94W Property BLM

County MOFFAT State COLORADO Sponsor USGS Drilling Co. BOYLES DRILLING Geologist SC. MILLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING Angular Subangular Subrounded Rounded	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL					
			.06-.25	.25-.5	.5-1.0	>1.0	Quartz			Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed.	Meta.	Ign.	Most abund.	TOTAL %	Vitrinite	Clinite	Durinite	Fusinite	
960	=====	SH, DK GREY, CARB W/ COAL INTBD												65								35x			X
970	SS, GREY	X					X	WELL	90												10			X
		X					X	WELL	90												10			X
980		X					X	WELL	90												10			X
		X					X	WELL	90												10			X
990		X					X	WELL	90												10			X
	"	X					X	WELL	90												10			X
	=====	SH, DK GREY, CARB W/ COAL, SANDY	X					X		15		35										40x			X
	=====		X					X		15		35										40x			X
1000	SS, LT GREY W/ SH, GREY INTBD	X					X	WELL	70															
	=====		X					X	WELL	70		25										5			X
	=====		X					X	WELL	70		25										5			X
1010		X					X	WELL	70		25										5			X
	=====		X					X	WELL	70		25										5			X
	=====		X					X	WELL	70		25										5			X
1020		X					X	WELL	70		25										5			X
	=====		X					X	WELL	70		25										5			X
	=====		X					X	WELL	70		25										5			X
1030	=====	SH, GREY - BROWN - LT GREEN											100												
	=====	"											100												
1040	=====	COAL											7	1								92x			

Project No. H50146

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE

EXHIBIT 1 LITHOLOGIC LOGDate 09-26-75Hole No. Y-1A Elev. 6621' Total Depth 1117' Location SW 1/4 SW 1/4 NW 1/4 SEC 25, T2N, R94W Property BLMCounty MOFFAT State COLORADO Sponsor USGS Drilling Co. BOYLES BROS Geologist S.C. MURDER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL							
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0			Angular	Subangular	Subrounded	Rounded	Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed.	Meta.	Ign.	Most abund.	TOTAL %	Vitrain	Clarain
1040		SH, GREY-BROWN-LT GREEN																									
1050																											
1060																											
1070																											
1080																											
		SH, GREY, SANDY	x	x				x	WELL	35		65															
		" "	x	x				x	WELL	35		65															
1090			x	x				x	WELL	35		65															
		" "	x	x				x	WELL	35		65															
1100			x	x				x	WELL	35		65															
		" "	x	x				x	WELL	35		65															
1110			x	x				x	WELL	35		65															
		" "	x	x				x	WELL	35		65															
		" "	x	x				x	WELL	35		65															
1120			x	x				x	WELL	35		65															
			x	x				x	WELL	35		65															

3 CONES & 3 SHANKS LEFT IN HOLE



Century Geophysical Corporation
Denver, Colo.

C 366-1 SP 117-000

COMPANY

ROSE HOLE

AREA

COUNTY

SECTION

CSMRS

YI-A

Yampa Valley

Moffat

STATE Colo

DATE 9-27-75

WELL NO. YI-A

SEC

TWP

RANGE

1117

BIT ME

CASING

42

Yampa Valley

Moffat

Colo

CSMRS

9-27-75

1090

OPERATOR

UNIT NO.

1528

LOCATION

0.0

STAND BY

2.7

LOGGING

1.7

TOTAL

4.4

ROUNDTRIP

MILES

CHARGEABLE

STANDBY

TIME IN

1630

TIME OUT

1812

INITIAL RUN

1090

GAMMA SCALE

2

TIME CONSTANT

2

CALIBRATION & PROBE DATA

SOURCE NO.

A453

PROBE NO.

101

DETECTOR

XT-1

DEAD TIME

0.0

WATER FACTOR

1.2

PIS SCALE

10

SCALE

2.5

LOGGING SPEED

20

FROM

TO

TOTAL

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Density

SCALE

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LOGGING SPEED

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SCALE

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LOGGING SPEED

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SCALE

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SCALE

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LOGGING SPEED

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SCALE

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LOGGING SPEED

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FROM

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TOTAL

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Century Geophysical Corporation
Denver, Colo.

C 366-E SP 117468

COMPANY CSMRI

BORE HOLE Y1-A

AREA Yampa valley

COUNTY Moffat

SECTION TOWNSHIP

DATE 9-27-75

STATE Colo

LOG MEASURED FROM Surface

HOLE NO. Y1-A

SEC TWP RANGE

AREA Yampa Valley

COUNTY Moffat

STATE Colo

COMPANY CSMRI

DATE 9-27-75

TOTAL FOOTAGE LOGGED 1090

FOOT DRILLED 1117

BIT SIZE 6 5/8

CASING 42

BORE HOLE FLUID 420

DENSITY

VISCOSITY

RESISTIVITY

OPERATOR Hollander

UNIT NO. 7528

LOCATION Camp

DRIVE 0.0

STAND BY 2.7

LOGGING 1.7

TOTAL 4.4

FOUNDRY RELEASE

CHARGEABLE

STANDST

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INITIAL RUN
FOOT LOGGED 1090

LAMMA SCALE 10

TIME CONSTANT 2

LABORATION & PROBE DATA

SOURCE NO. A453

PROBE NO. 8010-101

DATE 8-20-49

DETECTOR X-201

DRIFT (mV) 0.0

WATER FACTOR 1.2

F'S SCALE 10

SHOWN PER 1

INCHES

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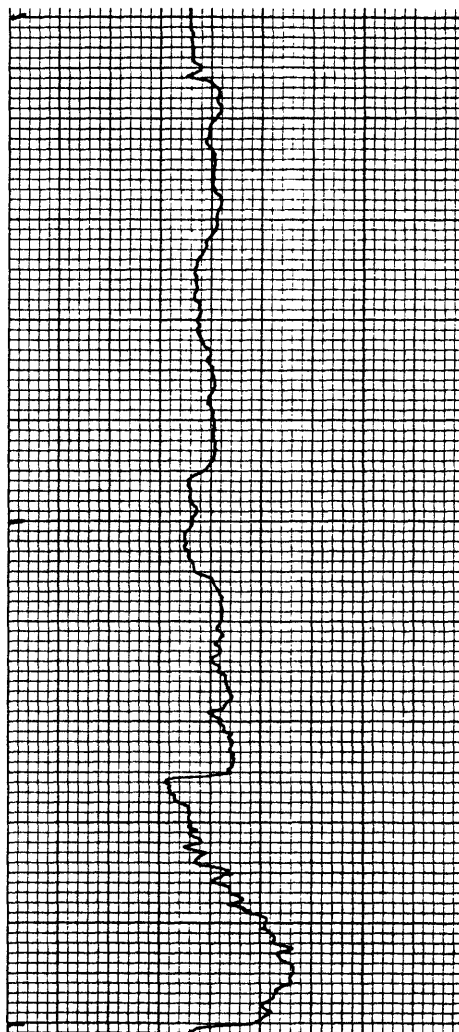
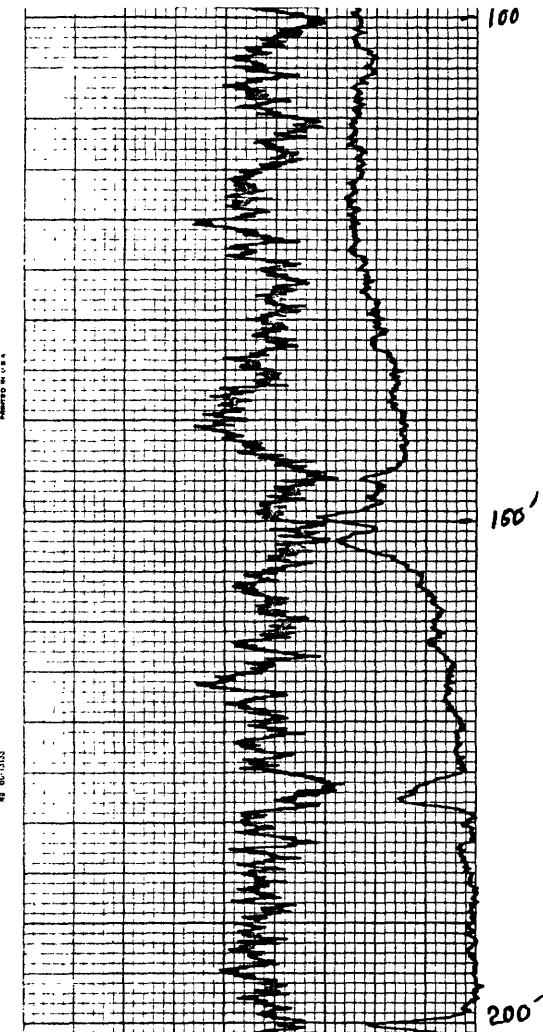
MEAS

SELF POTENTIAL

NATURAL GAMMA RAY
COUNTS PER SECOND

DENSITY

RESISTANCE
OHMS





Century Geophysical Corporation
Denver, Colo.

C 346-E 1P 117400

COMPANY

CSMRI

BORE HOLE

Y1-A

AREA

Yampa Valley

COUNTY

Moffat

SECTION

TOWNSHIP

RANGE

STATE

Colo

LOG MEASURED FROM

Surface

HOLE NO.

Y1-A

SEC

TWP

RANGE

T.D. DRILLED

1117

BIT SIZE

5 7/8

CAVING

42

BORE HOLE FLUID

4.0

DENSITY

1090

VISCOSITY

7528

RESISTIVITY

1090

LOCATION

Crater

DRIVE

0.0

STAND BY

2.7

LOGGING SPEED

1.7

TOTAL

4.4

FOUNDERS

MISCELL

CHARGEABLE

STANDBY

TIME IN

1630

TIME OUT

1812

INITIAL RUN

1090

GAMMA SCALE

10

TIME CONSTANT

2

CALIBRATION & PROBE DATA

SOURCE NO.

4453

PROBE NO.

8010-101

DETECTOR

XT-1

DEAD TIME

0.0

WATER FACTOR

1.2

RES SCALE

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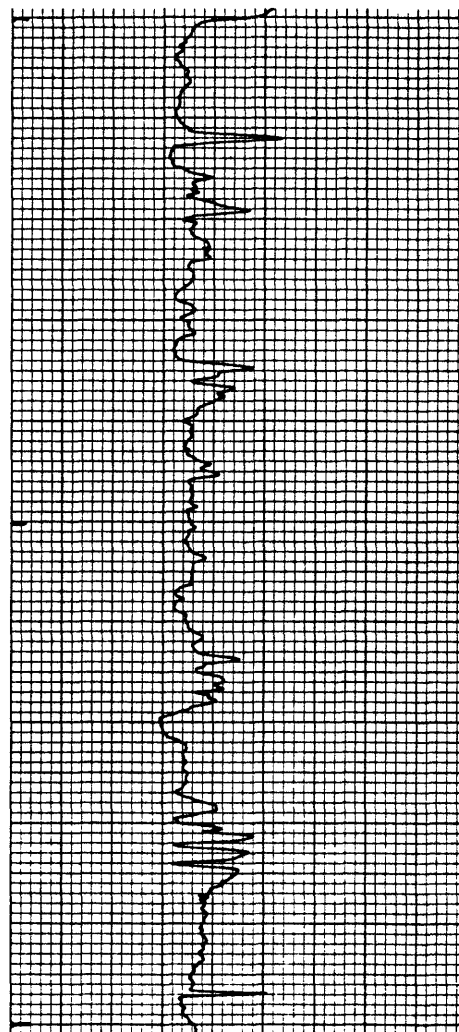
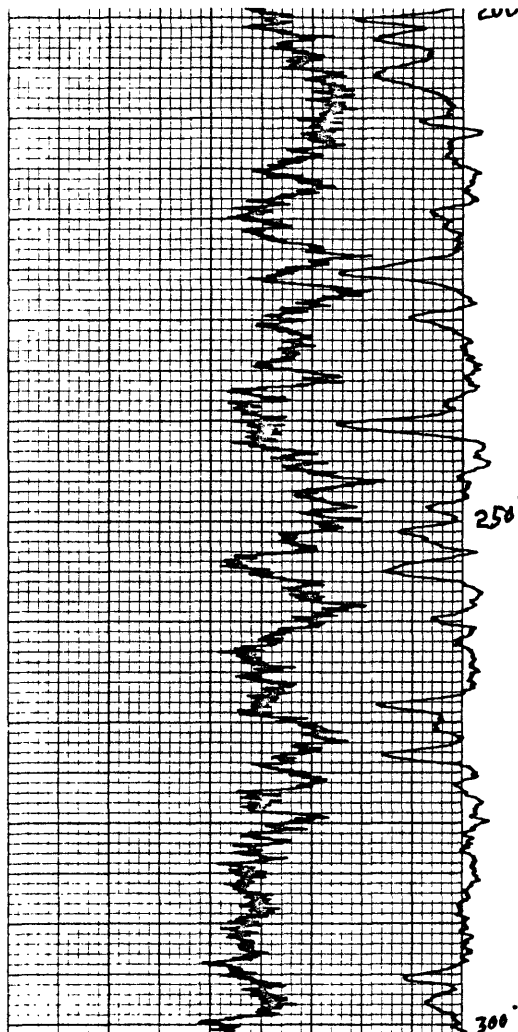
SELF POTENTIAL


NATURAL GAMMA RAY
COUNTS PER SECOND

DENSITY

RESISTANCE
OHMS

RECORDING CHART GRAPHIC CONTROLS CORPORATION BUFFALO NEW YORK





Century Geophysical Corporation
Denver, Colo.

C 364-E SP 117400

COMPANY **CSMRI**

BORE HOLE **YI-A**

AREA **Yampa Valley**

COUNTY **Moffat**

SECTION _____ TOWNSHIP _____ RANGE _____

DATE **9-27-75**

LOG MEASURED FROM **Surface**

STATE **Colo**

HOLE NO. **YI-A**

ACC _____ TOP _____ SANGS _____

AREA **Yampa Valley**

COUNTY **Moffat**

STATE **Colo**

COMPANY **CSMRI**

DATE **9-27-75**

TOTAL FOOTAGE LOGGED **1090**

T.D. DRILLED **1117**

BIT SIZE **5 5/8**

CASING **42**

ROSE HOLE FLUID **H₂O**

DENSITY _____

VISCOSITY _____

RESISTIVITY _____

OPERATOR **Hollander**

UNIT NO. **7528**

LOCATION **Craig**

DRIVE **0.0**

TIME IN **1630**

STAND BY **2.7**

TIME OUT **1812**

INITIAL RUN

T.D. LOGGED **1090**

GAMMA SCALE **10**

TIME CONSTANT **2**

CALIBRATION & PROBE DATA

SOURCE NO. **A453**

PROB. NO. **4918-101**

DEFLECTION **8020-49**

LOGGED TIME **8701**

WATER FACTOR **0.0**

PES SCALE **1.2**

Density

SCALE **2.58**

LOGGING SPEED **20**

FROM _____ TO _____

TOTAL _____

GAMMA BEGUNS Initial run offset

SCALE _____

LOGGING SPEED _____

FROM _____ TO _____

TOTAL _____

SOURCE VALUE **49661**

PROB. NO. **158**

TIME & DATE **7/22/74**

AIR FACTOR **1.0**

LOGGING SPEED **10**

FROM _____ TO _____

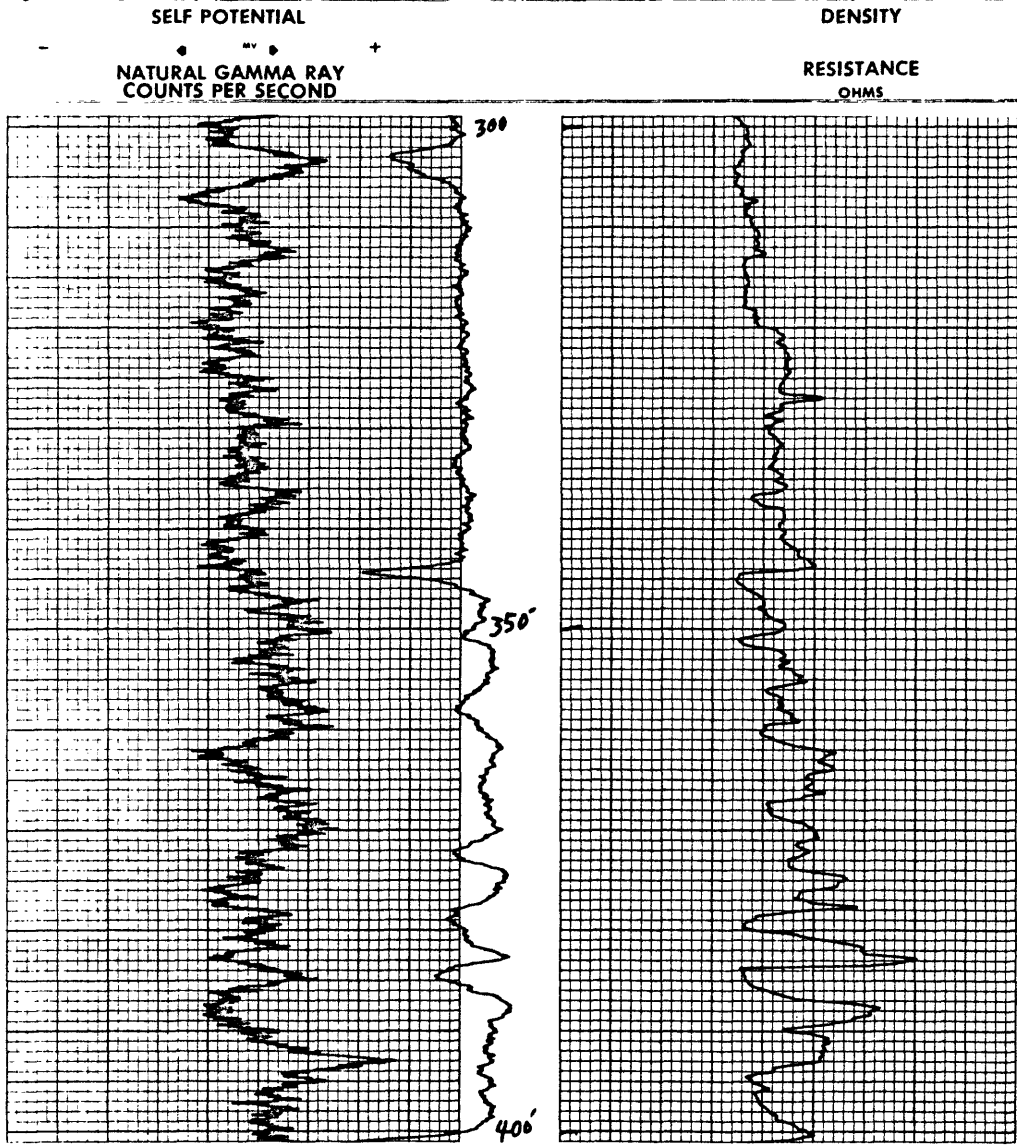
TOTAL _____

LOGGING SPEED **20**

FROM _____ TO _____

TOTAL _____

10 ohms per 1 inch





Century Geophysical Corporation
Denver, Colo.

C 366 I SP 117488

COMPANY

BORE HOLE

AREA

COUNTY

SECTION

CSMRI

YI-A

Yampa Valley

Moffat

Colo

9-27-75

Surface

WELL NO. YI-A

SEC TWP RANGE

Yampa Valley

Moffat

Colo

CSMRI

9-27-75

1090

T.D. DEPTH 1117

548 42

420

7528

Hollander

7528

1090

0.0

1630

2.7

1812

1.7

4.4

ROUNDTRIP

MILEAGE

CHARGEABLE

STANDSTILL

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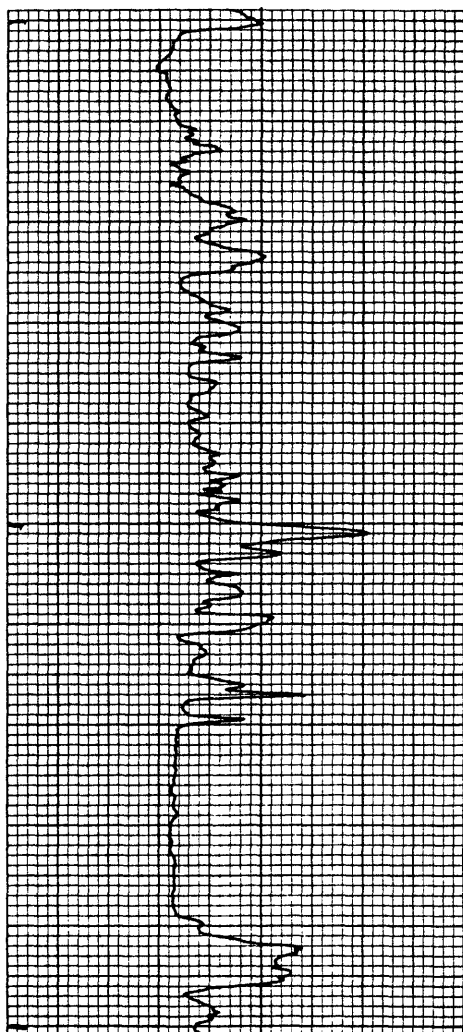
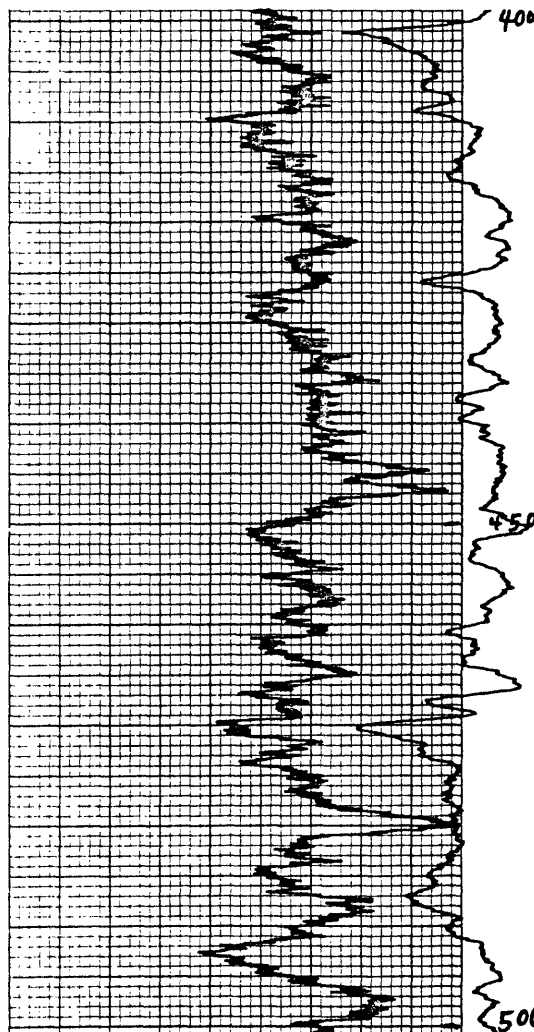
SELF POTENTIAL

DENSITY

NATURAL GAMMA RAY
COUNTS PER SECOND

RESISTANCE
OHMS

RECORDING CHART GRAPHIC CONTROLS CORPORATION BUFFALO, NEW YORK





Century Geophysical Corporation
Denver, Colo.

C 368 E SP 11748B

COMPANY

WIRE LOG

AREA

COUNTY

SECTION

CSMRI

YI-A

Yampa valley

Moffat

TOWNSHIP

RANGE

Colo

Surface

DATE 9-27-75

WELL NO YI-A

SEC

TWP

RANGE

Yampa Valley

Moffat

Colo

CSMRI

9-27-75

TOTAL FOOTAGE LOGGED 1090

TO DEPTH 1117

SEC

TWP

RANGE

647

42

BORE HOLE FLUID

DENSITY

7528

LOCATION

CRG

DRIVE

0.0

STAND BY

2.7

LOGGING

1.7

TOTAL

4.4

COUNTDOWN

MIRAGE

CHARGEABLE

STANDBY

TIME IN

1630

TIME OUT

1812

INITIAL RUN

LOGGED 1090

GAMMA SCALE

TIME CONSTANT

2

CALIBRATION & PROBE DATA

SOURCE NO

A453

PROBE NO

8028-48

DETECTOR

XTa1

WATER FACTOR

1.2

SCALE

10

OHMS PER 1

INCHES

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Density

SCALE

2.57

LOGGING SPEED

20

FROM

TO

TOTAL

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SELF POTENTIAL

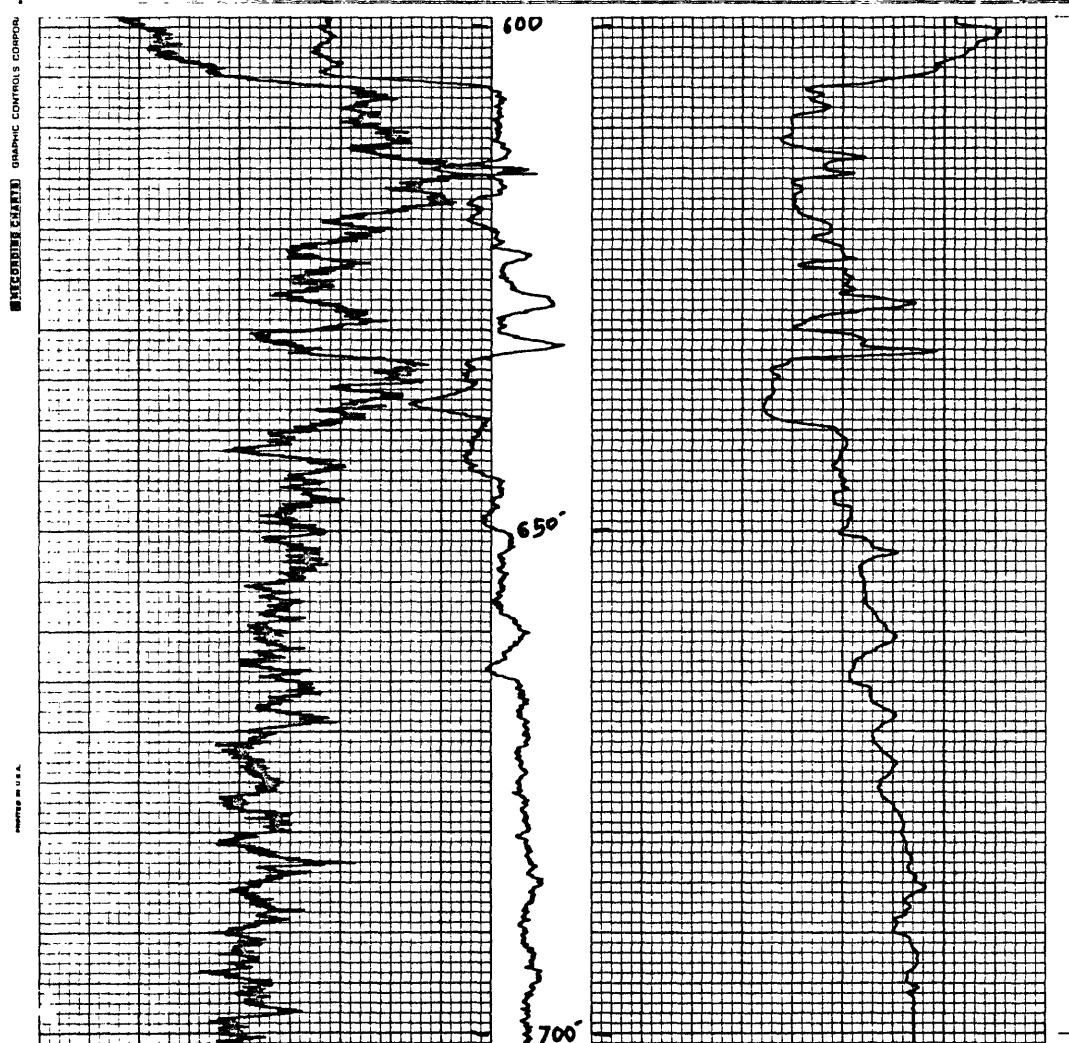
NATURAL GAMMA RAY

COUNTS PER SECOND

DENSITY

RESISTANCE

OHMS





Century Geophysical Corporation
Denver, Colo.

C 366 E SP 117488

COMPANY CSMRS

WELL NO. Y1-A

AREA Yampa Valley

COUNTY Moffat

SECTION

STATE Colo

RANGE LOG MEASURED FROM Surface

DATE 9-27-75

WELL NO. Y1-A

SEC TWP

Yampa Valley

COUNTY Moffat

STATE Colo

COMPANY CSMRS

DATE 9-27-75

TOTAL FOOTAGE LOGGED 1090

TD DRILLED 1117

BIT SIZE 6 5/8

WELL MOLE FLUID 42

DENSITY 4.0

VISCOSITY

RESISTIVITY

OPERATOR Hollander

UNIT NO. 7528

LOCATION Crag

DRIVE 0.0

STAND BY 2.7

LOGGING 1.7

TOTAL 4.4

ROUNDTRIP

MILEAGE

CHARGEABLE

STANDBY

Miles

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INITIAL RUN 1090

GAMMA SCALE 10

TIME CONSTANT 2

LOGGING SPEED 20

LOGGING SPEED 20

LOGGING SPEED 20

LOGGING SPEED 20

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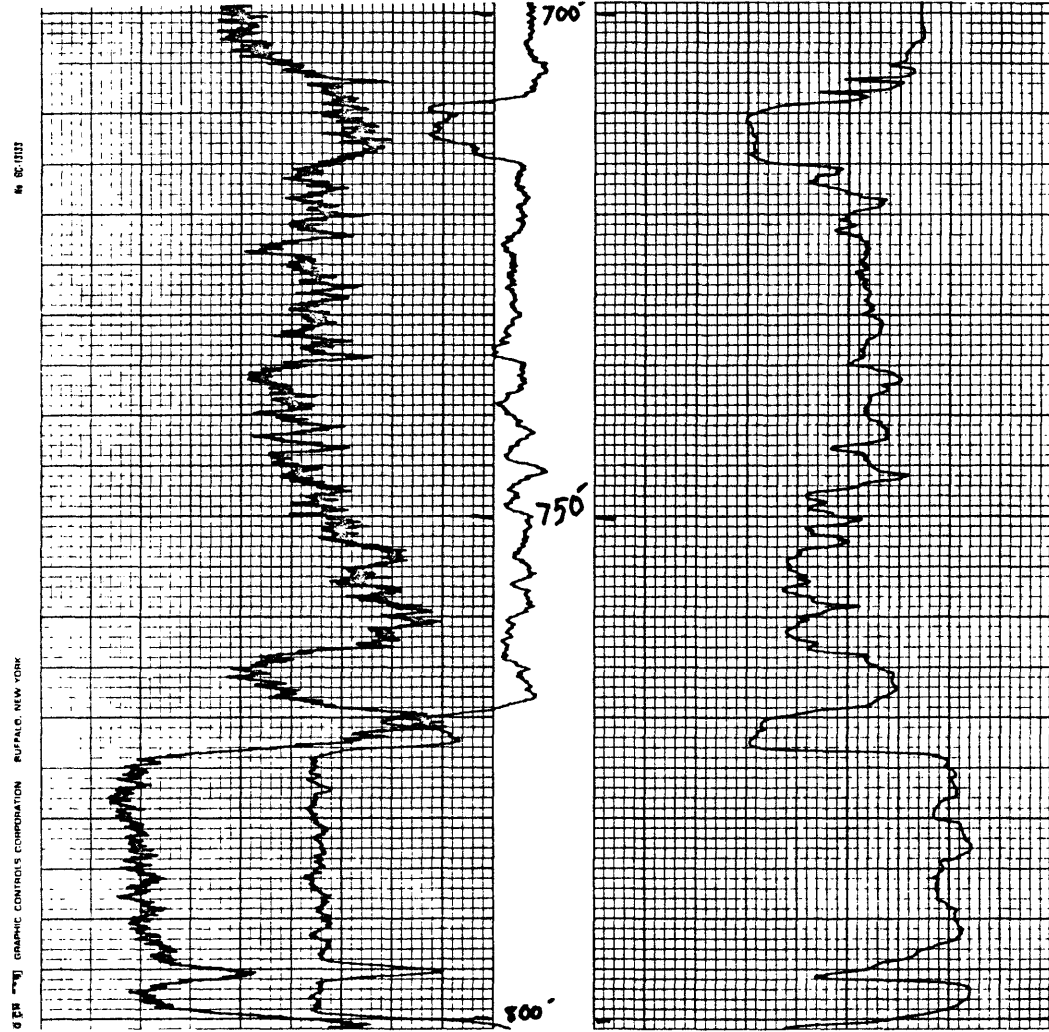
LOGGING SPEED 20


SELF POTENTIAL

NATURAL GAMMA RAY
COUNTS PER SECOND

DENSITY

RESISTANCE
OHMS



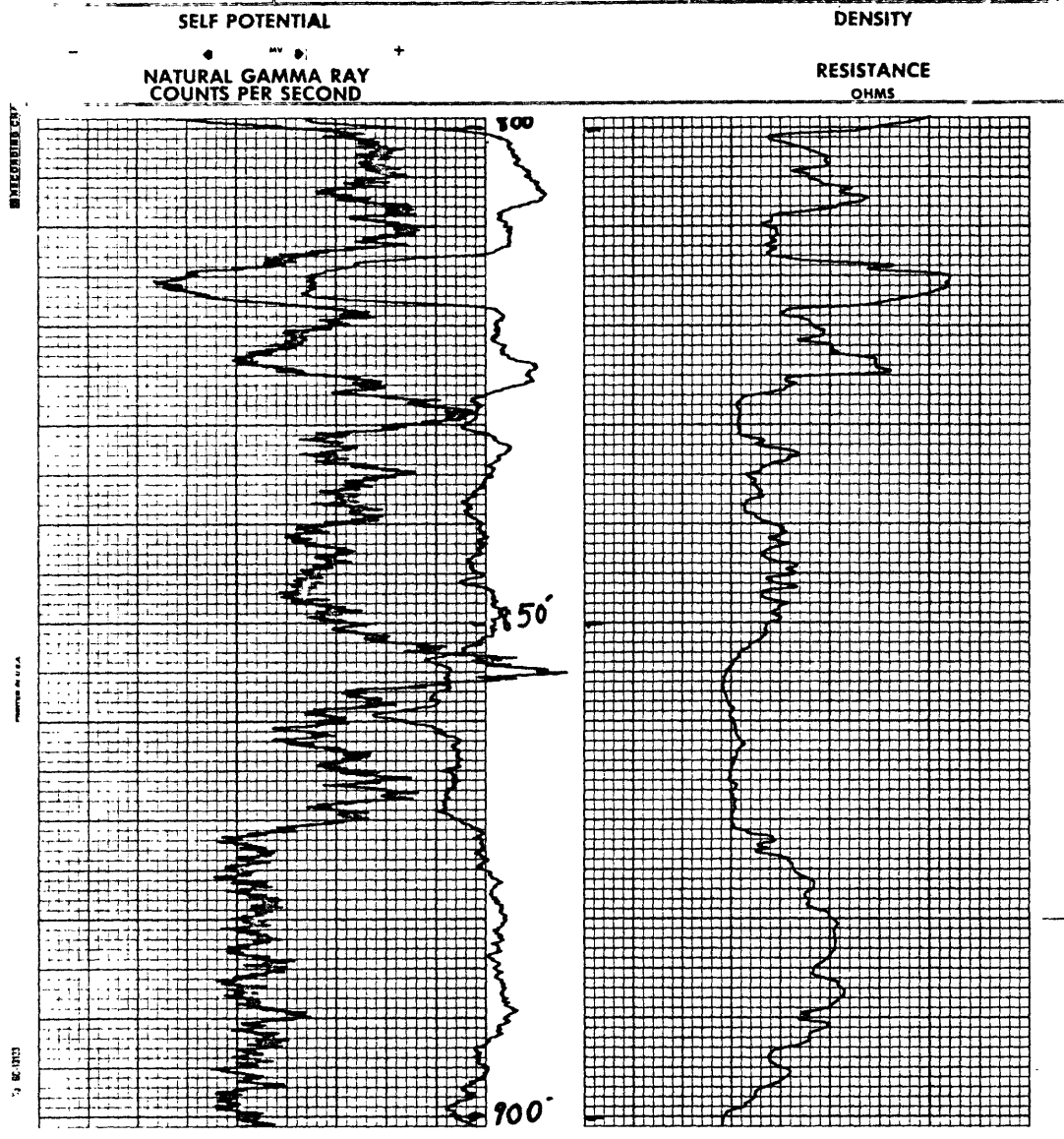


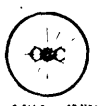
Century Geophysical Corporation
Denver, Colo.

HOLE NO. Y1-A		T.S. SHELLER 1117	
DATE 9-27-75	ALTA Yampa Valley	DAY HRS 5:45	CARDS 42
COUNTY Moffat		BORE HOLE FLUID 45.0	
STATE Colo		DENSITY 1.7	
COMPANY CSMRI		OPERATOR Hollander	
TOTAL FOOTAGE LOGGED 1090		LOCATION Crags	

INITIAL RUN **Density**

TO LOGGED 1090	SCALE 2.5	LOGGING SPEED 20	TIME CONSTANT 2	LOGGING SPEED 20	TIME CONSTANT 2
SOURCE VALUE 44961		PROBABLE 157		TYPE & SIZE 7/8" x 1/4"	
WATER FACTOR 1.0		AIR FACTOR 1.0		E FACTOR 1.59 x 10⁻⁵	





Century Geophysical Corporation
Denver, Colo.

C 346-1 SP 117488

COMPANY **CSMRI**
BORE HOLE **YI-A**
AREA **Yampa Valley**
COUNTY **Moffat**
SECTION _____

DATE **9-27-75**

WELL NO. **YI-A**
FAC _____ TOP _____ RANGE _____
AREA **Yampa Valley**
COUNTY **Moffat**
STATE **Colo**
COMPANY **CSMRI**
DATE **9-27-75**
TOTAL FOOTAGE LOGGED **1090**

TD DRILLED **1117**
BIT SIZE **5 5/8** IN CASING **42**
BORE HOLE FLUID **H₂O**
DENSITY _____ VISCOSITY _____
SENSITIVITY _____
OPERATOR **Hollander**
WELL NO. **7528**
LOCATION **Craig**

INITIAL RUN
TD LOGGED **1090**
GAMMA SCALE **10**
TIME CONSTANT **2**
CALIBRATION & PROBE DATA

Density			GAMMA RAY			DRIVE		
SCALE			Initial run off-scale			TIME IN		
T.C.	LOGGING SPEED	FROM	T.C.	LOGGING SPEED	FROM	STAND BY	TIME OUT	
5	20					2.7	1812	
						4.4		
TOTAL			TOTAL			CHARGEABLE		
						STANDBY		

SOURCE NO **A453**
SOURCE VALUE **4.961**
PROBE SIZE **15/8**
TYPE & SIZE **7/8 x 1/4**
T.C. FACTOR **1.59 x 10⁵**
AIR FACTOR **1.0**
WATER FACTOR **1.2**
P'S SCALE **10** ohms per 1 inch

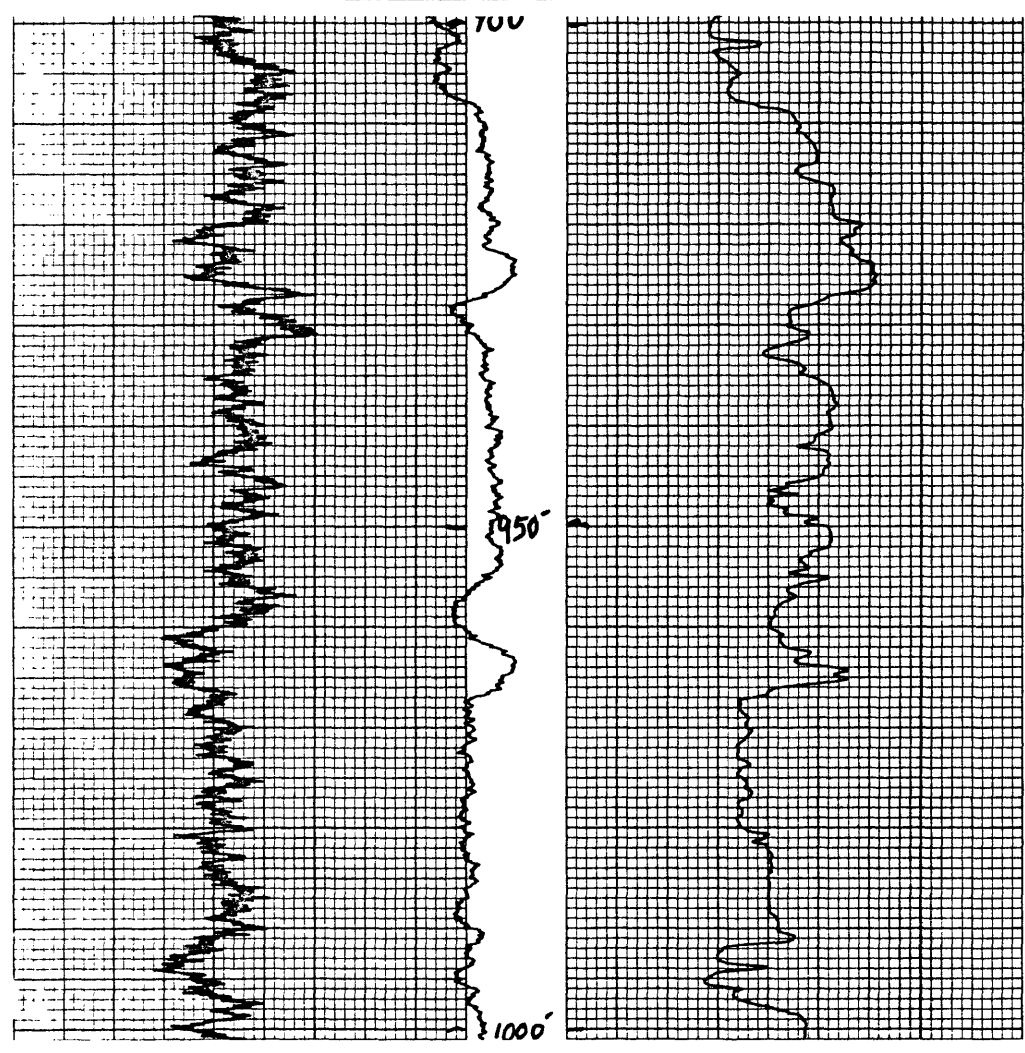
SELF POTENTIAL

DENSITY

NATURAL GAMMA RAY
COUNTS PER SECOND

RESISTANCE
OHMS

RECORDING CHARTS GRAPHIC CONTROLS CORPORATION BUFFALO, NEW YORK





Century Geophysical Corporation
Denver, Colo.

C 366-E SP 117488

COMPANY

BORE HOLE

AREA

COUNTY

SECTION

CSMRI

YI-A

Yampa Valley

Moffat

Colo

TOWNSHIP

RANGE

LOG MEASURED FROM
Surface

HOLE NO.
YI-A

SEC

TWP

RANGE

TO DRILLED
1117

MIT SILL
547

CASING
42

AREA
Yampa Valley

COUNTY
Moffat

STATE
Colo

COMPANY
CSMRI

DATE
9-27-75

TOTAL FOOTAGE LOGGED
1090

BORE HOLE FLUID
420

DENSITY

VISCOSITY

RESISTIVITY

OPERATOR
Hollander

UNIT NO.
7525

LOCATION
Craig

DRIVE
0.0

TIME IN
1630

STAND BY
2.7

TIME OUT
1812

TD LOGGED
1090

GAMMA SCALE

TIME CONSTANT
2

CALIBRATION & PROBE DATA

SOURCE NO.
A453

MODEL NO.
8010-101

DETECTOR
8020-48

DEAD TIME
0.0

WATER FACTOR
1.2

PUL SCALE

10 ohms per 1 inch

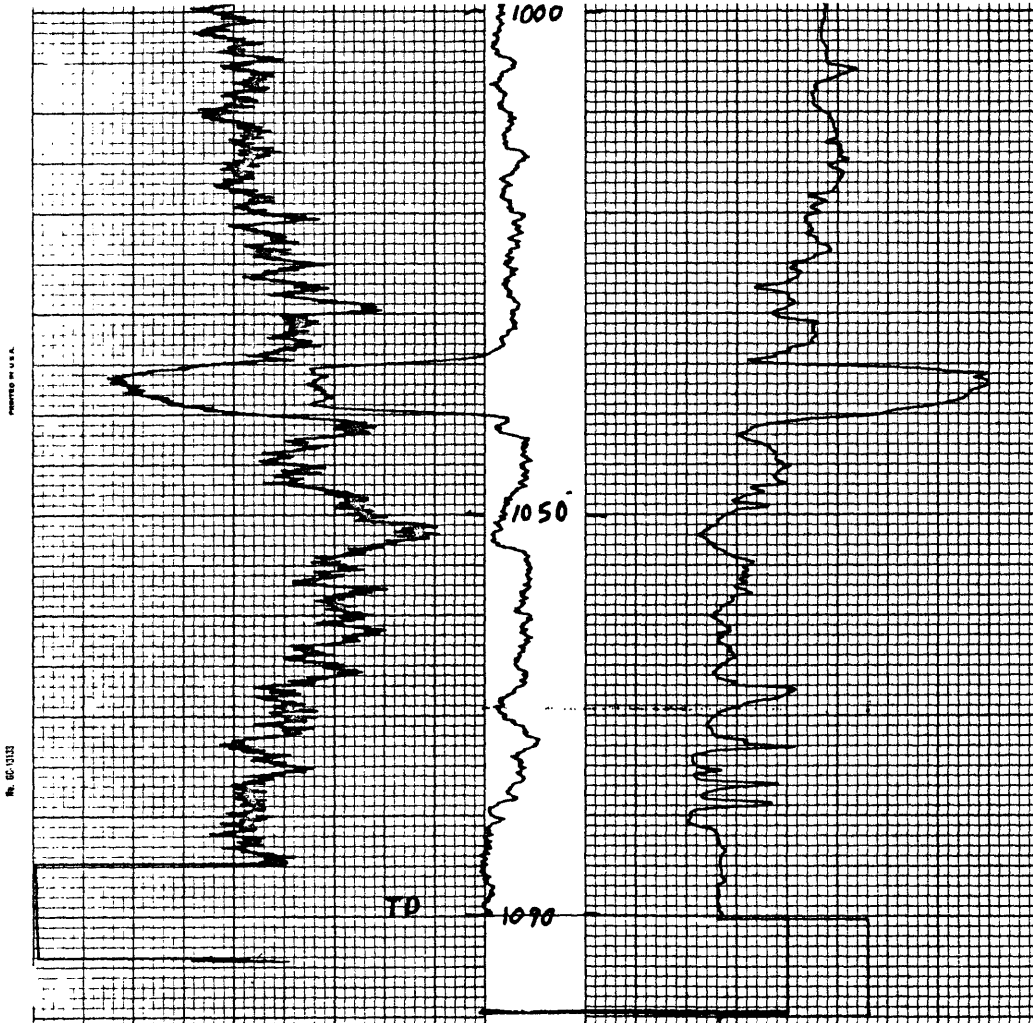
10 ohms per 1 inch

SELF POTENTIAL

DENSITY

NATURAL GAMMA RAY
COUNTS PER SECOND

RESISTANCE
OHMS





Century Geophysical Corporation
Denver, Colo.

C 344 E SP 117488

COMPANY CSMRI

BORE HOLE YI-A

AREA Yampa Valley

COUNTY Moffat

SECTION TOWNSHIP

STATE Colo

DATE 9-27-75

LOG MEASURED FROM Surface

HOLE NO YI-A

SEC TWP RANGE

AREA Yampa Valley

COUNTY Moffat

STATE Colo

COMPANY CSMRI

DATE 9-27-75

TOTAL FOOTAGE LOGGED 1090

LOG DRILLED 1117

BIT SIZE 5 7/8

CASING 42

BORE HOLE FLUID 420

DENSITY

VISCOSITY

RESISTIVITY

OPERATOR Hollander

UNIT NO 7528

LOCATION Camp

DRIVE 0.0

STAND BY 2.7

LOGGING SPEED 1.7

TOTAL 4.4

ROUNDTRIP MILEAGE

CHARGEABLE STANDSTBY

TIME IN 1630

TIME OUT 1812

INITIAL RUN
TO LOGGED 1090
GAMMA SCALE 10
TIME CONSTANT 2
CALIBRATION & PROBE DATA
SOURCE NO A453
SOURCE VALUE 4761
DEAD TIME 0.0
WATER FACTOR 1.2
F'S SCALE 10

Density

SCALE 2.5

TC 1.5

FROM

TO

TOTAL

GAMMA BEAMS

Initial run offset

SCALE

TC

FROM

TO

TOTAL

SCALE

TC

FROM

TO

TOTAL

SCALE

TC

FROM

TO

TOTAL

SELF POTENTIAL

NATURAL GAMMA RAY
COUNTS PER SECOND

DENSITY

RESISTANCE
OHMS

RECORDING CHARTS GRAPHIC CONTROLS CORPORATION BUFFALO, NEW YORK

GAMMA RAY CPS/IN
TC 2 20 CPS/IN

DENSITY

YI-A

RESISTANCE
TC 5

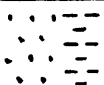





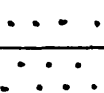
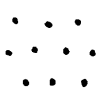
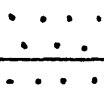
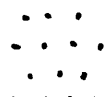
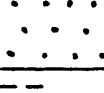
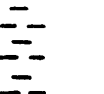
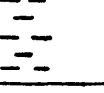

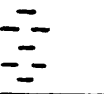
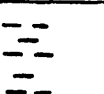
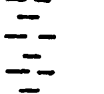
RES 10 OHMS/IN

Project No. H50146

 Hole No. Y-2 Elev. 6558' Total Depth 1380' Location SW 1/4, NE 1/4, NW 1/4, SW 1/4, SEC 21, T8N, R93W

 Date 11-03-75

 County MOFFAT State COLO Sponsor USGS Drilling Co. IRON CLAD Property BLM Geologist SC. MULLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL			
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed.	Meta.	Ign.	Most abund.	TOTAL %	Vitrain	Clasrain
OVERBURDEN ↑ 0 10 20 30 40 50 60 70 80		ALLUVIUM - SANDY CLAY, YELLOW-BROWN, OXIDIZED	x	x				x	med	50			50										
		CLYST, YELLOW-BROWN w/ CLYST RED-PURPLE BENT, INTBD											100										
		"											100										
		"											100										
		"											100										
		SS, LT YELLOW-BROWN	x	x				x	med	98	2												
		"	x	x				x	med	98	2												
		"	x	x				x	med	98	2												
		"	x	x				x	med	98	2												
		"	x	x				x	med	98	2												
		"	x	x				x	med	98	2												
		CLYST, WHITE-LT GREY											100										
		"											100										
		"											100										
		"											100										
		"											100										
	"											100											

Project No. H50196

 Hole No. 42 Elev. 6558' Total Depth 1380' Location SW 1/4, NE 1/4, NW 1/4, SW 1/4, SEC 21, T8N, R93W Date 11-03-75

 County MOFFAT State COLORADO Sponsor USGS Drilling Co. IRAN CLAD Property BLM Geologist J.C. Muehl

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING			SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL				
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0	Angular	Subangular	Subrounded		Rounded	Quartz	Feldspar	Mafic	Clay	Pyrite	Others	TOTAL %	Sed.	Meta.	Ign.	Most abund.	TOTAL %	Vitrinite	Clarinite
80		CLYST, WHITE-LT GREY																								
		"																								
90																										
		"																								
		"																								
100		"																								
		"																								
		"																								
		"																								
		"																								
110		"																								
		"																								
		"																								
		"																								
		"																								
120		SS, LT GREY (CGL ?)	x	x	x	x		x	POOR	60	25	10				5	x			CHT						
		"	x	x	x	x		x	POOR	60	25	10				5	x			CHT						
		"	x	x	x	x		x	POOR	60	25	10				5	x			CHT						
130		"	x	x	x	x		x	POOR	60	25	10				5	x			CHT						
		"	x	x	x	x		x	POOR	60	25	10				5	x			CHT						
140		CLYST, LT GREY, SANDY	x	x				x	MLD	20	10	70														
		"	x	x				x	MLD	20	10	70														
150		SS, LT GREY, (CONG ?)	x	x	x			x	POOR	60	25	10				5	x			CHT						
		"	x	x	x			x	POOR	60	25	10				5	x			CHT						
160			"	x	x	x		x	POOR	60	25	10				5	x			CHT						

Project No. H50146EXHIBIT 2 LITHOLOGIC LOGDate 11-03-75Hole No. Y-2 Elev. 6558' Total Depth 1380' Location SW 1/4, NE 1/4, NW 1/4, SW 1/4, SEC 21, T8N, R93W Property BLMCounty MOFFAT State COLO Sponsor USGS Drilling Co. IRON CAD Geologist S.C. MILLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL			
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed. Meta. Ign.	Most abund.	TOTAL %	Vitrain	Clarain	Durain	Fusain
160		SS, LT GREY, (CGL?)	x	x				x	POOR	75	15	10				5	x	CHT					
		"	x	x				x	POOR	75	15	10				5	x	CHT					
170		"	x	x				x	POOR	60	25	10				5	x	CHT					
		SS, LT GREY	x	x				x	MED	60	25	10				5	x	CHT					
180		"	x	x				x	MED	60	25	10				5	x	CHT					
		"	x	x				x	MED	60	25	10				5	x	CHT					
190		CLYST, LT GREY w/ SS LT GREY INTBD	x	x				x	MED	40	15	35											
		"	x	x				x	MED	40	15	35											
200		"	x	x				x	MED	40	15	35											
		SS, LT GREY, CGL	x	x	x			x	POOR		15	5				15		CHT					
		"	x	x	x			x	POOR	55	?	16	5			15		CHT					
210		"	x	x	x			x	POOR	55	?	16	5			15		CHT					
		"	x	x	x			x	POOR	55	?	15	5			15		CHT					
220		"	x	x	x			x	POOR	55	?	15	5			15		CHT					
		"	x	x	x			x	POOR	55	?	15	5			15		CHT					
230		"	x	x	x			x	POOR	55	?	15	5			15		CHT					
		"	x	x	x			x	POOR	55	?	15	5			15		CHT					
240		"	x	x	x			x	POOR	55	?	15	5			15		CHT					

Project No. H50196 Date 11-03-75
 Hole No. Y-2 Elev. 6558' Total Depth 1380' Location SW 1/4, NE 1/4, NW 1/4, SEC 21, T8N, R93W Property BLM
 County MOFFAT State COLO Sponsor USGS Drilling Co. TRCA CLAD Geologist SC. MUESSA

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING				SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL				
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0	Angular	Subangular	Subrounded	Rounded		Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed.	Meta.	Ign.	Most abund.	TOTAL %	Vitrain	Clarain	Durain
240		CLYST, BLUE-GREY-PURPLE, BENT																									
		"																									
250		"																									
		"																									
260		"																									
		"																									
270		"																									
		"																									
280		"																									
		"																									
290		"																									
		"																									
300		SH, BLUE GREY W/ SH, DIL GREY, CARB INTBD																									
		"																									
310		"																									
		"																									
320		"																									

Project No. H50146

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE

EXHIBIT 2 LITHOLOGIC LOGDate 11-03-75Hole No. V-2 Elev. 6558' Total Depth 1380' Location SW 1/4, NE 1/4, NW 1/4, SEC 21, T8N, R93W Property BLMCounty MOFFAT State COLORADO Sponsor USGS Drilling Co. IRON CLAD Geologist S.C. MULLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL			
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed. Meta. Ign.	Most abund.	TOTAL %	Vitrain	Clarain	Durain	Fusain
320		SH, BLUE-GREY w/ SH, DK GREY, CARB INTBD											95						5				x
		"											95						5				x
330		"											95						5				x
		SH, DK GREY, CARB											80						20				x
340		SH, BLUE-GREY w/ SH, DK GREY, CARB INTBD											95						5				x
		SH, DK GREY, CARB											85						15				x
350		SH, BLUE-GREY w/ SH, DK GREY, CARB INTBD											95						5				x
		"											95						5				x
360		"											95						5				x
		"											95						5				x
370		"											95						5				x
		"											95						5				x
380		"											95						5				x
		"											95						5				x
390		"											95						5				x
		"											95						5				x
400		"											95						5				x

Project No. H5046 COLORADO SCHOOL OF MINES RESEARCH INSTITUTE
 EXHIBIT 2 LITHOLOGIC LOG
 Date 11-03-75
 Hole No. Y-2 Elev. 6538' Total Depth 1360' Location SW 1/4, NE 1/4, NW 1/4, SW 1/4, SEC 21, T8N, R93W Property BLM
 County MOFFAT State COLORADO Sponsor USGS Drilling Co. IRON CLAD Geologist J.C. MULLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL			
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed. Meta. Ign.	Most abund.	TOTAL %	Vitrain	Clarain	Durain	Fusain
900		SH, BLUE-GRAY w/ SH, DK GREY, CARB INTBD											95						5				x
		"											95						5				x
910													95						5				x
		"											95						5				x
920													95						5				x
		"											95						5				x
930													95						5				x
		"											95						5				x
940		SS, GREY, SILTY	x	x				x	med	60	15	25											
		"	x	x				x	med	60	15	25											
950			x	x				x	med	60	15	25											
		SH, BLUE-GRAY w/ SH, DK GREY, CARB INTBD																					
960		"																					
		"																					
970		SH, DK GREY, CARB																					
		"																					
980																							

Project No. H50196 COLORADO SCHOOL OF MINES RESEARCH INSTITUTE
 EXHIBIT 2 LITHOLOGIC LOG Date 11-03-75
 Hole No. Y-2 Elev. 6558' Total Depth 1380' Location SW 1/4, NE 1/4, NW 1/4, SW 1/4, SEC 21, T8N, R13E Property BLM
 County MOFFAT State COLO Sponsor USGS Drilling Co. IRON CLAD Geologist J.C. MULLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING		SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL						
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0	Angular	Subangular		Subrounded	Rounded	Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed.	Meta.	Ign.	Most abund.	TOTAL %	Vitrain	Clarain	Durain
480	" " " "	SLTST, GREY w/ SH, DK GREY INTBD	x						x	well	25		15	60													
	" " " "	" "	x						x	well	25		15	60													
490	" " " "		x						x	well	25		15	60													
	" " " "	" "	x						x	well	25		15	60													
500	" " " "		x						x	well	25		15	60													
	" " " "	" "	x						x	well	25		15	60													
510	" " " "	SH, DK GREY, (CARB?)												100									?				
	" " " "	" "												100									?				
520	" " " "	SS, GREY, SILTY	x	x					x	med	60		15	25													
	" " " "	" "	x	x					x	med	60		15	25													
530	" " " "	SH, DK GREY, (CARB?)												100									?				
	" " " "	SS, GREY, SILTY	x	x					x	med	60		15	25													
540	" " " "	" "	x	x					x	med	60		15	25													
	" " " "	" "	x	x					x	med	65		15	20													
550	" " " "	" "	x	x					x	med	65		15	20													
	" " " "	" "	x	x					x	med	60		15	25													
560	" " " "	" "	x	x					x	med	60		15	25													

Project No. H50146 COLORADO SCHOOL OF MINES RESEARCH INSTITUTE
 EXHIBIT 2 LITHOLOGIC LOG
 Hole No. Y-2 Elev. 6558' Total Depth 1380' Location SW 1/4, NE 1/4, NW 1/4, SW 1/4, SEC 21, TEN, R3W Date 11-03-75
 County MOFFAT State COLORADO Sponsor USGS Drilling Co. IRON CLAD Property BLM
 Geologist J.C. MALLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL				
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed. Meta. Ign.	Most abund.	TOTAL %	Vitrinite	Clarinite	Durane	Fusain	
580		SS, GRAY, SILTY	x	x				x	med	60	15	25												
		" "	x	x				x	med	60	15	25												
570			x	x				x	med	60	15	25												
		" "	x	x				x	med	60	15	25												
580		SH, DK GRAY w/ SS, GRAY INTBD																						
		" "																						
590																								
		" "																						
600																								
		" "																						
610		" "																						
		SS, S&P-LT GRAY	x					x	well	75	15	10												
620		" "	x					x	well	75	15	10												
			x					x	well	75	15	10												
630			x					x	well	70	20	10												
		" "	x					x	well	65	25	10												
640			x					x	well	60	30	10												

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE
EXHIBIT 2 LITHOLOGIC LOG

Project No. H50146 Date 11-03-75
 Hole No. Y-2 Elev. 6558' Total Depth 1380' Location SW 1/4, NE 1/4, NW 1/4, SEC 21 T8N R93W Property BLM
 County MOFFAT State COLORADO Sponsor USGS Drilling Co. IRON CLAD Geologist J.C. MULLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL			
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafica	Clay	Pyrite	Others	TOTAL %	Sed. Meta. Ign.	Most abund.	TOTAL %	Vitrain	Clarain	Durain	Fusain
640		SH, DK GREY, CARB & SANDY	x					x	med 25				65						10				x
		COAL											6	1					93				x
650		"											6	1					93				x
		SH, DK GREY, SANDY	x					x		25			70						5				x
		" "	x					x		25			70						5				x
660		" "	x					x		25			70						5				x
		" "	x					x		25			70						5				x
670		" "	x					x		25			70						5				x
		SH, DK GREY, CARB											80						20				x
		SS, LT GREY - LT BROWN	x					x	well	70		20	5										
680		" "	x					x	well	70		20	5										
		" "	x					x	well	70		20	5										
690		" "	x					x	well	70		20	5										
		" "	x					x	well	70		20	5										
700		" "	x					x	well	70		20	5										
		" "	x					x	well	70		20	5										
710		" "	x					x	well	70		20	5										
		SH, DK GREY, CARB & SANDY																					
720																							

Project No. H50146 COLORADO SCHOOL OF MINES RESEARCH INSTITUTE
 EXHIBIT 2 LITHOLOGIC LOG
 Hole No. Y-2 Elev. 6538' Total Depth 1380' Location SW 1/4 NE 1/4 NW 1/4, Sec 21 T8N R23W Date 11-03-75
 County MOFFAT State COLORADO Sponsor USGS Drilling Co. IRON CLAD Property BLM
 Geologist S.C. MILLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING Angular Subangular Subrounded Rounded	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL						
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed. Meta. Ign.	Most abund.	TOTAL %	Vitrain	Clarain	Barren	Fusain			
720		SH, DK GREY, CARB & SANDY	x					x	Well	25	10	65														
		"	x						x	Well	25	10	65													
730		"	x						x	Well	25	10	65													
		"	x						x	Well	25	10	65													
740		"	x						x	Well	25	10	65													
		"	x						x	Well	25	10	65													
750		"	x						x	Well	25	10	65													
		"	x						x	Well	25	10	65													
760		"	x						x	Well	35	15	50													
		"	x						x	Well	35	15	50													
770		"	x						x	Well	30	10	60													
		"	x						x	Well	30	10	60													
780		SS, S&P - LT GREY	x						x	Well	70	20										10			x	
		"	x							x	Well	70	20									10			x	
790		"	x						x	Well	70	20										10			x	
		"	x							x	Well	70	20									10			x	
800		"	x						x	Well	70	20										10			x	

Project No. H50196

 Date 11-03-75

 Hole No. 4-2 Elev. 6558' Total Depth 1380' Location SW 1/4, NE 1/4, NW 1/4, SW 1/4, SEC 21, T8N, R93N Property BLM




















 County MOFFAT State COLORADO Sponsor USGS Drilling Co. IRON CLAD Geologist S.C. Munn

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL			
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed.	Meta.	Ign.	Most abund.	TOTAL %	Vitrinite	Clarinite
800		SS, S & P - LT GRAY	x					x	well	70		20							10				x
		" "	x					x	well	70		20							10				x
810			x					x	well	70		20							10				x
		" "	x					x	well	70		20							10				x
820		" "	x					x	well	70		20							10				x
		SH, DK GRAY, CARB	x					x	well	70		20							10				x
												85							15				x
		SH, GRAY										100											
830												100											
		"										100											
840												100											
		"										100											
850												100											
		"										100											
860												100											
		"										100											
870		SLTST, GRAY	x	x				x	med	25	10	65											
		"	x	x				x	med	25	10	65											
880			x	x				x	med	25	10	65											

Project No. H50196

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE

EXHIBIT 2 LITHOLOGIC LOGDate 11-03-75Hole No. Y-2 Elev. 6550' Total Depth 1380' Location SW 1/4, NE 1/4, NW 1/4, SW 1/4, SEC 21, T8N, R93WProperty BLMCounty MOFFAT State COLORADO Sponsor USGS Drilling Co. IRON CLADGeologist J.C. MULLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING			SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL				
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0	Angular	Subangular	Subrounded		Rounded	Quartz	Feldspar	Mafica	Clay	Pyrite	Others	TOTAL %	Sed.	Meta.	Ign.	Most abund.	TOTAL %	Vitrain	Clarain
880	SLTST, GRAY w/ SH, DK GRAY, CARB(?) INTBD	x	x					x	MSD	20		5	65									10			x
	"	x	x					x	MSD	20		5	65									10			x
890	"	x	x					x	MSD	20		5	65									10			x
		COAL												5	1								94	x		
		"												5	1								94	x		
900		"												5	1								94	x		
		"												5	1								94	x		
910		SH, DK GRAY w/ COAL CLASTS												80									20			x
		"												80									20			x
920		COAL w/ SH, DK GRAY, CARB INTBD												45									55	x		x
		SH, DK GRAY												95									5			x
		"												95									5			x
930		"												95									5			x
		"												95									5			x
		COAL												40									60	x		x
		SH, DK GRAY												95									5			x
940		"												95									5			x
		"												95									5			x
		SS, LT GRAY-SP	x						x	WELL	60		25	10									5			x
950		"	x						x	WELL	60		25	10									5			x
		"	x						x	WELL	60		25	10									5			x
960		"	x						x	WELL	60		25	10									5			x

Project No. H50146

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE

EXHIBIT 2 LITHOLOGIC LOGDate 11-03-75Hole No. Y-2 Elev. 6558' Total Depth 1380' Location SW 1/4, NE 1/4 NW 1/4, SW 1/4, SEC 21, T8N, R13N Property BLMCounty MOFFAT State COLO Sponsor USGS Drilling Co. IRON CLAD Geologist S.C. Murrell

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)				ROUND-ING		SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL					
			.06-.25	.25-.5	.5-1.0	>1.0	Angular	Subangular		Subrounded	Rounded	Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed.	Meta.	Ign.	Most abund.	TOTAL %	Vitrain	Clarain
960		Ss, 5' A - LT GREY	x					x		well	60	20	10								10				x
		" "	x					x		well	60	20	10								10				x
970			x					x		well	60	20	10								10				x
		" "	x					x		well	60	20	10								10				x
980			x					x		well	60	20	10								10				x
		" "	x					x		well	60	20	10								10				x
990		SLTST, GREY, SANDY	x					x		well	45	10	35								10				x
		" "	x					x		well	45	10	35								10				x
1000		SH, GREY, SANDY	x					x		well	25	10	65												
		" "	x					x		well	25	10	65												
1010			x					x		well	25	10	65												
		" "	x					x		well	25	10	65												
1020			x					x		well	25	10	65												
		" "	x					x		well	25	10	65												
1030			x					x		well	25	10	65												
		" "	x					x		well	25	10	65												
1040		SH, DK GREY, CARB											80								20				x

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE

EXHIBIT 2 LITHOLOGIC LOG

Project No. H50146

Date 11-03-75

Hole No. Y-2 Elev. 6558' Total Depth 1380'

Location SW 1/4, NE 1/4, NW 1/4, SW 1/4, SEC 21, T8N, R93W Property BLM

County MOFFAT State COLO

Sponsor USGS

Drilling Co. IRON CLAD

Geologist S.C. Mueller

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUNDING			SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE							ROCK FRAGMENTS				COAL				
			.0025-.125	.125-.25	.25-.5	.5-1.0	>1.0	Angular	Subangular	Subrounded	Rounded	Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed.	Meta.	Ign.	Most abund.	TOTAL %	Vitrain	Clarain	Durain	Fusain
1040		SH, GREY, SANDY	X							X	Well	25		10	60								5				X
		" "	X							X	Well	25		10	60								5				X
1050		" "	X							X	Well	25		10	60								5				X
		" "	X							X	Well	25		10	60								5				X
1060		COAL													5	1							94	X			X
		"													5	1							94	X			X
		SS, GREY, SILTY, CARB(?)	X							X	Well	50		15	25								10				X
1070		" "	X							X	Well	50		15	25								10				X
		" "	X							X	Well	50		15	25								10				X
1080		SS, S&P - LT GREY	X							X	Well	75		15	5								5				X
		" "	X							X	Well	75		15	5								5				X
1090		" "	X							X	Well	75		15	5								5				X
		" "	X							X	Well	75		15	5								5				X
1100		" "	X							X	Well	75		15	5								5				X
		" "	X							X	Well	75		15	5								5				X
1110		" "	X							X	Well	75		15	5								5				X
		" "	X							X	Well	75		15	5								5				X
1120		SH, DK GREY, CARB																									

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE

EXHIBIT 2 LITHOLOGIC LOG

 Project No. H50146

 Date 11-03-75

 Hole No. 1-2 Elev. 6558 Total Depth 1380' Location SW 1/4, NE 1/4, NW 1/4, SEC 21, T8N, R93W Property BLM

 County MOFFAT State COLO Sponsor USGS Drilling Co. IRON CLAD Geologist S.C. MULLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING			SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL						
			.06-.25	.25-.125	.125-.25	.25-.5	.5-1.0	>1.0	Angular	Subangular		Subrounded	Rounded	Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed.	Meta.	Ign.	Most abund.	TOTAL %	Vitrain	Clarain	Durain
1120		SH, DK GREY - PURPLE															95							5				X
		" "	X							X			5				90							5				X
1130			X							X			5				90							5				X
		" "	X							X			5				90							5				X
1140			X							X			5				90							5				X
		" "	X							X			5				90							5				X
1150																	95							5				X
		" "															95							5				X
1160																	95							5				X
		" "															95							5				X
1170																	95							5				X
		" "															95							5				X
1180																	90							10	X			X
		" "															95							5				X
1190																	95							5				X
		" "															95							5				X
1200																	95							5				X

Project No. H50146

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE

EXHIBIT 2 LITHOLOGIC LOGDate 11-03-75Hole No. Y-2 Elev. 6558' Total Depth 1380' Location SW 1/4, NE 1/4, NW 1/4, SEC 21, T8N, R93W Property BLMCounty MOFFAT State COLO Sponsor USGS Drilling Co. IRON CLAD Geologist S.C. MULLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL					
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed.	Meta.	Ign.	Most abund.	TOTAL %	Vitrain	Clarain	Durain	Fusain
1200		SH, DK GREY - PURPLE																				5			x
		" "																				5			x
1210		" "																				5			x
		COAL																				90	x		x
1220		SS, GREY, CARB(?)	x					x	well	75	15											10			x
		SH, GREY																				5			x
		" "																				5			x
1230		SS, DK GREY, CARB(?)	x	x		x		x	Poor	60	10	20										10			x
		" "	x	x		x		x	Poor	60	10	20										10			x
1240		" "	x	x		x		x	Poor	60	10	20										10			x
		" "	x			x		x	Poor	60	10	20										10			x
1250		" "	x			x		x	Poor	60	10	20										10			x
		SH, DK GREY, CARB w/ COAL INTBD																				50	x		x
		" "																				50	x		x
1260		SH, DK GREY w/ SS, LT GREY-SS P INTBD	x					x		40	10	50													
		" "	x					x		40	10	50													
1270		" "	x					x		40	10	50													
		" "	x					x		40	10	50													
1280		" "	x					x		40	10	50													

Project No. H50146 COLORADO SCHOOL OF MINES RESEARCH INSTITUTE
 EXHIBIT 2 LITHOLOGIC LOG
 Date 11-03-75
 Hole No. Y-2 Elev. 6558' Total Depth 1380' Location SW 1/4 NE 1/4 NW 1/4 SEC 21 T8N R13W Property BLM
 County MOFFAT State COLORADO Sponsor USGS Drilling Co. IRON CLAD Geologist S.C. Munn

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING Angular Subangular Subrounded Rounded	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL				
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafice	Clay	Pyrite	Others	TOTAL %	Sed. Meta. Ign.	Most abund.	TOTAL %	Vitrain	Clarain	Durain		
1280		SH, DK GRAY w/ SS, LT GRAY-SS & P INTBD	x					x	Well	40	10	50												
1290		"	x					x	Well	40	10	50												
1300		"	x					x	Well	40	10	50												
		"	x					x	Well	40	10	50												
1310		"	x					x	Well	40	10	50												
		"	x					x	Well	40	10	50												
1320		"	x					x	Well	40	10	50												
		"	x					x	Well	40	10	50												
1330		"	x					x	Well	40	10	50												
		"	x					x	Well	40	10	50												
1340		"	x					x	Well	40	10	50												
		"	x					x	Well	40	10	50												
1350		"	x					x	Well	40	10	50												
		"	x					x	Well	40	10	50												
1360		"	x					x	Well	40	10	50												

Project No. HSD/96 EXHIBIT 2 LITHOLOGIC LOG Date 11-03-75
Hole No. V-2 Elev. 6558' Total Depth 1380' Location SW 1/4 NE 1/4 NW 1/4 SEC 21, TEN, R93W Property BLM
County MOFFAT State COLORADO Sponsor USGS Drilling Co. IRON CLAD Geologist J.C. MULLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING			SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL								
			.06-.25	.25-.125	.125-.25	.25-.5	.5-1.0	>1.0	Angular	Subangular		Subrounded	Rounded	Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed.	Meta.	Ign.	Most abund.	TOTAL %	Vitrain	Clarain	Durain	Fusain	
1360 BASIL CONGLOMERATE OF FULFm? 1370 → 1380		SS, OR GREY w/ SS, LT GREY - SSP	x	x	x			x				x	POOR	40		10	50													
			x	x	x			x		x	POOR	40		10	50															
		CG, SANDY	x	x	x			x		x		x	POOR	40		35				25	x	x	x	Chr						
			x	x	x			x		x	POOR	40		35						25	x	x	x	Chr						
1390																														
1400																														
1410																														
1420																														
1430																														
1440																														

S&P 3 SP 317400		DATE 11-3-75		Yampa valley		SURFACE H20	
COMPANY CSMRE		COUNTY MOFFAT		STATE Colo		DENSITY	
BORE HOLE Y-2		STATE Colo		STATE Colo		VELOCITY	
AREA Yampa Valley		COUNTY MOFFAT		COMPANY CSMRE		DENSITY	
SECTION		TOWNSHIP		DATE 11-3-75		UNIT NO. 7528	
RANGE		LOG MEASURED FROM Surface		TOTAL FOOTAGE LOGGED 1125		LOCATION Camp	
INITIAL RUN		DENSITY		GRAMA FORMUS		DRIVE 0.7	
T & LOGGED 1125		SCALE 2.5K		Tactical run off-site.		TIME IN 1130	
GRAMA SCALE		T.C. 5		Cor. Per. In LOGGING SPEED		STAND BY 2.8	
TIME CONSTANT 2		FROM		Sec. 20		LOGGING 1.8	
CALIBRATION & PROBE DATA		TO		Pi / Min		TOTAL 5.3	
SOURCE NO. A453		TOTAL		Pi		EQUIPMENT 44	
SOURCE VALUE 4Mci		TOTAL		Pi		MISAGE	
PROBES 1578		TOTAL		Pi		CHARACTERABLE	
DETECTOR XTAL		TOTAL		Pi		STANDARD	
DEAD TIME 0.0		TOTAL		Pi		TIME OUT 1318	
WATER FACTOR 1.12		TOTAL		Pi		MISAGE	
RES SCALE		TOTAL		Pi		MISAGE	
CHARGE		TOTAL		Pi		MISAGE	
INSTRUMENT		TOTAL		Pi		MISAGE	

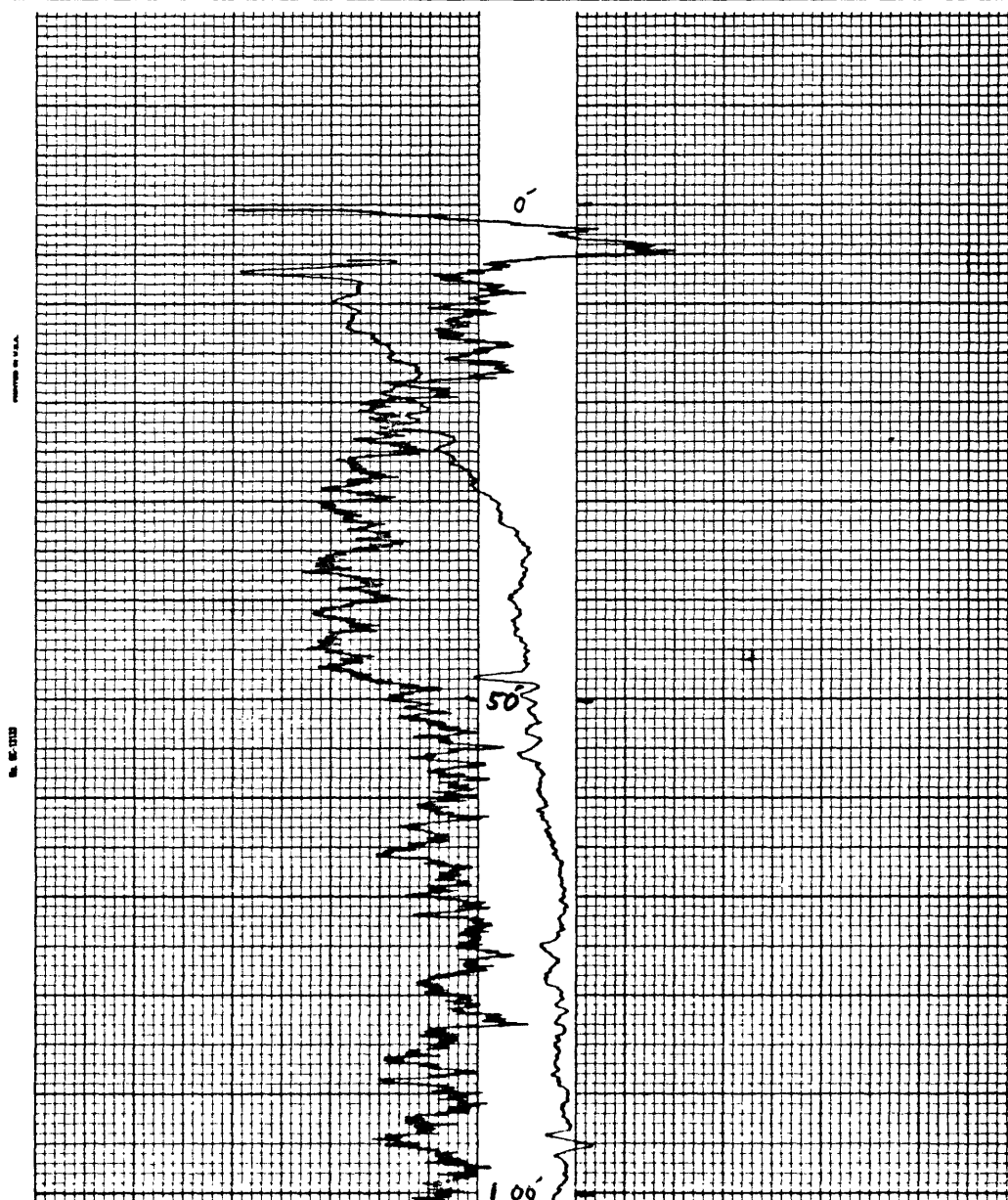
Hole bottomed at 1380'
 Base of Fort Union picked at 1372'
 No resistivity log due to malfunction

SELF POTENTIAL

DENSITY

NATURAL GAMMA RAY
COUNTS PER SECOND

RESISTANCE
OHMS





C 566-1 EP 117400

DATE 11-3-75

SEC. Twp. RANGE
Yampa Valley
Moffat
Colo
CSMRE
DATE 11-3-75
TOTAL FOOTAGE LOGGED 1125

BIT 4 1/2
BORE HOLE FLUID H₂O
SUSP. VISCOSITY
DENSITY
OPERATOR Mollander
UNIT NO. 7528
LOCATION Camp
DRIVE 0.7
STAND BY 2.8
LOGGING 1.8
TOTAL 5.3
ROUNDTRIP MILES 44
CHASSIS STANDBY

COMPANY CSMRE
BORE HOLE Y-2
AREA Yampa Valley
COUNTY Moffat
SECTION

TOWNSHIP RANGE STATE Colo

LOG MEASURED FROM Surface

INITIAL RUN		DENSITY		GAMMA RAY	
LOGGING	SCALE	LOGGING	SCALE	LOGGING	SCALE
1125	2.5K	5	20	5	20
TIME CONSTANT 2	LOGGING SPEED 20	TIME CONSTANT 2	LOGGING SPEED 20	TIME CONSTANT 2	LOGGING SPEED 20
CALIBRATION & PROBE DATA		CALIBRATION & PROBE DATA		CALIBRATION & PROBE DATA	
SOURCE NO. A453	BOUNCE VALUE 4M6	SOURCE NO. A453	BOUNCE VALUE 4M6	SOURCE NO. A453	BOUNCE VALUE 4M6
DETECTOR X-Tal	TYPE & SIZE 1518	DETECTOR X-Tal	TYPE & SIZE 1518	DETECTOR X-Tal	TYPE & SIZE 1518
DEAD TIME 0.0	IN FACTOR 1.67X10 ⁻⁵	DEAD TIME 0.0	IN FACTOR 1.67X10 ⁻⁵	DEAD TIME 0.0	IN FACTOR 1.67X10 ⁻⁵
WATER FACTOR 1.12	AIR FACTOR 1.0	WATER FACTOR 1.12	AIR FACTOR 1.0	WATER FACTOR 1.12	AIR FACTOR 1.0
RES SCALE		RES SCALE		RES SCALE	

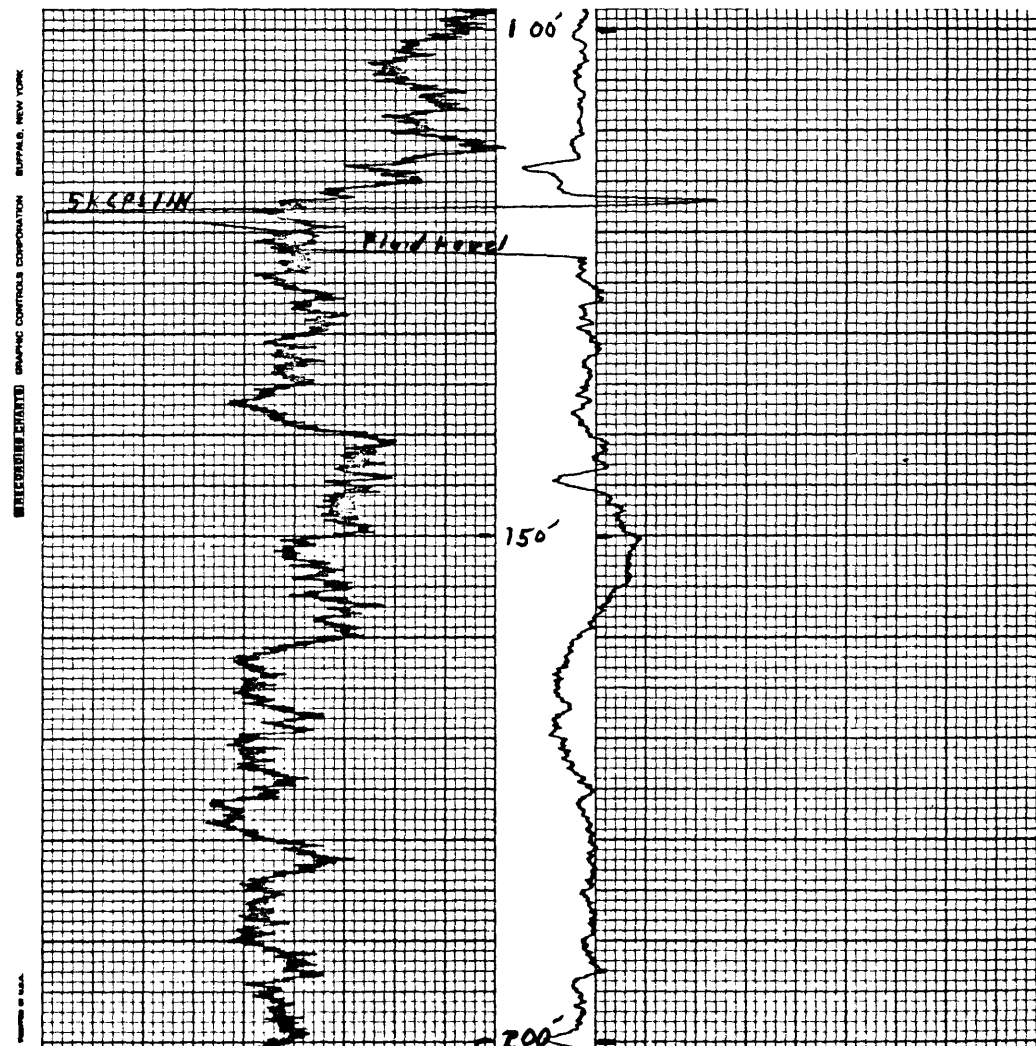
Hole bottomed at 1380'
Base of Fort Union picked at 1372'
No resistivity log due to malfunction.

SELF POTENTIAL

DENSITY

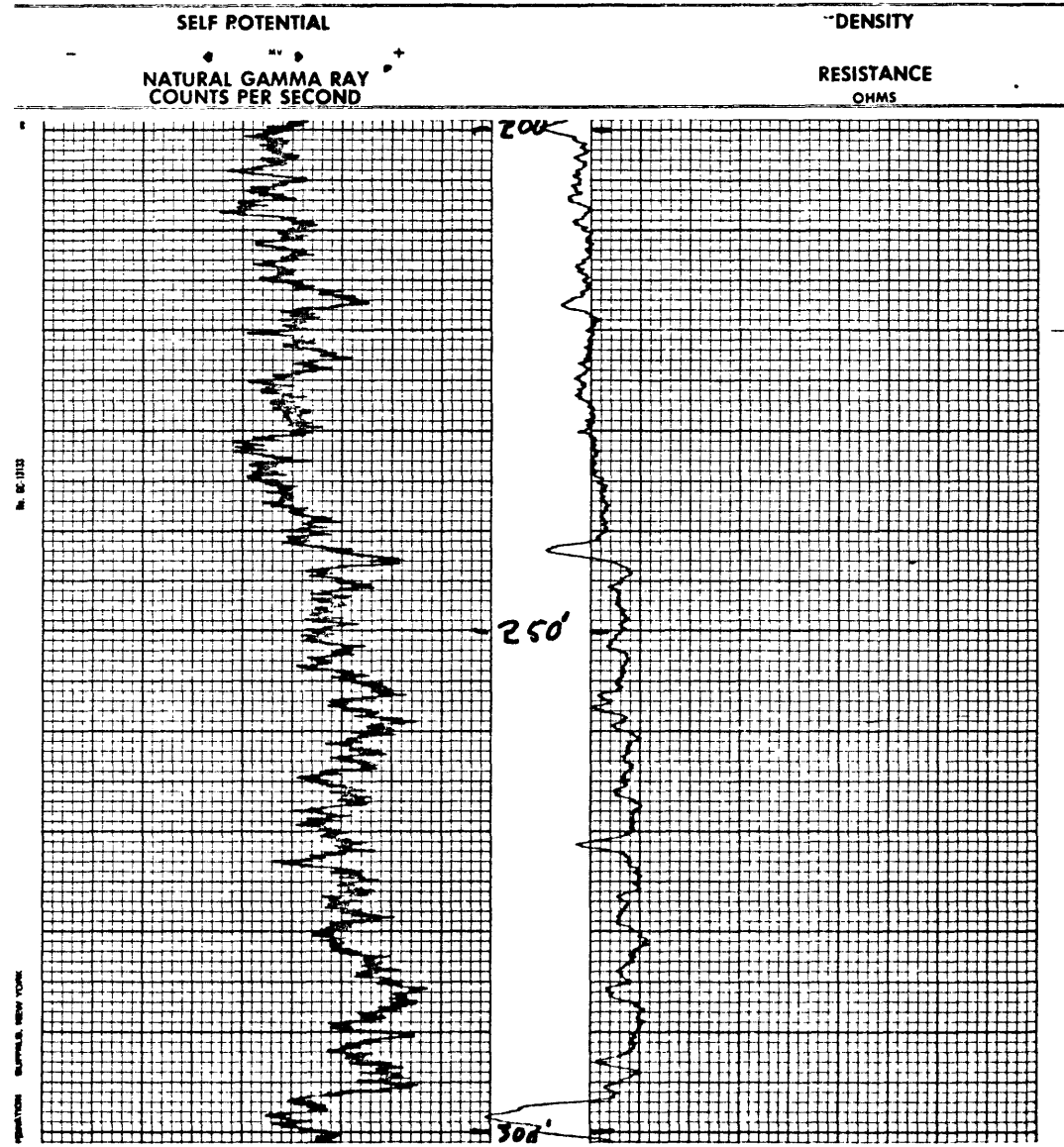
NATURAL GAMMA RAY
COUNTS PER SECOND

RESISTANCE
OHMS





C 366-1 SP 117400		DATE 11-3-75		HOLE NO. Y-2		D. DRILLED	
COMPANY CSMRE		TOWNSHIP		RANGE		SECTION	
BORE HOLE Y-2		STATE Colo		LOCAL MEASURED FROM Surface		LOG MEASURED FROM	
AREA Yampa Valley		COUNTY Moffat		STATE Colo		LOCAL MEASURED FROM	
LOCATION		TOWNSHIP		RANGE		SECTION	
INITIAL RUN		DENSITY		GAMMA RAY		GAMMA RAY	
1125		2.5K		COUNTS PER SECOND		COUNTS PER SECOND	
GAMMA SCALE		LOGGING SPEED		LOGGING SPEED		LOGGING SPEED	
10		5		5		5	
TIME CONSTANT		LOGGING SPEED		LOGGING SPEED		LOGGING SPEED	
2		20		20		20	
CALIBRATION & PROBE DATA		LOGGING SPEED		LOGGING SPEED		LOGGING SPEED	
SOURCE NO. A453		LOGGING SPEED		LOGGING SPEED		LOGGING SPEED	
SOURCE VALUE 4Hc		LOGGING SPEED		LOGGING SPEED		LOGGING SPEED	
DETECTOR XT-1		LOGGING SPEED		LOGGING SPEED		LOGGING SPEED	
DEAD TIME 0.0		LOGGING SPEED		LOGGING SPEED		LOGGING SPEED	
WATER FACTOR 1.12		LOGGING SPEED		LOGGING SPEED		LOGGING SPEED	
RES SCALE		LOGGING SPEED		LOGGING SPEED		LOGGING SPEED	
1.0		LOGGING SPEED		LOGGING SPEED		LOGGING SPEED	
Hole bottomed at 1380'		LOGGING SPEED		LOGGING SPEED		LOGGING SPEED	
Base of Fort Union picked at 1372'		LOGGING SPEED		LOGGING SPEED		LOGGING SPEED	
No resistivity log due to malfunction.		LOGGING SPEED		LOGGING SPEED		LOGGING SPEED	





Century Geophysical Corporation
Denver, Colo.

EXHIBIT 2

C 366-E SP 117488

COMPANY

BORE HOLE

AREA

COUNTY

SECTION

CSHRI

Y-2

Yampa Valley

Moffat

STATE

Colo

Density

2.5K

5

20

1.8

5.3

44

1.12

1.0

1.0

1.0

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DATE

11-3-75

HOLE NO.

Y-2

SEC

TWP

RANGE

BIT SIZE

4 1/2

CASING

BORE HOLE FLUID

H2O

DENSITY

RESISTIVITY

OPERATOR

Hollander

UNIT NO.

7528

LOCATION

Camp

DRIVE

0.7

TIME IN

11:30

STAND BY

2.8

TIME OUT

11:18

LOGGING

1.8

TOTAL

5.3

ROUNDTRIP

MILEAGE

44

CHARGEABLE

STANDBY

1.12

1.0

1.0

1.0

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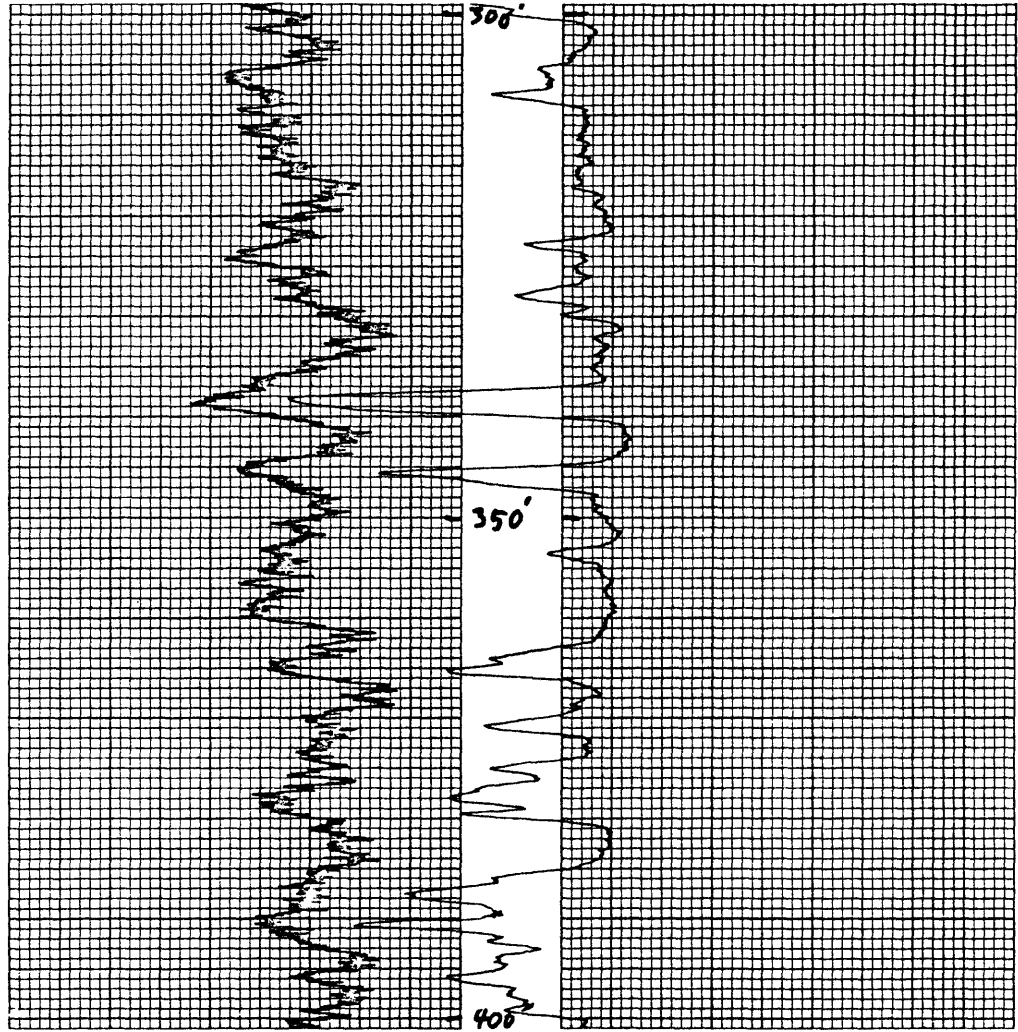
SELF POTENTIAL

DENSITY

NATURAL GAMMA RAY
COUNTS PER SECOND

RESISTANCE
OHMS

RECORDING CHART





Century Geophysical Corporation
Denver, Colo.

C-366-1 SP 117400

COMPANY
CSHRE

BORE HOLE
Y-2

AREA
Yampa Valley

COUNTY
MOFFAT

SECTION

TOWNSHIP

RANGE

STATE
Colo

LOG MEASURED FROM
Surface

DATE
11-3-75

HOLE NO.
Y-2

SEC

TWP

RANGE

AREA
Yampa Valley

COUNTY
MOFFAT

STATE
Colo

COMPANY
CSHRE

DATE
11-3-75

TOTAL FOOTAGE LOGGED
1125

T.D. DRILLED

DIAMETER
4 1/2

BOSS HOLE PLUGS
H2O

DENSITY

VELOCITY

RESISTIVITY

OPERATOR
Hollander

UNIT NO.
7528

LOCATION
Camp

DRIVE
0.7

STAND BY
2.8

LOGGING
1.8

TOTAL
6.3

ROUNDTRIP
44

CHARGEABLE
STANDBY

TIME IN
1130

TIME OUT
1318

T.D. LOGGED
1125

GAMMA SCALE
2.5K

TIME CONSTANT
2

CALIBRATION & PROBE DATA

SOURCE NO.
A453

FROM NO.
8020-101

DETECTORS
XTal

DEAD TIME
0.0

WATER FACTOR
1.12

RES SCALE

INITIAL RUN

LOGGING SPEED
10

LOGGING SPEED
20

LOGGING SPEED
20

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Density

SCALE
2.5K

LOGGING SPEED
10

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GAMMA RESUME

LOGGING SPEED
10

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SELF POTENTIAL

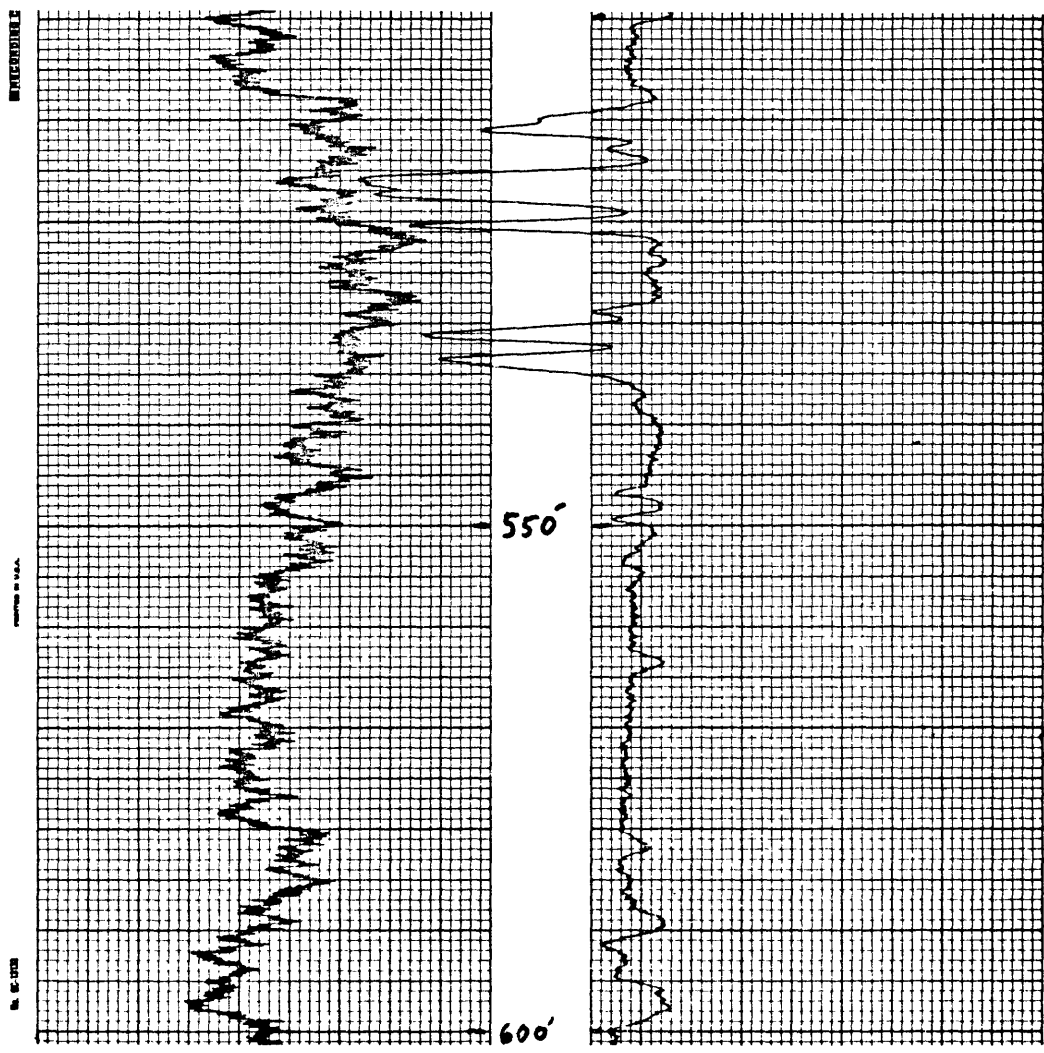
DENSITY

NATURAL GAMMA RAY

RESISTANCE

COUNTS PER SECOND

OHMS





C 364-1 SP 117000

COMPANY

CSHRE

BORE HOLE

Y-2

AREA

Yampa Valley

COUNTY

Moffat

SECTION

TOWNSHIP

RANGE

STATE

LOG MEASUREMENTS FROM

Surface

DATE

11-3-75

LOG MEASUREMENTS FROM

Surface

DATE

11-3-75

LOG MEASUREMENTS FROM

Surface

DATE

11-3-75

LOG MEASUREMENTS FROM

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11-3-75

LOG MEASUREMENTS FROM

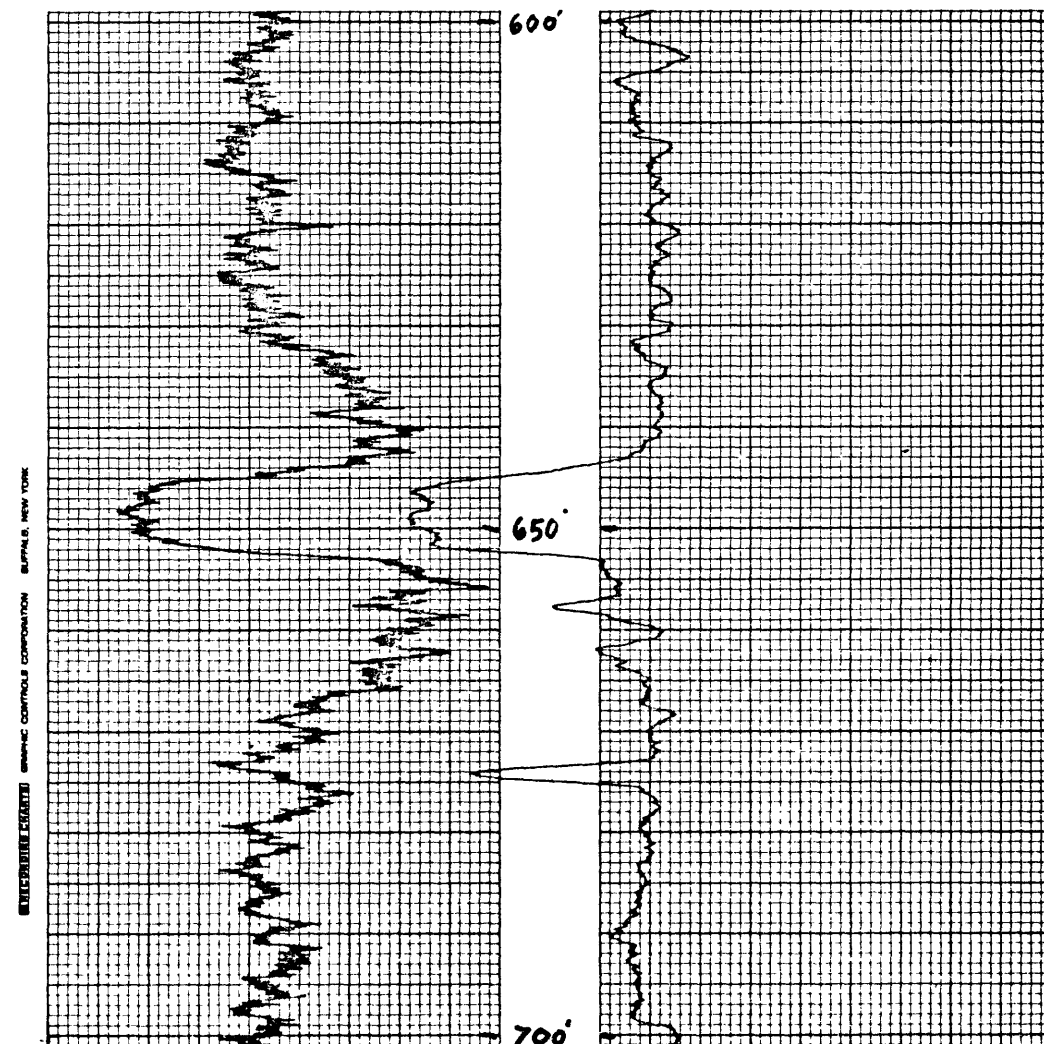
Surface

SELF POTENTIAL

DENSITY

NATURAL GAMMA RAY
COUNTS PER SECOND

RESISTANCE
OHMS





C 366 E SP 117608

COMPANY

BORT HOLE

AREA

COUNTY

SECTION

CSHRE

Y-2

Yampa Valley

Moffat

STATE

Colo

RANGE

Surface

DATE

11-3-75

HOLE NO

Y-2

SEC

TOP

RANGE

Yampa Valley

COUNTY

Moffat

STATE

Colo

COMPANY

CSHRE

DATE

11-3-75

TOTAL FOOTAGE LOGGED

1125

ITS DRILLED

4 1/2

BORT HOLE LOGS

H20

DENSITY

1120

VICINITY

PERMIT

Hollander

UNIT NO

7528

LOCATION

Camp

DRIVE

0.7

TIME IN

1130

STAND BY

2.8

TIME OUT

1318

LOGGING

1.8

TOTAL

5.3

HOUSING

44

CHARACTER

STANDBY

NO

INITIAL RUN

1125

GAMMA SCALE

10

TIME CONSTANT

2

CALIBRATION & PROBE DATA

SOURCE NO

A453

PROBE NO

8018-101

DETECTOR

XTAL

DEAD TIME

0.0

WATER FACTOR

1.12

PES SCALE

SP

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Density

2.5K

LOGGING SPEED

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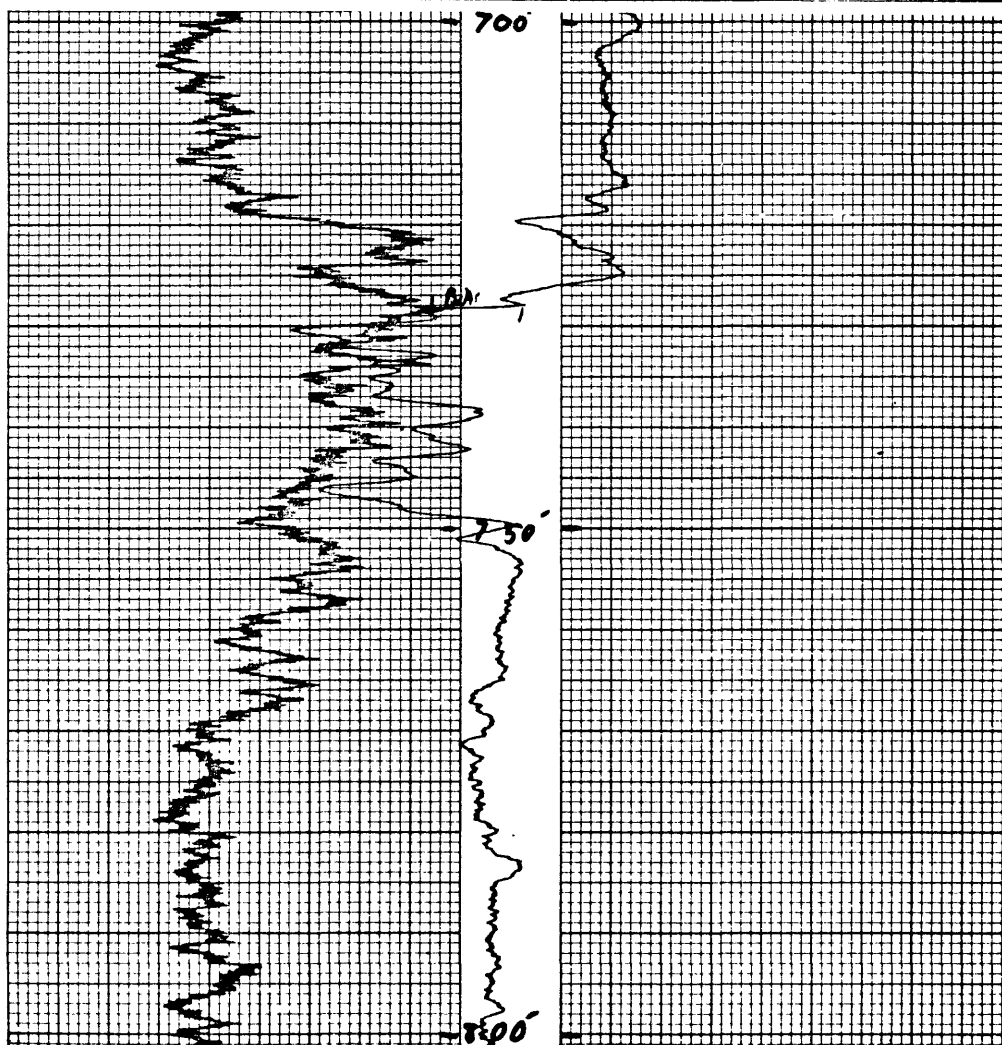
Hole bottomed at 1380'
Base of Fort Union picked at 1372'
No resistivity log due to malfunction.

SELF POTENTIAL

DENSITY

NATURAL GAMMA RAY
COUNTS PER SECOND

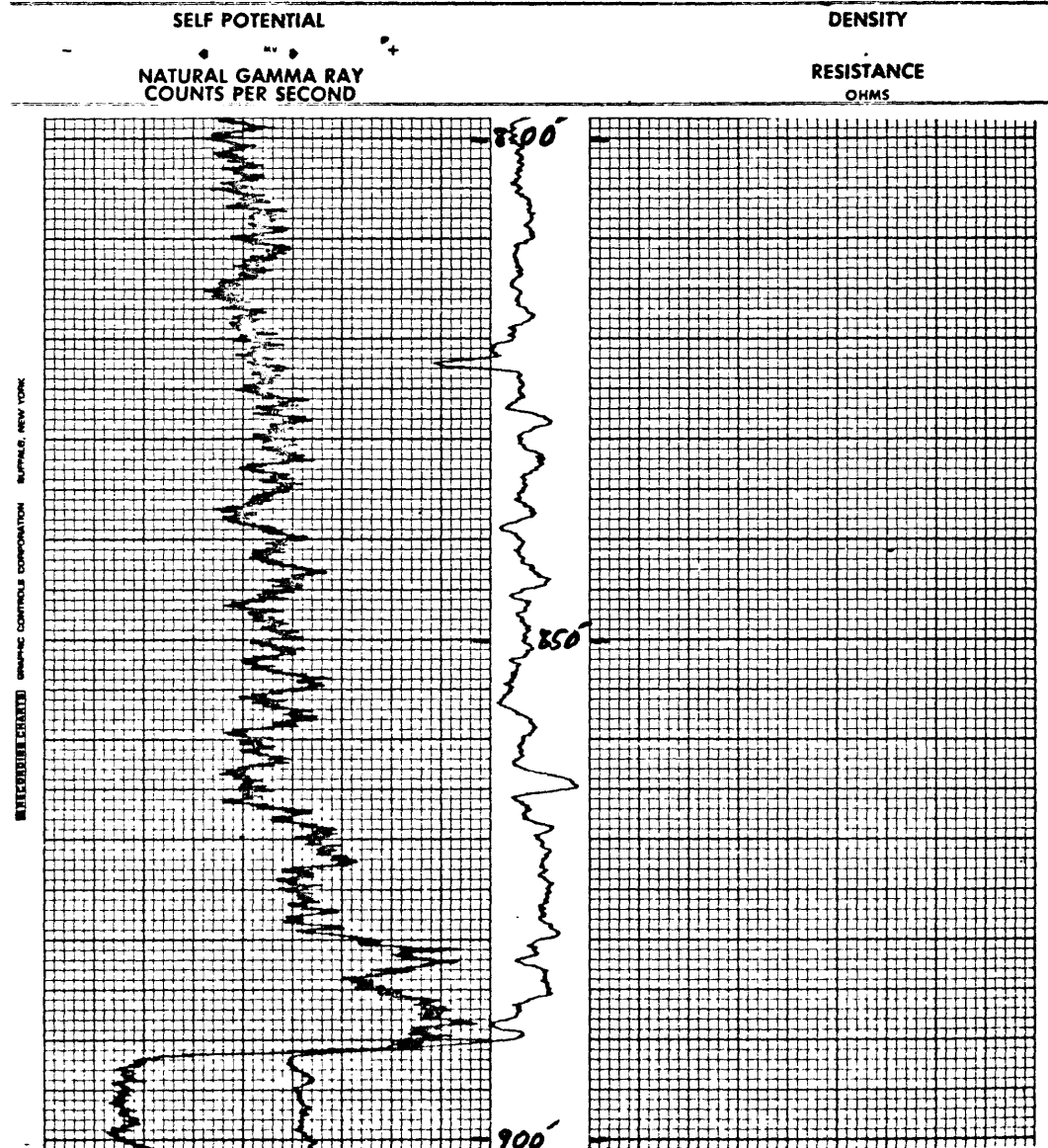
RESISTANCE
OHMS





C 360 E 10 117000		DATE 11-3-75		HOLE NO. Y-2		LOG MEASURED FROM Surface		TOTAL FOOTAGE LOGGED 1125	
COMPANY CSMRE		STATE Colo		APPROX. Yampa Valley		LOG MEASURED FROM Surface		TOTAL FOOTAGE LOGGED 1125	
BORE HOLE Y-2		COUNTY Moffat		APPROX. Moffat		LOG MEASURED FROM Surface		TOTAL FOOTAGE LOGGED 1125	
AREA Yampa Valley		TOWNSHIP		APPROX. Moffat		LOG MEASURED FROM Surface		TOTAL FOOTAGE LOGGED 1125	
SECTION		TOWNSHIP		APPROX. Moffat		LOG MEASURED FROM Surface		TOTAL FOOTAGE LOGGED 1125	
INITIAL RUN 1125		DENSITY SCALE 2.5 K		LOGGING SPEED 10 Cps Per In		LOGGING SPEED 20 In /Min		LOGGING SPEED 18	
GAMMA SCALE		LOGGING SPEED 10 Cps Per In		LOGGING SPEED 20 In /Min		LOGGING SPEED 18		LOGGING SPEED 18	
TIME CONSTANT 2		LOGGING SPEED 10 Cps Per In		LOGGING SPEED 20 In /Min		LOGGING SPEED 18		LOGGING SPEED 18	
CALIBRATION & PROBE DATA		LOGGING SPEED 10 Cps Per In		LOGGING SPEED 20 In /Min		LOGGING SPEED 18		LOGGING SPEED 18	
SOURCE NO. A453		SOURCE VALUE 44.6		LOGGING SPEED 10 Cps Per In		LOGGING SPEED 20 In /Min		LOGGING SPEED 18	
DETECTOR Xtal		DETECTOR 1514		LOGGING SPEED 10 Cps Per In		LOGGING SPEED 20 In /Min		LOGGING SPEED 18	
DEAD TIME 0.0		DEAD TIME 1.57 x 10 ⁻⁵		LOGGING SPEED 10 Cps Per In		LOGGING SPEED 20 In /Min		LOGGING SPEED 18	
WATER FACTOR 1.12		WATER FACTOR 1.0		LOGGING SPEED 10 Cps Per In		LOGGING SPEED 20 In /Min		LOGGING SPEED 18	
RES SCALE		RES SCALE		LOGGING SPEED 10 Cps Per In		LOGGING SPEED 20 In /Min		LOGGING SPEED 18	

Hole bottomed at 1380'
Base of Fort Union picked at 1373'
No resistivity log due to malfunction.





Century Geophysical Corporation
Denver, Colo.

EXHIBIT 2

C 360-1 SP 117600		DATE 11-3-75		HOLE NO. Y-2		TDS BRILLO 4 1/2	
COMPANY CSMRE		STATE Colo		AREA Yampa valley		CASHING	
HOLE NO. Y-2		LOG MEASURED FROM Surface		COUNTY Moffat		HOLE NO. H20	
AREA Yampa valley		LOG MEASURED FROM Surface		STATE Colo		DENSITY	
COUNTY Moffat		LOG MEASURED FROM Surface		COMPANY CSMRE		VIBRODITY	
SECTION		LOG MEASURED FROM Surface		DATE 11-3-75		DEPT. OPERATOR Hollander	
TOWNSHIP		LOG MEASURED FROM Surface		TOTAL FOOTAGE LOGGED 1125		UNIT NO. 7528	
INITIAL RUN		LOG MEASURED FROM Surface		LOG MEASURED FROM Surface		LOCATION	
T.D. LOGGED 1125		LOG MEASURED FROM Surface		LOG MEASURED FROM Surface		DRIVE 0.7	
GAMMA SCALE		LOG MEASURED FROM Surface		LOG MEASURED FROM Surface		STAND BY 2.8	
TIME CONSTANT 2		LOG MEASURED FROM Surface		LOG MEASURED FROM Surface		TIME IN 1130	
CALIBRATION & PROBE DATA		LOG MEASURED FROM Surface		LOG MEASURED FROM Surface		TIME OUT 1318	
SOURCE NO. A453		LOG MEASURED FROM Surface		LOG MEASURED FROM Surface		TOTAL 5.3	
SOURCE VALUE 4761		LOG MEASURED FROM Surface		LOG MEASURED FROM Surface		ROUNDTRIP MILEAGE 44	
DETECTOR X161		LOG MEASURED FROM Surface		LOG MEASURED FROM Surface		CHARGEABLE	
DEAD TIME 0.0		LOG MEASURED FROM Surface		LOG MEASURED FROM Surface		STANDBY	
WATER FACTOR 1.12		LOG MEASURED FROM Surface		LOG MEASURED FROM Surface			
RES SCALE		LOG MEASURED FROM Surface		LOG MEASURED FROM Surface			

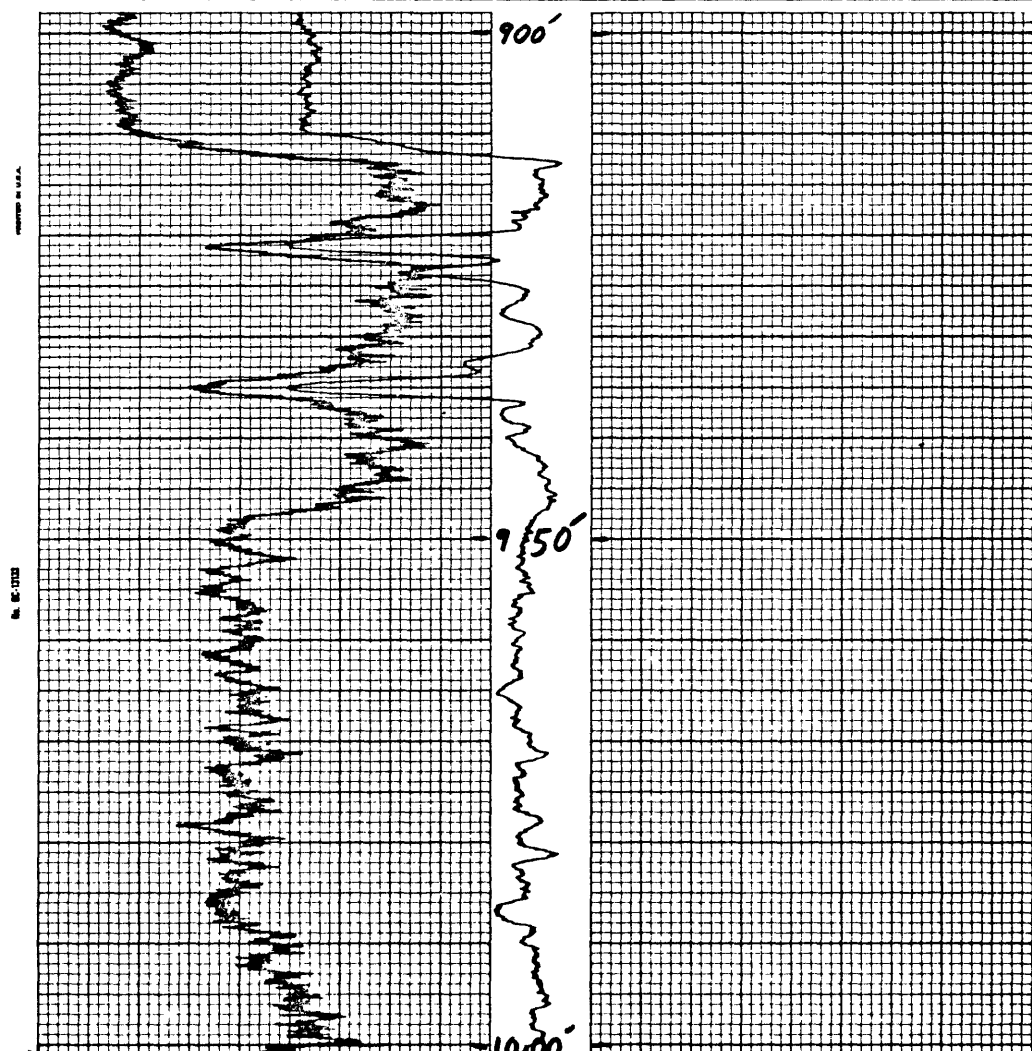
Hole bottomed at 1380'
Base of Fort Union picked at 1373'
No resistivity log due to malfunction.

SELF POTENTIAL

DENSITY

NATURAL GAMMA RAY
COUNTS PER SECOND

RESISTANCE
OHMS





C 364-E 1P 11740B

COMPANY

BORE HOLE

AREA

COUNTY

SECTION

CSMRE

Y-2

Yampa Valley

MOFFAT

TOWNSHIP

RANGE

Colo

LOG MEASURED FROM
Surface

DATE
11-3-75

HOLE NO.
Y-2

SEC

TWP

RANGE

AREA
Yampa Valley

COUNTY
MOFFAT

STATE
Colo

COMPANY
CSMRE

DATE
11-3-75

TOTAL FOOTAGE LOGGED
1125

FTD DRILLED

BIT DIA

4 1/2

BORE HOLE FLUID
H₂O

DENSITY

VISCOSITY

RESISTIVITY

OPERATOR
Hollander

UNIT NO

7528

LOCATION

Camp

DRIVE

0.7

STAND BY

2.8

LOGGING

1.8

TOTAL

6.3

ROUNDTRIP

MILEAGE

44

CHARGEABLE

STANDBY

TIME IN

1130

TIME OUT

1318

INITIAL RUN
1125

GAMMA SCALE

TIME CONSTANT

2

CALIBRATION & PROBE DATA

SOURCE NO

A453

PROBE NO

8018-101

DETECTOR

KTal

DEAD TIME

0.0

WATER FACTOR

1.12

RES SCALE

1.0

1.0

1.0

1.0

1.0

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Density

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Hole bottomed at 1380'
Base of Fort Union picked at 1373'
No resistivity log due to malfunction.

SELF POTENTIAL

NATURAL GAMMA RAY
COUNTS PER SECOND

DENSITY

RESISTANCE
OHMS

RECORDED CHART GRAPHIC CONTROLS CORPORATION BUFFALO, NEW YORK

RECORDED IN P.A.A.

Project No. H50146

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE

EXHIBIT 3 LITHOLOGIC LOGDate 11-13-75Hole No. Y-3Elev. 6542'Total Depth 1200'Location SE 1/4, SW 1/4, SW 1/4, SEC 15, T8N, R93WProperty J. PeroulisCounty MOFFATState COLORADOSponsor USGSDrilling Co. IRON CLADGeologist S.C. MILLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL			
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed. Meta. Ign.	Most abund.	TOTAL %	Vitrinite	Clarinite	Durinite	Fusinite
FLOWED FIELD	" " " "	SOIL - SILT LOAM, DK BROWN	X						WELL														
	ALLUVIUM - SANDY CLAY, YELLOW-BROWN, OXIDIZED		X					X	WELL	40			60										
10																							
20																							
30																							
OVERBURDEN																							
40		CLYST, LT GREY, BENT											100										
		" "											100										
50													100										
		" "											100										
60													100										
		" "											100										
70													100										
		" "											100										
80													100										

Project No. H5046 COLORADO SCHOOL OF MINES RESEARCH INSTITUTE
 EXHIBIT 3 LITHOLOGIC LOG
 Hole No. 43 Elev. 6542' Total Depth 1200' Location SE 1/4 SW 1/4, SW 1/4, SE 1/4 SEC 15, T8N, R93W Date 11-13-75
 County MOFFAT State COLORADO Sponsor USGS Drilling Co. IRON CLAD Property J. P. BOWMAN
 Geologist S. C. M. 1180

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL							
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed. Meta. Ign.	Most abund.	TOTAL %	Vitrinite	Clustrine	Durain	Fusain				
80		CLYST, LT GREY, BENT												100													
90		SS, LT GREY, CGL	x		x	x		x	x	POOR	SS		15	5			15			CHT							
			x		x	x		x	x	POOR	SS		15	5			15			CHT							
100		"	x		x	x		x	x	POOR	SS		15	5			15			CHT							
			x		x	x		x	x	POOR	SS		15	5			15			CHT							
110		"	x		x	x		x	x	POOR	SS		15	5			15			CHT							
			x		x	x		x	x	POOR	SS		15	5			15			CHT							
120		"	x		x	x		x	x	POOR	SS		15	5			15			CHT							
			x		x	x		x	x	POOR	SS		15	5			15			CHT							
130		CLYST, GREY												100													
		"												100													
140		"												100													
														100													
150		"												100													
														100													
160		"												100													
														100													

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE

EXHIBIT 3 LITHOLOGIC LOG

 Project No. H50146

 Date 11-13-75

 Hole No. 13 Elev. 6542' Total Depth 1200' Location SE 1/4, SW 1/4, SW 1/4, SE 1/4, SEC 15 T8N, R9W Property J. Peroulis

 County MOFFAT State COLORADO Sponsor USGS Drilling Co. IRON CLAD Geologist S.C. MULLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING			SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE					ROCK FRAGMENTS				COAL							
			.06-.125	.125-.25	.25-.5	.5-1.0	>1.0	Angular	Subangular	Subrounded	Rounded		Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed.	Meta.	Ign.	Most abund.	TOTAL %	Vitrain	Clarain	Durain	Fusain
160	----	CLYST, GREY														100												
	----	"														100												
170	----															100												
	----	"														100												
180	----															100												
	----	"														100												
190	----															100												
	----	"														100												
200	----															100												
	----	"														100												
210	----															100												
	----	"														100												
220	SS, LT GREY																										
	"	x x		x				x	POOR	75	20	5															
	"	x x		x				x	POOR	75	20	5															
230	"	x x		x				x	POOR	75	20	5															
	----	CLYST, GREY														100												
240	----															100												

Project No. H50146

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE

EXHIBIT 3 LITHOLOGIC LOGDate 11-13-75Hole No. Y-3 Elev. 6542' Total Depth 1200' Location SE 1/4, SW 1/4, SE 1/4, SEC 15, T8N, R93W Property J. P. ROVUSCounty MOFFAT State COLORADO Sponsor USGS Drilling Co. IRON CLAD Geologist S.C. MULLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING Angular Subangular Subrounded Rounded	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL				
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed. Mcta. Ign.	Most abund.	TOTAL %	Vitrain	Clarain	Durain	Fusain	
240	----	CLYST, GRAY												100										
250	----	"												100										
	----													100										
260	----	"												100										
	----													100										
270	----	"												100										
	----													100										
280	⊙	SS, GRAY, CGL	x	x	x			x	POOR	SS	35				10			CHT						
	⊙	"	x	x	x			x	POOR	SS	35				10			CHT						
290	⊙	"	x	x	x			x	POOR	SS	35				10			CHT						
	⊙	"	x	x	x			x	POOR	SS	35				10			CHT						
300	⊙	"	x	x	x			x	POOR	SS	35				10			CHT						
	⊙	"	x	x	x			x	POOR	SS	35				10			CHT						
310	⊙	"	x	x	x			x	POOR	SS	35				10			CHT						
	⊙	"	x	x	x			x	POOR	SS	35				10			CHT						
320	⊙	"	x	x	x			x	POOR	SS	35				10			CHT						
	⊙	"	x	x	x			x	POOR	SS	35				10			CHT						
320	----	CLYST, GRAY	x							5			95											

Project No. H50146

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE

EXHIBIT 3 LITHOLOGIC LOGDate 11-13-75Hole No. Y-3 Elev. 6542' Total Depth 1200' Location SE 1/4, SW 1/4, SE 1/4, SEC 15, T8N, R93WProperty J. P. BARKERCounty MOFFAT State COLORADO Sponsor USGSDrilling Co. IRON CLADGeologist S. C. MULLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUNDING			SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL				
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0	Angular	Subangular	Subrounded		Rounded	Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed.	Meta.	Ign.	Most abund.	TOTAL %	Vitrinite	Clarinite
320	•••••	SS, GREY	x						x	Well	70		15	12			3				Ch					
330	•••••	"	x						x	Well	70		15	12			3				Ch					
	•••••	"	x						x	Well	70		15	12			3				Ch					
340	---	CLYST, GREY	x								5		95													
	---	" "	x								5		95													
350	•••••	SS, GREY	x						x	Well	75		20	5												
	•••••	"	x						x	Well	75		20	5												
360	•••••	"	x						x	Well	75		20	5												
	•••••	"	x						x	Well	75		20	5												
370	---	CLYST, GREY w/ SS, GREY INTBD	x						x	Well	25		75													
	---	" "	x						x	Well	25		75													
380	---	"	x						x	Well	25		75													
	---	"	x						x	Well	25		75													
390	---	"	x						x	Well	25		75													
	---	"	x						x	Well	25		75													
400	---	"	x						x	Well	25		75													

Project No. H50146 COLORADO SCHOOL OF MINES RESEARCH INSTITUTE
 EXHIBIT 3 LITHOLOGIC LOG Date 11-13-75
 Hole No. Y-3 Elev. 6542' Total Depth 1200' Location SE 1/4, SW 1/4, SW 1/4, SE 1/4, SEC 15, T8N, R13W Property J. PEROUXIS
 County MOFFAT State COLORADO Sponsor USGS Drilling Co. IRON CLAD Geologist S.C. MULLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL			
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed. Meta. Ign.	Most abund.	TOTAL %	Vitrain	Clarain	Durain	Fusain
400		CLYST, OR GREY-PURPLE, BENT & CARB?											100							0			
		" "											100							0			
410		CLYST, GREY-PURPLE, BENT											100										
		" "											100										
420		" "											100										
		" "											100										
430		" "											100										
		" "											100										
440		CLYST, GREY											100										
		" "											100										
450		" "											100										
		" "											100										
460		" "											100										
		" "											100										
470		SS, GREY w/ SH, GREY INTBD	x					x	WELL	50	15	35											
		" "	x					x	WELL	50	15	35											
		" "	x					x	WELL	50	15	35											
480		" "	x					x	WELL	50	15	35											

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE

EXHIBIT 3 LITHOLOGIC LOG

 Project No. H50146

 Hole No. Y-3 Elev. 6542' Total Depth 1200' Location S 3/4, SW 1/4, SE 1/4, SEC 15, T8N, R93W

 Date 11-13-75

 County MOFFAT

 State COLORADO

 Sponsor USGS

 Drilling Co. IRON CLAD

 Property J. PEROUIS

 Geologist S.C. MILLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING			SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL					
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0	Angular	Subangular	Subrounded		Rounded	Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed.	Meta.	Ign.	Most abund.	TOTAL %	Vitrain	Clarain	Durain
480		SS, GREY w/SH, GREY INTBD	x						x		WELL	50		15	35												
		SS, GREY	x	x	x				x		MED-POOR	95		5													
490			x	x	x				x		MED-POOR	95		5													
			x	x	x				x		MED-POOR	95		5													
500			x	x	x				x		MED-POOR	95		5													
			x	x	x				x		MED-POOR	95		5													
510			x	x	x				x		MED-POOR	95		5													
			x	x	x				x		MED-POOR	95		5													
520			x	x	x				x		MED-POOR	95		5													
			x	x	x				x		MED-POOR	95		5													
530		SH, GREY, CARB												85								15				x	
		" "												85								15				x	
540														85								15				x	
			" "												85								15				x
550		SS, GREY, SILTY	x						x		WELL	50		15	35												
		" "	x						x		WELL	50		15	35												
560			x						x		WELL	50		15	35												
			x							x		WELL	50		15	35											

Project No. H50196

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE

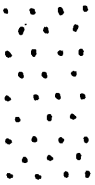
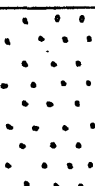
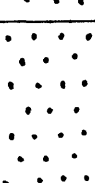
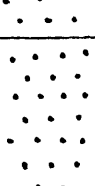
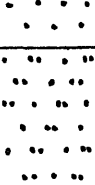
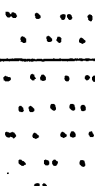
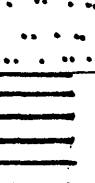
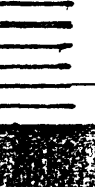
EXHIBIT 3 LITHOLOGIC LOGDate 11-19-75Hole No. Y-3 Elev. 6542' Total Depth 1200' Location SE 1/4, SW 1/4, SW 1/4, SE 1/4, SEC 15, T6N, R93W Property J. PerovichCounty MOFFAT State COLORADO Sponsor USGS Drilling Co. IRON CLAD Geologist S.C. MULLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUNDING Angular Subangular Subrounded Rounded	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL			
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed. Meta. Ign.	Most abund.	TOTAL %	Vitrinite	Clarinite	Durane	Fusulin
560		SS, GRAY, SILTY	x					x	well	50	15	35											
		" "	x					x	well	50	15	35											
570		" "	x					x	well	50	15	35											
		SH, GRAY w/ SH, DK GRAY CARB INTBD	x					x		10	5	75							10				x
580		" "	x					x		10	5	75							10				x
		" "	x					x		10	5	75							10				x
590		" "	x					x		10	5	75							10				x
		" "	x					x		10	5	75							10				x
600		SS, GRAY, SILTY	x					x	well	65	10	25											
		" "	x					x	well	65	10	25											
610		" "	x					x	well	65	10	25											
		" "	x					x	well	65	10	25											
620		" "	x					x	well	65	10	25											
		" "	x					x	well	65	10	25											
630		SS, GRAY	x					x	well	70	25	5											
		" "	x					x	well	70	25	5											
640		" "	x					x	well	70	25	5											

Project No. H50146

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE

EXHIBIT 3 LITHOLOGIC LOGDate 11-13-75Hole No. Y-3 Elev. 6542' Total Depth 1200' Location SE 1/4, SW 1/4, SE 1/4, SEC 15, T8N, R93W Property J. PEROUKISCounty MOFFAT State COLORADO Sponsor USGS Drilling Co. IRON CLAD Geologist J.C. MILLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)				ROUND-ING Angular Subangular Subrounded Rounded	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL						
			.06-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed.	Meta.	Ign.	Most abund.	TOTAL %	Vitrain	Clarain	Durain	Fusain	
640		SS, GREY	x					x	WELL	65	25	10													
650		"	x						x	WELL	65	25	10												
660		"	x					x	WELL	65	25	10													
			x						x	WELL	65	25	10												
670		"	x					x	WELL	65	25	10													
			x						x	WELL	65	25	10												
680		"	x					x	WELL	65	25	10													
			x						x	WELL	65	25	10												
690		SS, GREY, SILTY	x					x	WELL	40	20	40													
		" "	x						x	WELL	40	20	40												
700		"	x					x	WELL	40	20	40													
			x						x	WELL	40	20	40												
710		SH, DK GREY, CARB										85										15			
													85									15			
720		"										85										15			
		COAL										4										96	x		
											4											96	x		

Project No. H50146 COLORADO SCHOOL OF MINES RESEARCH INSTITUTE
 EXHIBIT 3 LITHOLOGIC LOG
 Date 11-13-75
 Hole No. Y-3 Elev. 6542' Total Depth 1200' Location SE 1/4, SW 1/4, SE 1/4, SEC 15, T8N, R9E Property J. PERQUELIS
 County MOFFAT State COLO Sponsor USGS Drilling Co. IRON CLAD Geologist S.C. MULLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING Angular Subangular Subrounded Rounded	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL			
			.0025-.125	.125-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed. Meta. Ign.	Most abund.	TOTAL %	Vitrain	Clitracin	Durain	Fusain
720		COAL w/ SH, DK GREY, CARB											35						65	x			
		SS, GREY-BROWN	x					x	Well	75	15	10											
730		"	x					x	Well	75	15	10											
		"	x					x	Well	75	15	10											
740		SH, DK GREY, SANDY	x					x		25		70							5				
		"	x					x		25		70							5				
750		"	x					x		25		70							5				
		"	x					x		25		70							5				
760		"	x					x		25		70							5				
		"	x					x		30		65							5				
770		"	x					x		30		65							5				
		SS, S&P - LT GREY	x	x	x	x		x	Poor	70	24					6	x	x	CHT				
780		"	x	x	x	x		x	Poor	70	24					6	x	x	CHT				
		"	x	x	x	x		x	Poor	70	24					6	x	x	CHT				
790		"	x	x	x	x		x	Poor	70	24					6	x	x	CHT				
		"	x	x	x	x		x	Poor	70	24					6	x	x	CHT				
800		"	x	x	x	x		x	Poor	70	24					6	x	x	CHT				

Project No. H50146

 Date 11-13-75

 Hole No. Y-3 Elev. 6542' Total Depth 1200' Location SE 1/4, SW 1/4, SE 1/4, SEC 15, T8N, R3W Property J. Perovli

 County MOFFAT State COLORADO Sponsor USGS Drilling Co. IRON CLAD Geologist J.C. Muehle

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING Angular Subangular Subrounded Rounded	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL			
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed. Meta. Ign.	Most abund.	TOTAL %	Vitrinite	Clarinite	Durane	Fusinite
800		SS, S&P-LT GREY	X	X	X	X		X	POOR	70	24					6	XX						
		"	"	X	X	X	X		X	POOR	70	24					6	XX					
810		"	X	X	X	X		X	POOR	70	24					6	XX						
		"	"	X	X	X	X		X	POOR	70	24					6	XX					
820		"	X	X	X	X		X	POOR	70	24					6	XX						
		"	"	X	X	X	X		X	POOR	70	24					6	XX					
830		"	X	X	X	X		X	POOR	70	24					6	XX						
		"	"	X	X	X	X		X	POOR	70	24					6	XX					
840		"	X	X	X	X		X	POOR	70	24					6	XX						
		"	"	X	X	X	X		X	POOR	70	20					10	XX					
850		"	X	X	X	X		X	POOR	70	20					10	XX						
		"	"	X	X	X	X		X	POOR	70	20					10	XX					
860		SS, S&P-LT GREY, CGL	X		X	X		X	POOR	80	10					10	XX						
		"	"	X		X	X		X	POOR	80	10					10	XX					
870		"	X		X	X		X	POOR	80	10					10	XX						
		"	"	X		X	X		X	POOR	80	10					10	XX					
880		"	X		X	X		X	POOR	80	10					10	XX						

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE

Project No. H50196 EXHIBIT 3 LITHOLOGIC LOG Date 11-13-75
 Hole No. Y-3 Elev. 6542' Total Depth 1200' Location SE 1/4 SW 1/4 SE 1/4 SEC 15 T8N R9W Property J. PEROUIS
 County MOFFAT State COLORADO Sponsor USGS Drilling Co. IRON CLAD Geologist S.C. MULLER

FORMATION CONTACTS, FOOTNOTES, SHOWS, INTERVALS (IN FEET)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING Angular Subangular Subrounded Rounded	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL						
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed.	Meta.	Ign.	Most abund.	TOTAL %	Vitrain	Clarain	Durain	Fusain	
POOR RECOVERY	880	SS, S&P-LT GREY, CGL	x		x	x		x	POOR																	
		" "	x		x	x		x	POOR																	
	890		x		x	x		x	POOR																	
		" "	x		x	x		x	POOR																	
	900	" "	x		x	x		x	POOR																	
		SLTST, LT BROWN	x					x	WELL	25	15	60														
		" "	x					x	WELL	25	15	60														
	910	" "	x					x	WELL	25	15	60														
		" "	x					x	WELL	25	15	60														
	920	SS, GREY W/ SH, GREY INTBD	x					x	WELL	65	10	25														
		" "	x					x	WELL	65	10	25														
	930	" "	x					x	WELL	65	10	25														
		" "	x					x	WELL	65	10	25														
	940	" "	x					x	WELL	65	10	25														
		COAL												5	1								94x			
	950													5	1								94x			
													5	1								94x				
960													5	1								94x				

Project No. H50196

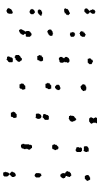
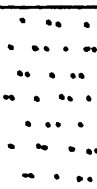
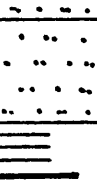
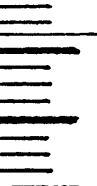
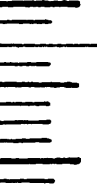
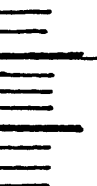
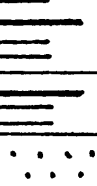
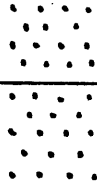

 Date 11-13-75

 Hole No. 43 Elev. 6542' Total Depth 1200' Location SE 1/4, SW 1/4, SW 1/4, SE 1/4, SEC 15 T8N, R24W Property J. PERCULIS

 County MOFFAT State COLORADO Sponsor USGS Drilling Co. IRON CLAD Geologist J.C. MUEHLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)				ROUND-ING	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL								
			.0625-.125	.125-.25	.25-.5	.5-1.0			>1.0	Angular	Subangular	Subrounded	Rounded	Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed.	Meta.	Ign.	Most abund.	TOTAL %	Vitrinite	Clarinite
960		COAL												10									90	x			
		SH, DK GREY w/ COAL CLASTS												80									20			x	
970		"												80									20			x	
		"												80									20			x	
980		"												80									20			x	
		"												80									20			x	
990		COAL w/ SH, DK GREY, CARB INTBD												25									75	x			x
		SH, DK GREY												95									5			x	
1000		"												95									5			x	
		COAL w/ SH, DK GREY, CARB INTBD												30									70	x			x
		SH, DK GREY												95									5			x	
1010		"												95									5			x	
		"												95									5			x	
1020		"												95									5			x	
		"												95									5			x	
1030		"												95									5			x	
		"												95									5			x	
1040		"												95									5			x	

Project No. H50146 EXHIBIT 3 Date 11-13-75
Hole No. Y-3 Elev. 6542' Total Depth 1200' Location SE 1/4, SW 1/4, SW 1/4, SE 1/4, SEC 15, T8N, R93W Property J. PERAKIS
County MOFFAT State COLORADO Sponsor USGS Drilling Co. IRON CLAD Geologist S.C. MULLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)				ROUND-ING	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL							
			.0625-.125	.125-.25	.25-.5	.5-1.0			Angular	Subangular	Subrounded	Rounded	Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed.	Meta.	Ign.	Most abund.	TOTAL %	Vitrain	Clarain
1040		SS, LT GREY - S&P, SILTY	x					x	Well	65		10	15													
			x						x	Well	65		10	15												
1050		"	x					x	Well	65		10	15													
			x						x	Well	65		10	15												
1060		"	x					x	Well	65		10	15													
			x						x	Well	65		10	15												
1070		SH, GREY w/ SH, DK GREY, CARB INTBD										85									15				x	
													85									15				x
1080		"										85									15				x	
													85									15				x
1090		"										85									15				x	
													85									15				x
1100		"										85									15				x	
													85									15				x
1110		SS, GREY	x	x				x	Med	75	20	5														
			x	x				x	Med	75	20	5														
1120		"	x	x				x	Med	75	20	5														
			x	x				x	Med	75	20	5														

Project No. H50196 COLORADO SCHOOL OF MINES RESEARCH INSTITUTE
 EXHIBIT 3 LITHOLOGIC LOG Date 11-13-75
 Hole No. V-3 Elev. 6542' Total Depth 1200' Location SE 1/4, SW 1/4, SW 1/4, SEC 15, T8N, R93W Property J. PEROUKIS
 County MOFFAT State COLORADO Sponsor USGS Drilling Co. IRON CLAD Geologist J.C. MULLEN

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING Angular Subangular Subrounded Rounded	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL			
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed. Meta. Ign.	Most abund.	TOTAL %	Vitrain	Clarain	Durain	Fusain
1120	.	SS, GRAY	x	x				x	MED	75		20	5										
		"	x	x				x	MED	75		20	5										
1130	.		x	x				x	MED	75		20	5										
		"	x	x				x	MED	75		20	5										
1140	.		x	x				x	MED	75		20	5										
		"	x	x				x	MED	75		20	5										
1150	.		x	x				x	MED	75		20	5										
		"	x	x				x	MED	75		20	5										
1160	.		x	x				x	MED	75		20	5										
		"	x	x				x	MED	75		20	5										
1170	⊙	CG, SANDY		x	x	x		x	POOR	85		10				5		CHT					
		"		x	x	x		x	POOR	85		10				5		CHT					
1180	⊙			x	x	x		x	POOR	85		10				5		CHT					
		"		x	x	x		x	POOR	85		10				5		CHT					
1190	⊙			x	x	x		x	POOR	85		10				5		CHT					
		"		x	x	x		x	POOR	85		10				5		CHT					
1200	⊙			x	x	x		x	POOR	85		10				5		CHT					





C 366-1 SP 117485

DATE 11-16-75

WELL NO	Y-3
SEC	Top
RANGE	
DATE	11-16-75
AREA	Yampa valley
COUNTY	Moffat
STATE	Colo
COMPANY	CSHRE
DATE	11-16-75
TOTAL FOOTAGE LOGGED	1118
OPERATOR	Hollander
UNIT NO	75-28
LOCATION	Craig

COMPANY	CSMRI
WELL NO	Y-3
AREA	Yampa valley
COUNTY	Moffat
STATE	Colo
SECTION	
TOWNSHIP	
RANGE	
LOG MEASURED FROM	Surface

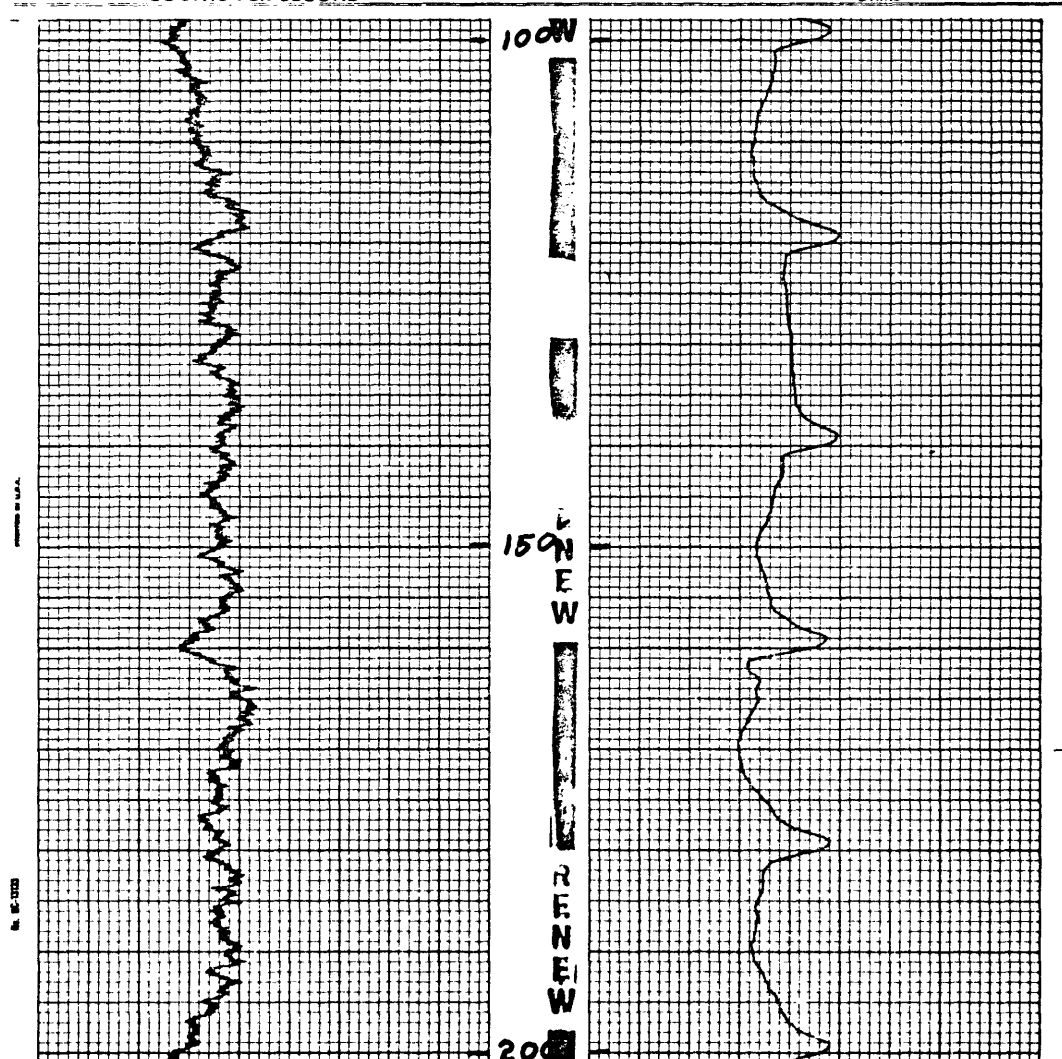
INITIAL RUN	Density	BATHY THERM	LOG MEASURED FROM	DRIVE	TIME IN
LOG NO	1118	SCALE	2.5	0.7	1030
BATHY SCALE	25	LOGGING SPEED	20	STAND BY	TIME OUT
TIME CONSTANT	2	LOGGING SPEED	20	LOGGING	1600
CAUSATION & POSE DATA		LOGGING SPEED	20	TOTAL	55
SOURCE NO	A953	LOGGING SPEED	20	FOUND	6.2
PROB NO	8060-2	LOGGING SPEED	20	MILLAGE	40
DETECTOR	YTA	LOGGING SPEED	20	CHARGEABLE	
DEAD TIME	0.0	LOGGING SPEED	20	STANDBY	
WATER FACTOR	1.12	LOGGING SPEED	20		
RES SCALE		LOGGING SPEED	20		

SELF POTENTIAL

DENSITY

NATURAL GAMMA RAY
COUNTS PER SECOND

RESISTANCE
OHMS





Y-3

1200

EXHIBIT 3

C 304-E 3P 117400

DATE 11-16-75

AREA Yampa valley
COUNTY Moffat
STATE Colo
COMPANY CSMRE
DATE 11-16-75
TOTAL FOOTAGE LOGGED 1118

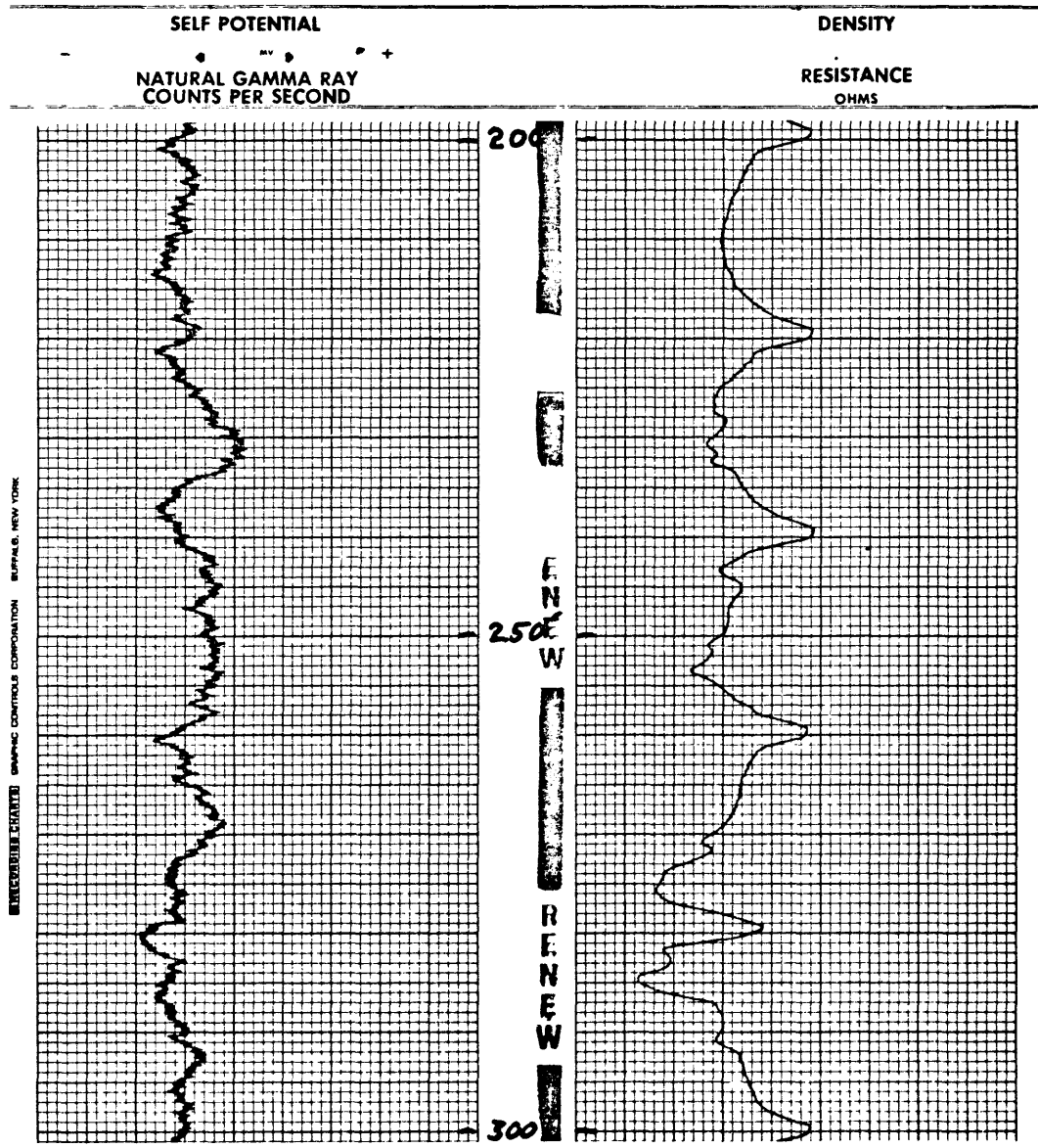
BIT SIZE 4 1/2 in
SOFT HOLE FLUID 1720 mud
DENSITY
VISCOSITY
OPERATOR Hollander
UNIT NO 7528
LOCATION Craig

COMPANY CSMRI
BOSS HOLE Y-3
AREA Yampa valley
COUNTY Moffat

STATE Colo

SECTION TOWNSHIP RANGE LOG MEASURED FROM Surface

INITIAL RUN		DENSITY		GAMMA COUNTS		LOGGING SPEED		LOGGING SPEED		LOGGING SPEED	
SCALE	SCALE	SCALE	SCALE	SCALE	SCALE	SCALE	SCALE	SCALE	SCALE	SCALE	SCALE
1118	25	5	2.5	5	2.5	5	2.5	5	2.5	5	2.5
LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED
20	20	20	20	20	20	20	20	20	20	20	20
TIME CONSTANT	TIME CONSTANT	TIME CONSTANT	TIME CONSTANT	TIME CONSTANT	TIME CONSTANT	TIME CONSTANT	TIME CONSTANT	TIME CONSTANT	TIME CONSTANT	TIME CONSTANT	TIME CONSTANT
2	2	2	2	2	2	2	2	2	2	2	2
CALIBRATION & PROBE DATA	CALIBRATION & PROBE DATA	CALIBRATION & PROBE DATA	CALIBRATION & PROBE DATA	CALIBRATION & PROBE DATA	CALIBRATION & PROBE DATA	CALIBRATION & PROBE DATA	CALIBRATION & PROBE DATA	CALIBRATION & PROBE DATA	CALIBRATION & PROBE DATA	CALIBRATION & PROBE DATA	CALIBRATION & PROBE DATA
SOURCE NO AFS3	SOURCE NO AFS3	SOURCE NO AFS3	SOURCE NO AFS3	SOURCE NO AFS3	SOURCE NO AFS3	SOURCE NO AFS3	SOURCE NO AFS3	SOURCE NO AFS3	SOURCE NO AFS3	SOURCE NO AFS3	SOURCE NO AFS3
PROB NO 8060-2	PROB NO 8060-2	PROB NO 8060-2	PROB NO 8060-2	PROB NO 8060-2	PROB NO 8060-2	PROB NO 8060-2	PROB NO 8060-2	PROB NO 8060-2	PROB NO 8060-2	PROB NO 8060-2	PROB NO 8060-2
DETECTOR Xtal	DETECTOR Xtal	DETECTOR Xtal	DETECTOR Xtal	DETECTOR Xtal	DETECTOR Xtal	DETECTOR Xtal	DETECTOR Xtal	DETECTOR Xtal	DETECTOR Xtal	DETECTOR Xtal	DETECTOR Xtal
DEAD TIME 0.0	DEAD TIME 0.0	DEAD TIME 0.0	DEAD TIME 0.0	DEAD TIME 0.0	DEAD TIME 0.0	DEAD TIME 0.0	DEAD TIME 0.0	DEAD TIME 0.0	DEAD TIME 0.0	DEAD TIME 0.0	DEAD TIME 0.0
WATER FACTOR 1.12	WATER FACTOR 1.12	WATER FACTOR 1.12	WATER FACTOR 1.12	WATER FACTOR 1.12	WATER FACTOR 1.12	WATER FACTOR 1.12	WATER FACTOR 1.12	WATER FACTOR 1.12	WATER FACTOR 1.12	WATER FACTOR 1.12	WATER FACTOR 1.12
RES SCALE	RES SCALE	RES SCALE	RES SCALE	RES SCALE	RES SCALE	RES SCALE	RES SCALE	RES SCALE	RES SCALE	RES SCALE	RES SCALE





Century Geophysical Corporation
Denver, Colo.

C-366-2 SP 117488

COMPANY

CSMRI

BORE HOLE

Y-3

AREA

Yampa valley

COUNTY

Moffat

STATE

Colo

SECTION

TOWNSHIP

RANGE

LOG MEASURED FROM

Surface

HOLE NO

Y-3

SEC

TWP

RANGE

DEPT

1200

CASING

AREA

Yampa valley

COUNTY

Moffat

STATE

Colo

COMPANY

CSMRI

DATE

11-16-75

TOTAL FOOTAGE LOGGED

1118

RESISTIVITY

DRIVE

Hollander

UNIT NO

7528

LOCATION

Craig

TD LOGGED

1118

GAMMA SCALE

25

TIME CONSTANT

2

CALIBRATION & PROBE DATA

SOURCE NO

A453

PROBE NO

8060-2

DETECTOR

XTM

DEAD TIME

0.0

WATER FACTOR

1.12

RES SCALE

1.0

SOURCE VALUES

4Mci

PROBE SIZE

1 1/2

TYPE & SIZE

1/2 X 2

W FACTOR

1.36 X 10⁵

AIR FACTOR

1.0

Density

SCALE

2.5

LOGGING SPEED

20

FROM

TO

TOTAL

GAMMA ROUNDS

(initial run off-scale)

SCALE

2.5

LOGGING SPEED

20

FROM

TO

TOTAL

SCALE

0.7

STAND BY

0

LOGGING SPEED

55

FROM

TO

TOTAL

DRIVE

0.7

STAND BY

0

LOGGING SPEED

55

FROM

TO

TOTAL

TIME IN

1030

TIME OUT

1600

LOGGING

55

FROM

TO

TOTAL

40

CHASSISABLE

STANBY

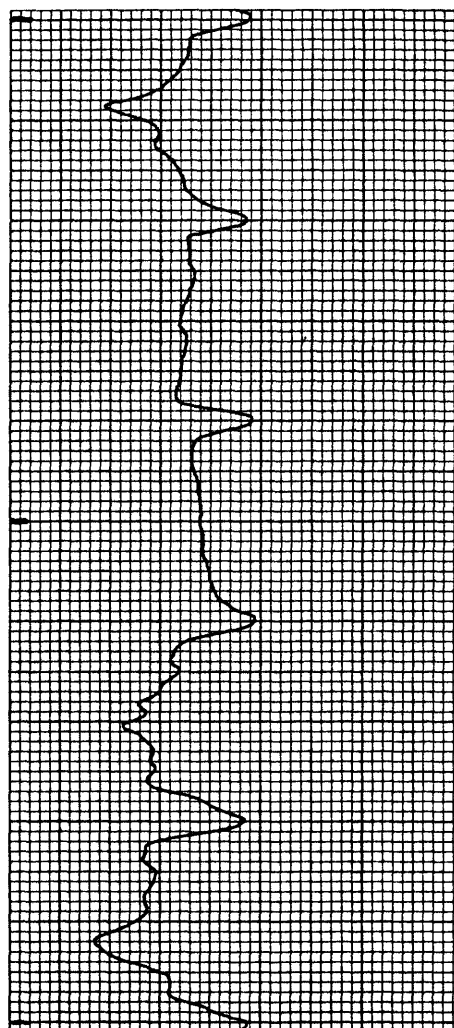
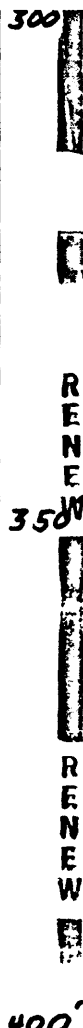
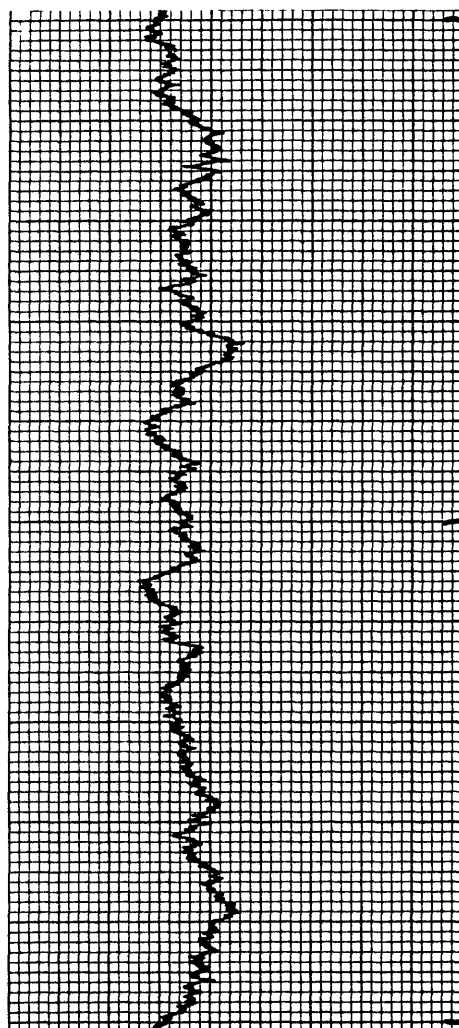
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SELF POTENTIAL

DENSITY

NATURAL GAMMA RAY
COUNTS PER SECOND

RESISTANCE
OHMS



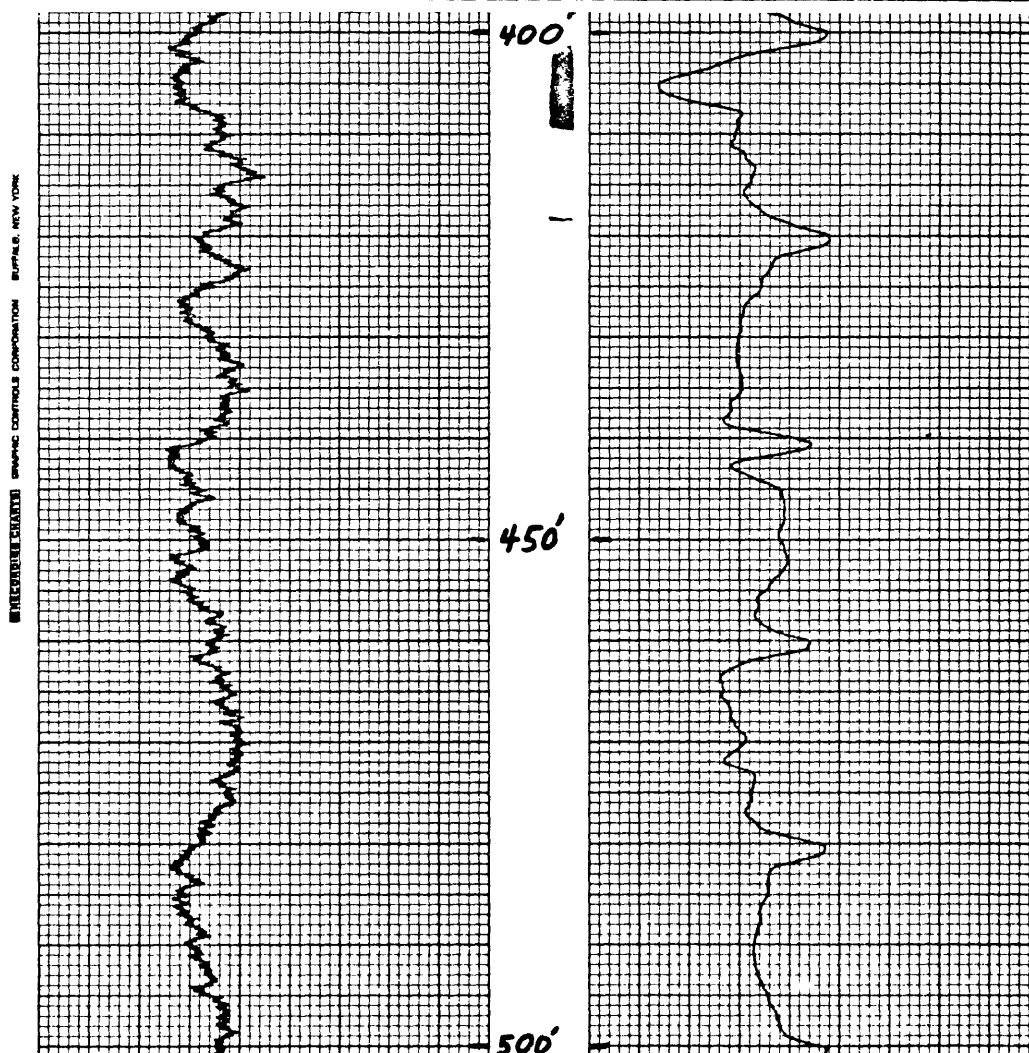
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SELF POTENTIAL

DENSITY

**NATURAL GAMMA RAY
COUNTS PER SECOND**

RESISTANCE
OHMS

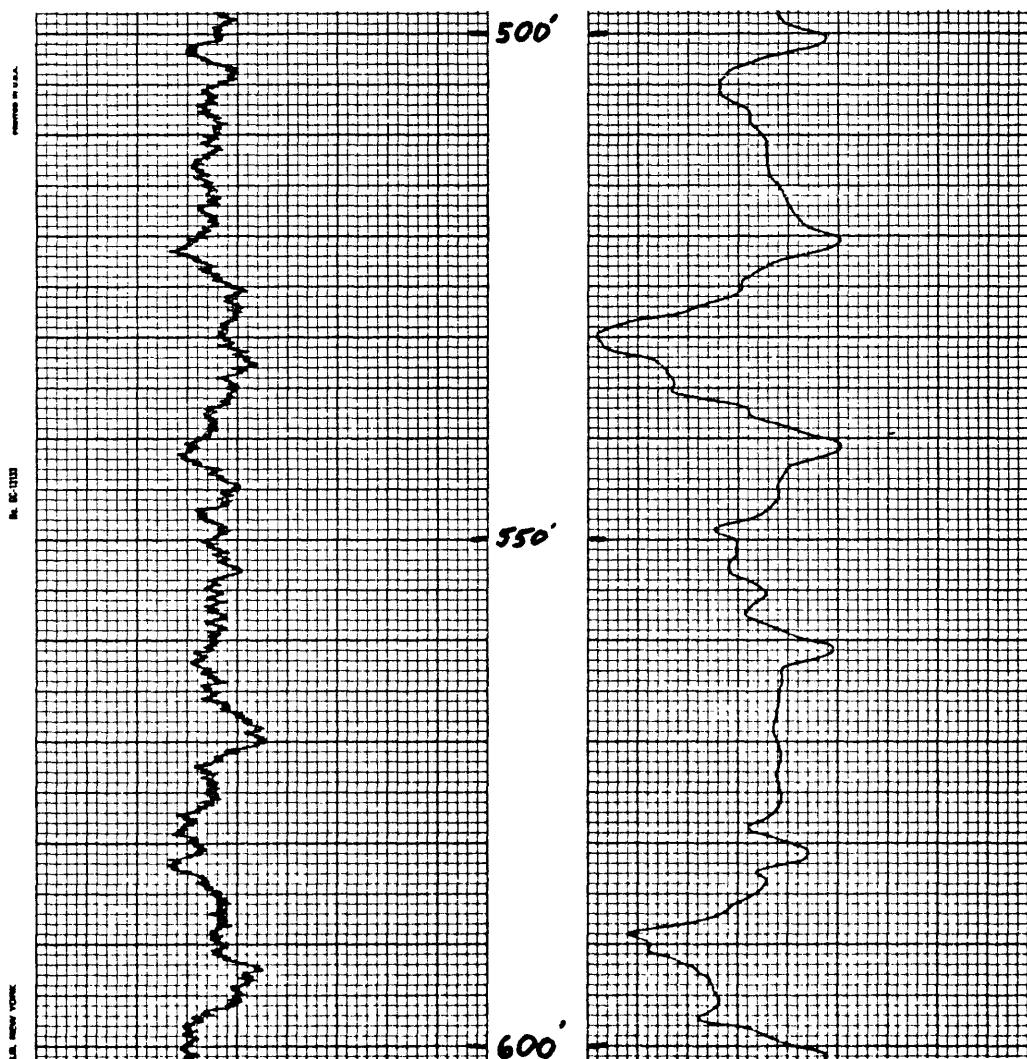


360-8 BP 117680		11-16-75		Yampa valley		122017100	
COMPANY CSMRI		COUNTY Moffat		DISTRICT Hollander		VICINITY	
BORE HOLE Y-3		STATE Colo		WELL IDENT			
AREA Yampa valley		CORRELATION CSHRE		OPERATOR			
COUNTY Moffat		DATE 11-16-75		UNIT NO. 7528			
SECTION		TOWNSHIP		RANGE		LOCATION Craig	
LOG MEASURED FROM Surface		LOG MEASURED FROM		TOTAL FOOTAGE LOGGED 1118			
INITIAL RUN		DENSITY		GAMMA RAY		DRIVE	
T.B. LOG NO. 1118		SCALE		SCALE		SCALE	
GAMMA SCALE		T.C.		T.C.		T.C.	
TIME CONSTANT 2		LOGGING SPEED 25		LOGGING SPEED 25		LOGGING SPEED 25	
CALIBRATION & PROBE DATA		TOTAL		TOTAL		TOTAL	
SOURCE NO. A953		SOURCE VALUE 4Mci		SOURCE NO. 8060-2		SOURCE VALUE 15/6	
PROBE NO. 8060-2		PROBE NO. Y2X2		PROBE NO. Y2X2		PROBE NO. Y2X2	
DEFLECTOR Y2X1		DEFLECTOR Y2X2		DEFLECTOR Y2X2		DEFLECTOR Y2X2	
BIAS TIME 0.0		BIAS TIME 1.36x10 ⁵		BIAS TIME 1.36x10 ⁵		BIAS TIME 1.36x10 ⁵	
WATER FACTOR 1.12		WATER FACTOR 1.0		WATER FACTOR 1.0		WATER FACTOR 1.0	
PDS SCALE		PDS SCALE		PDS SCALE		PDS SCALE	
S.P.		S.P.		S.P.		S.P.	

SELF POTENTIAL

DENSITY

NATURAL GAMMA RAY COUNTS PER SECOND

RESISTANCE
OHMS



Century Geophysical Corporation
Denver, Colo.

EXHIBIT 3

C 300-2 50 117400

DATE 11-16-75

WELL NO Y-3

1200

SEC 1

TWP 2

RANGE 41/2

41/2

RANGE

AREA Yampa valley

COUNTY Moffat

STATE Colo

COMPANY CSMRE

DATE 11-16-75

TOTAL FOOTAGE LOGGED 1118

SOFT HOLE FLUID 17201111

ETHNICITY

VISCOSITY

RESISTIVITY

OPERATOR Hollander

UNIT NO 75-28

LOCATION Craig

DRIVE 0.7

STAND BY 0

TIME IN 1030

TIME OUT 1600

COMPANY CSMRI

WELL NO Y-3

AREA Yampa valley

COUNTY Moffat

SECTION

TOWNSHIP

RANGE

STATE Colo

LOG MEASURED FROM Surface

TD LOGGED 1118

GAMMA SCALE

TIME CONSTANT 2

CALIBRATION & PROBE DATA

SOURCE NO A453

PROBE NO 8060-2

DETECTOR Xtal

DEAD TIME 0.0

WATER FACTOR 1.12

RES SCALE

INITIAL RUN

LOGGING SPEED 25

LOGGING SPEED 20

LOGGING SPEED 20

LOGGING SPEED 20

LOGGING SPEED 20

LOGGING SPEED 20

LOGGING SPEED 20

LOGGING SPEED 20

LOGGING SPEED 20

Density

SCALE 2.5

SCALE 2.5

SCALE 2.5

SCALE 2.5

SCALE 2.5

SCALE 2.5

SCALE 2.5

SCALE 2.5

SCALE 2.5

GAMMA BEAMS

Initial run offsets

Initial run offsets

Initial run offsets

Initial run offsets

Initial run offsets

Initial run offsets

Initial run offsets

Initial run offsets

Initial run offsets

SCALE

SCALE

SCALE

SCALE

SCALE

SCALE

SCALE

SCALE

SCALE

SCALE

SCALE

SCALE

SCALE

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SCALE

SCALE

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SCALE

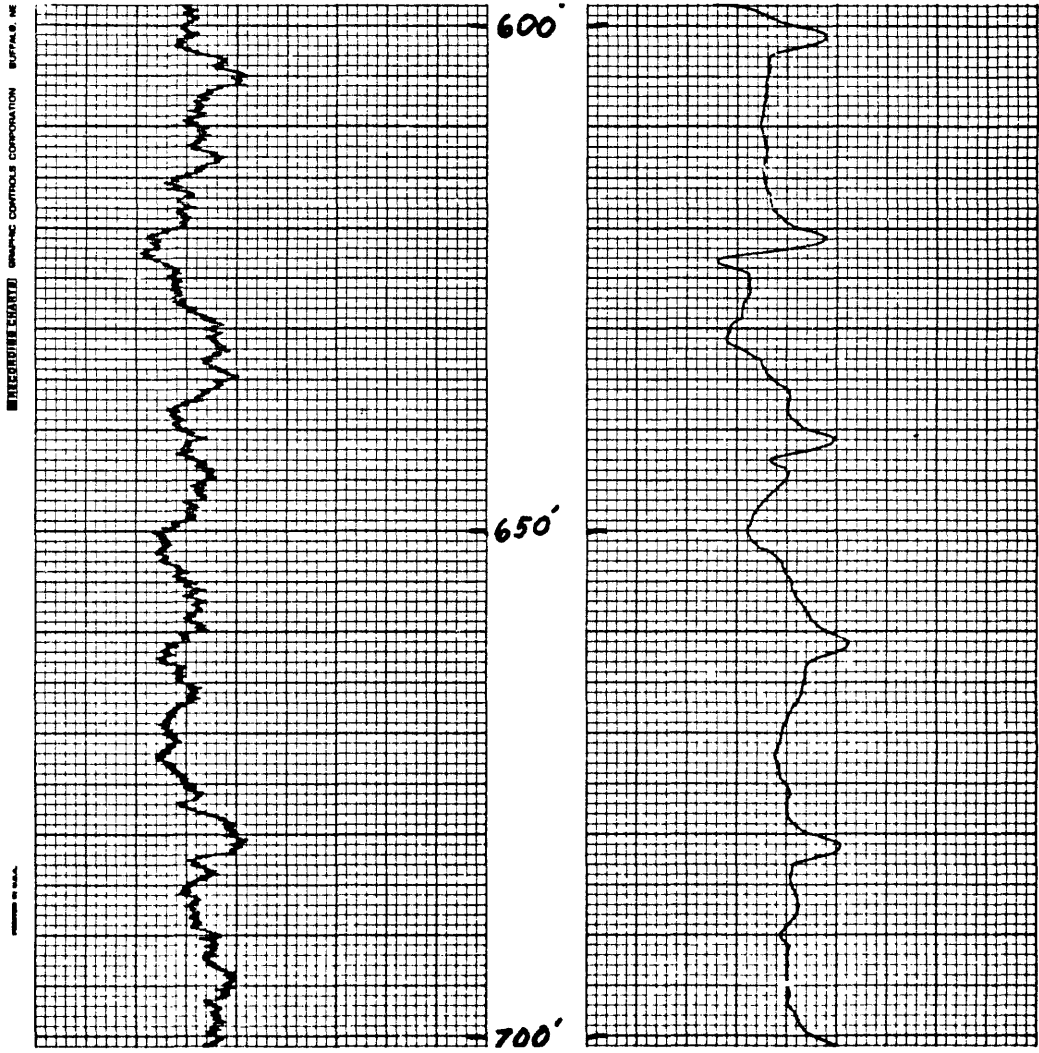
SCALE

SELF POTENTIAL

DENSITY

NATURAL GAMMA RAY
COUNTS PER SECOND

RESISTANCE
OHMS





Century Geophysical Corporation
Denver, Colo.

EXHIBIT 3

C 366-9 50 117000

DATE 11-16-75

Y-3

1200

COMPANY CSMRI

BORE HOLE Y-3

AREA Yampa valley

COUNTY Moffat

STATE Colo

SECTION

TOWNSHIP

RANGE

LOG MEASURED FROM

Surface

Yampa valley
Moffat
Colo
CSMRI
11-16-75
TOTAL FOOTAGE LOGGED
1118

BIT SIZE 4 1/2
BURR HOLES PLUS 1201 Mud
DENSITY
VISCOMITY
OPERATOR Hollander
UNIT NO 7528
LOCATION Craig

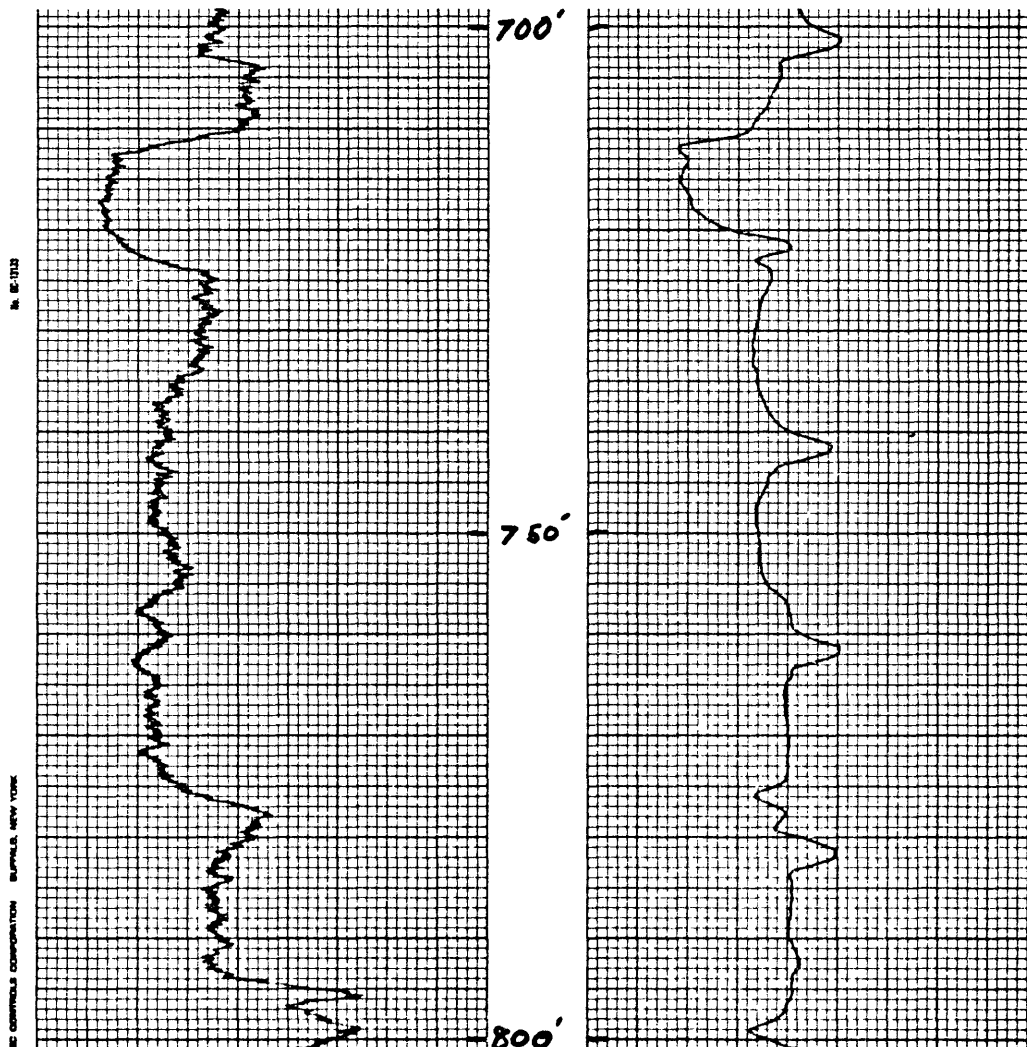
INITIAL RUN		DENSITY		GAMMA RESISTANCE		DRIVE	
SCALE	LOGGING SPEED	SCALE	LOGGING SPEED	SCALE	LOGGING SPEED	STAND BY	TIME IN
1118	25	2.5	20	0	0	0	1030
TIME CONSTANT 2	LOGGING SPEED 20	FROM	TO	FROM	TO	LOGGING 5.5	TIME OUT 1600
CALIBRATION & PROBE DATA		TOTAL		TOTAL		TOTAL	
SOURCE NO A453		SOURCE VALUE 4MCI		TOTAL		TOTAL	
PROBE NO 8060-2		PROBE NO 13/8		TOTAL		TOTAL	
DETECTOR Xtal		DETECTOR 1/2 X 2		TOTAL		TOTAL	
DEAD TIME 0.0		DEAD TIME 1.36 X 10 ⁻⁵		TOTAL		TOTAL	
WATER FACTOR 1.12		WATER FACTOR 1.0		TOTAL		TOTAL	
RES SCALE		RES SCALE		TOTAL		TOTAL	
S.P.		S.P.		TOTAL		TOTAL	

SELF POTENTIAL

DENSITY

NATURAL GAMMA RAY
COUNTS PER SECOND

RESISTANCE
OHMS





Century Geophysical Corporation
Denver, Colo.

EXHIBIT 3

C 366-B SP 17-000

DATE 11-16-75

WELL NO. Y-3

DEPTH 1200

COMPANY CSMRI

AREA Yampa valley
COUNTY Moffat

LOG NO. 412
LOG DATE 11-20-75

BORE HOLE Y-3

STATE Colo

LOG NO. 412

AREA Yampa valley
COUNTY Moffat

STATE Colo

LOG NO. CSMRI

LOG NO. 412

SECTION

TOWNSHIP

RANGE

LOG MEASURED FROM Surface

DATE 11-16-75

TOTAL FOOTAGE LOGGED 1118

LOG NO. 412

LOCATION Craig

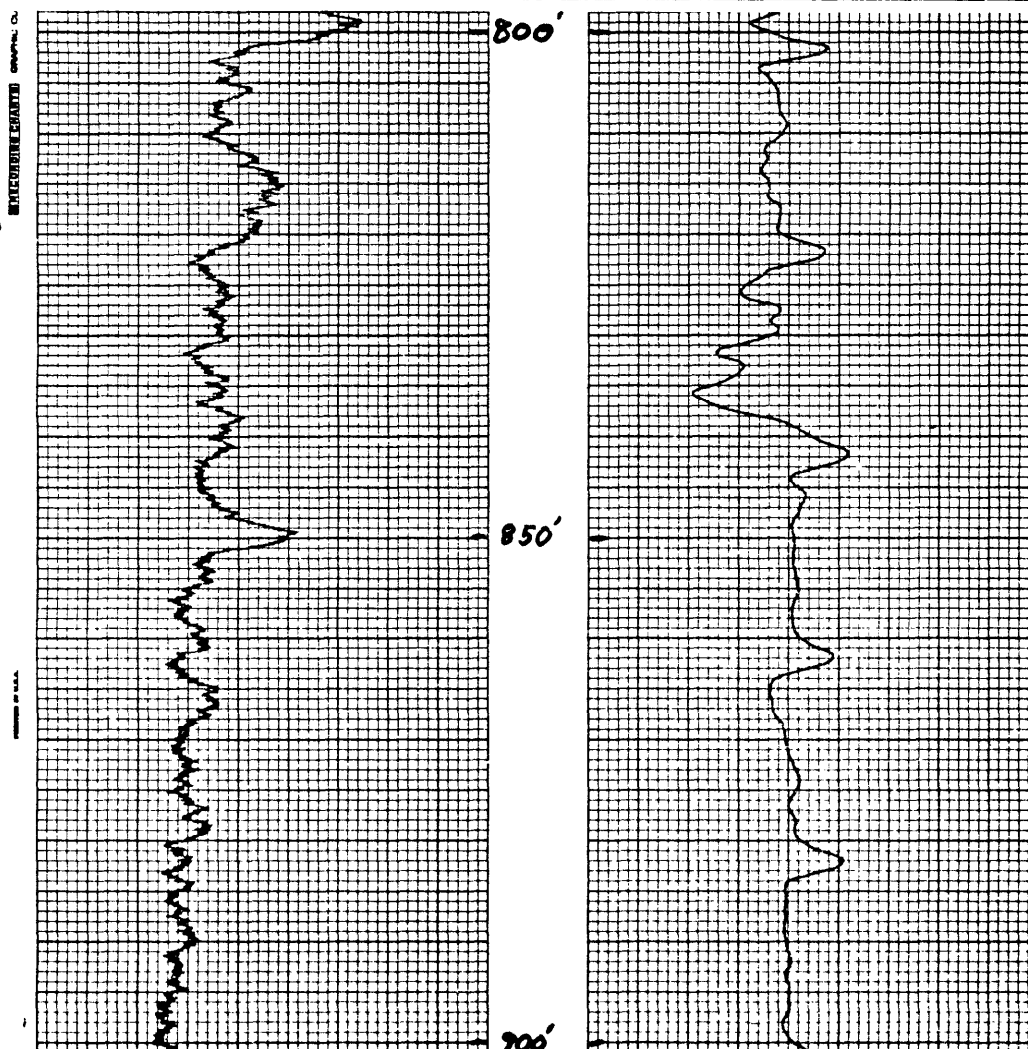
INITIAL RUN		DENSITY		GAMMA RAY		GAMMA RAY		GAMMA RAY		GAMMA RAY	
T.C. LOGGED		SCALE		SCALE		SCALE		SCALE		SCALE	
1118	25	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
GAMMA SCALE	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED
2	20	20	20	20	20	20	20	20	20	20	20
TIME CONSTANT	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED
2	20	20	20	20	20	20	20	20	20	20	20
CALIBRATION & POOR DATA	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED
2	20	20	20	20	20	20	20	20	20	20	20
SOURCE NO. A453	SOURCE VALUE 4MCI	SOURCE VALUE 4MCI	SOURCE VALUE 4MCI	SOURCE VALUE 4MCI	SOURCE VALUE 4MCI	SOURCE VALUE 4MCI	SOURCE VALUE 4MCI	SOURCE VALUE 4MCI	SOURCE VALUE 4MCI	SOURCE VALUE 4MCI	SOURCE VALUE 4MCI
PROBE NO. 8060-2	PROBE NO. 13/2	PROBE NO. 13/2	PROBE NO. 13/2	PROBE NO. 13/2	PROBE NO. 13/2	PROBE NO. 13/2	PROBE NO. 13/2	PROBE NO. 13/2	PROBE NO. 13/2	PROBE NO. 13/2	PROBE NO. 13/2
DETECTOR XTal	DETECTOR 1/2 X 2	DETECTOR 1/2 X 2	DETECTOR 1/2 X 2	DETECTOR 1/2 X 2	DETECTOR 1/2 X 2	DETECTOR 1/2 X 2	DETECTOR 1/2 X 2	DETECTOR 1/2 X 2	DETECTOR 1/2 X 2	DETECTOR 1/2 X 2	DETECTOR 1/2 X 2
DEAD TIME 0.0	DEAD TIME 1.36 X 10 ⁻⁵	DEAD TIME 1.36 X 10 ⁻⁵	DEAD TIME 1.36 X 10 ⁻⁵	DEAD TIME 1.36 X 10 ⁻⁵	DEAD TIME 1.36 X 10 ⁻⁵	DEAD TIME 1.36 X 10 ⁻⁵	DEAD TIME 1.36 X 10 ⁻⁵	DEAD TIME 1.36 X 10 ⁻⁵	DEAD TIME 1.36 X 10 ⁻⁵	DEAD TIME 1.36 X 10 ⁻⁵	DEAD TIME 1.36 X 10 ⁻⁵
WATER FACTOR 1.12	WATER FACTOR 1.0	WATER FACTOR 1.0	WATER FACTOR 1.0	WATER FACTOR 1.0	WATER FACTOR 1.0	WATER FACTOR 1.0	WATER FACTOR 1.0	WATER FACTOR 1.0	WATER FACTOR 1.0	WATER FACTOR 1.0	WATER FACTOR 1.0
AIR FACTOR	AIR FACTOR	AIR FACTOR	AIR FACTOR	AIR FACTOR	AIR FACTOR	AIR FACTOR	AIR FACTOR	AIR FACTOR	AIR FACTOR	AIR FACTOR	AIR FACTOR
1.12	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
RES SCALE	RES SCALE	RES SCALE	RES SCALE	RES SCALE	RES SCALE	RES SCALE	RES SCALE	RES SCALE	RES SCALE	RES SCALE	RES SCALE
1.12	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

SELF POTENTIAL

DENSITY

NATURAL GAMMA RAY
COUNTS PER SECOND

RESISTANCE
OHMS

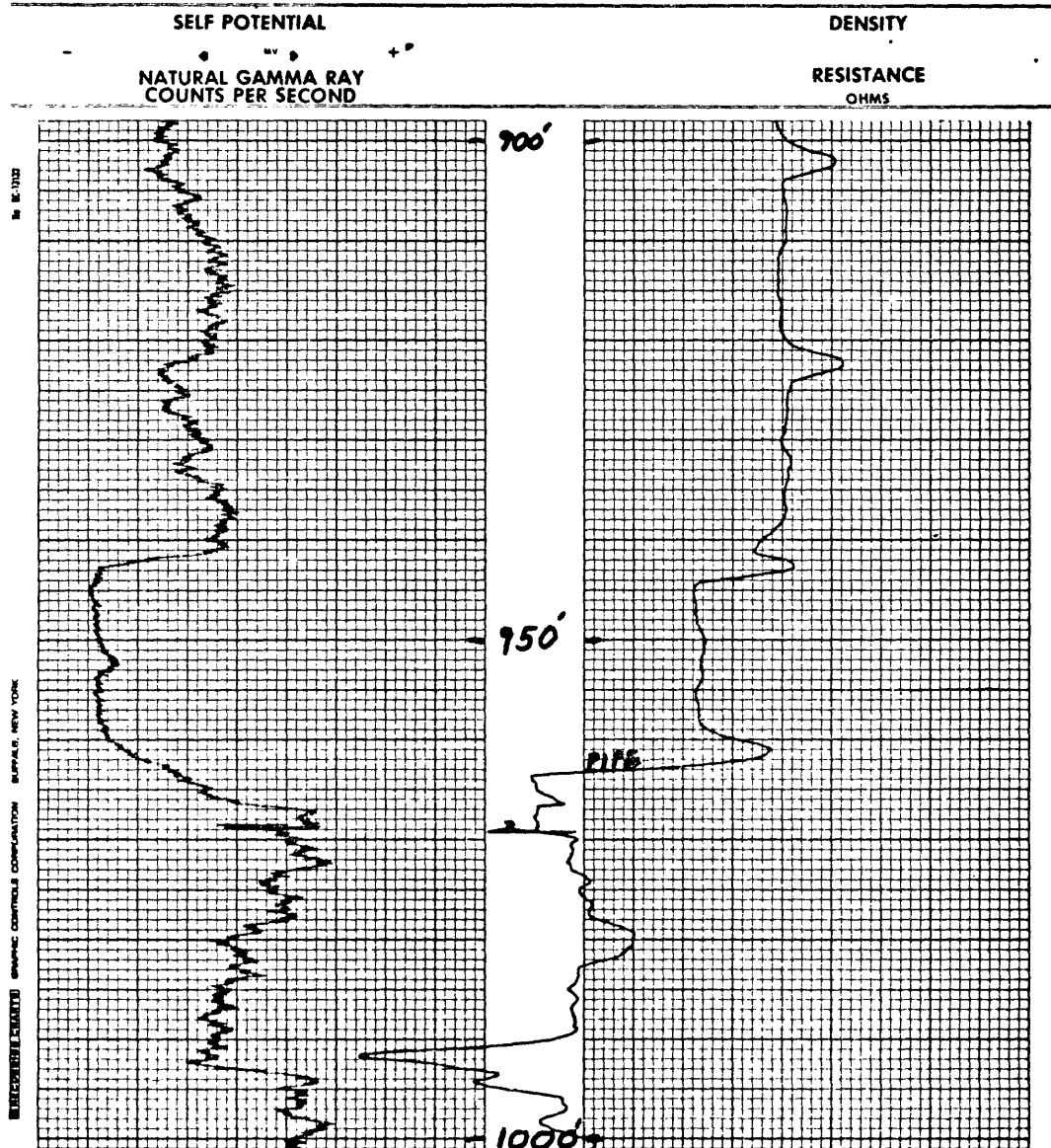




Century Geophysical Corporation
Denver, Colo.

EXHIBIT 3

C 300 S 3D 117400		DATE 11-16-75		HOLE NO Y-3		1200	
COMPANY CSMRI		AREA Yampa valley		COUNTY Moffat		STATE Colo	
BORE HOLE Y-3		TOWNSHIP		RANGE		SECTION	
COUNTY Moffat		STATE Colo		LOCAL MEASURED FROM Surface		TOTAL: FOOTAGE LOGGED 1118	
INITIAL RUN		DENSITY SCALE		GAMMA BEAMS (initial run only)		DRIVE 0.7	
TO LOGGED 1118		SCALE 2.5X		SCALE		TIME IN 1030	
GAMMA SCALE		LOGGING SPEED		LOGGING SPEED		STAND BY 0	
TIME CONSTANT 2		LOGGING SPEED 25		LOGGING SPEED		TIME OUT 1600	
CALIBRATION & PROBE DATA		LOGGING SPEED 20		LOGGING SPEED		LOGGING 5.5	
SOURCE NO A953		SOURCE VALUE 4Mci		LOGGING		TOTAL 6.2	
MODEL NO 8060-2		PROBE NO 1516		LOGGING		ROUNDTRIP MILES 40	
DETECTOR XTal		PROBE NO 1516		LOGGING		CHARGEABLE STANDBY	
DEAD TIME 0.0		PROBE NO 1516		LOGGING			
WATER FACTOR 1.12		PROBE NO 1516		LOGGING			
RES SCALE		PROBE NO 1516		LOGGING			





Century Geophysical Corporation
Denver, Colo.

WELL NO.	Y-3	
SEC.	TWP.	RANGE
AREA	Yampa valley	
COUNTY	Moffat	
STATE	Colo	
COMPANY	CSMRI	
DATE	11-16-75	
TOTAL FOOTAGE LOGGED	1118	

EXHIBIT 3

COMPANY	CSMRI
BORE HOLE	Y-3
AREA	Yampa valley
COUNTY	Moffat
STATE	Colo
TOWNSHIP	
RANGE	
LOG MEASURED FROM	Surface

FB LOGGED	1118
GAMMA SCALE	25
TIME CONSTANT	2
CALIBRATION & PROBE DATA	
SOURCE NO.	A453
PROBE NO.	8060-2
DETECTOR	XTal
DEAD TIME	0.0
WATER FACTOR	1.12
RES. SCALE	
SCALE	2.5
LOGGING SPEED	20
FROM	
TO	
TOTAL	

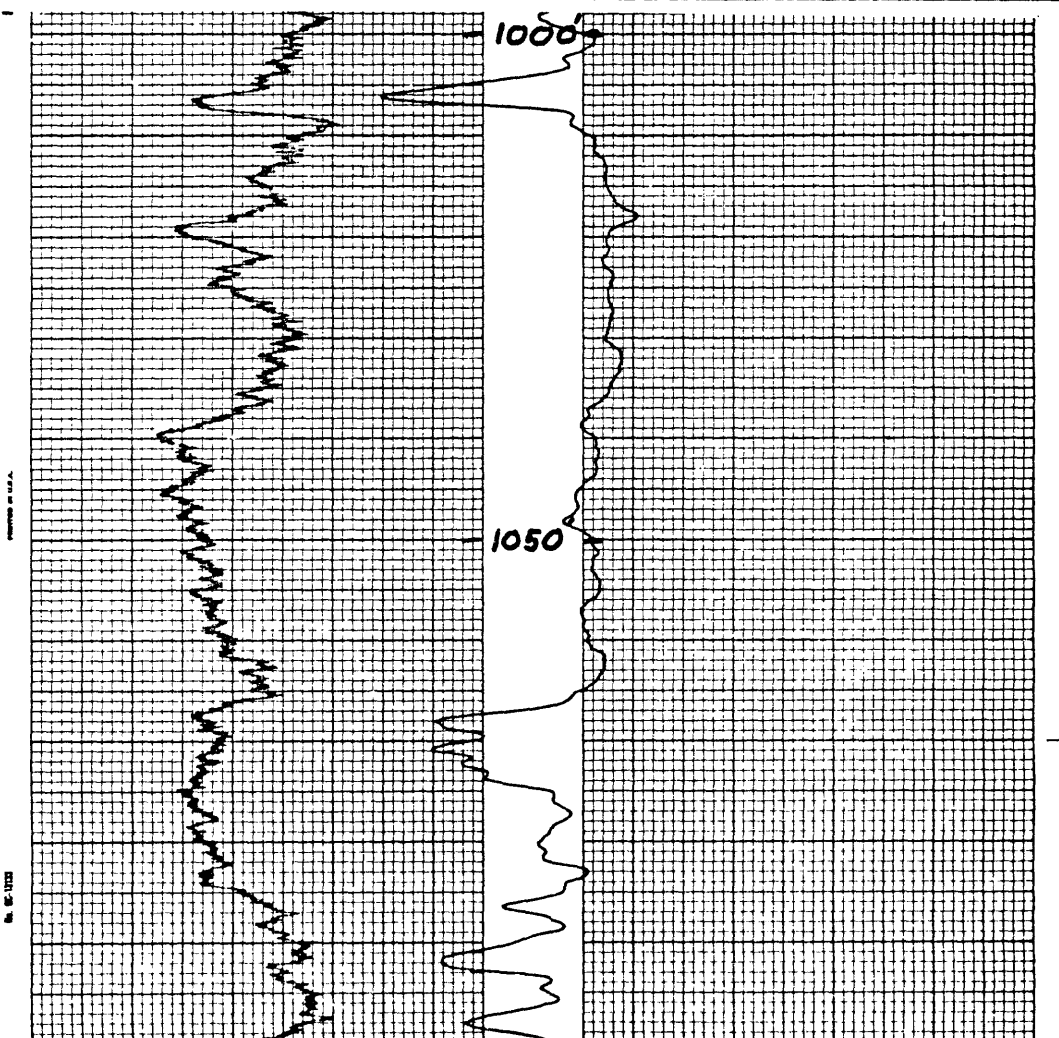
DRIVE	0.7
STAND BY	0
LOGGING	5.5
TOTAL	6.2
FOUNTAIN	40
MILEAGE	
CHARGEABLE	
STANDBY	

SELF POTENTIAL

DENSITY

NATURAL GAMMA RAY
COUNTS PER SECOND

RESISTANCE
OHMS





Century Geophysical Corporation
Denver, Colo.

EXHIBIT 3

C-360-1 09 117400

COMPANY **CSMRI**
BORE HOLE **Y-3**
AREA **Yampa valley**
COUNTY **Moffat**
SECTION **1118**

DATE **11-16-75**

WELL NO. **Y-3**
SEC **1** TWP **1** RANGE **1**
AREA **Yampa valley**
COUNTY **Moffat**
STATE **Colo**
COMPANY **CSMRI**
DATE **11-16-75**
TOTAL FOOTAGE LOGGED **1118**

LOG NO. **1200**
DIT SITE **41/2** CASING
BORE HOLE FLUID **11201/1nd**
DENSITY
VISCOSITY
OPERATOR **Hollander**
UNIT NO. **7528**
LOCATION **Craig**

INITIAL RUN		DENSITY		GAMMA ERRORS	
SCALE		SCALE		SCALE	
TC	5	TC	5	TC	5
LOGGING SPEED	20	LOGGING SPEED	20	LOGGING SPEED	20
FROM	0	FROM	0	FROM	0
TO	1118	TO	1118	TO	1118
TOTAL	1118	TOTAL	1118	TOTAL	1118

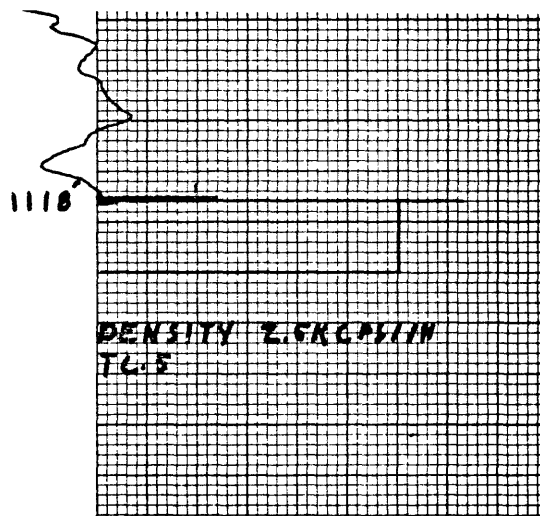
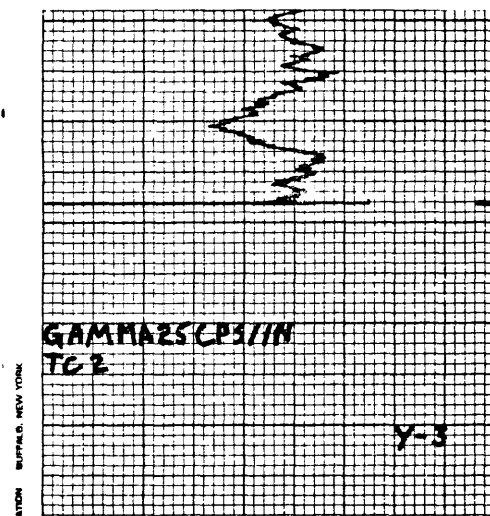
SOURCE NO. **A453**
PROB NO. **8060-2**
DEFECTOR **XTal**
DEAD TIME **0.0**
WATER FACTOR **1.12**
RES SCALE

SOURCE VALUE **4Mci**
PROB SIZE **1 1/2**
IR FACTOR **1.36 X 10⁵**
AIR FACTOR **1.0**

SP

SELF POTENTIAL
NATURAL GAMMA RAY
COUNTS PER SECOND

DENSITY
RESISTANCE
OHMS



Project No. H50146 COLORADO SCHOOL OF MINES RESEARCH INSTITUTE
 EXHIBIT 4 LITHOLOGIC LOG
 Hole No. Y-4 Elev. 6418' Total Depth 757' Location SE 1/4, SE 1/4, SE 1/4, SW 1/4, SEC 6 T6N, R9SW Date 10-01-75
 County MOFFAT State COLO Sponsor USGS Drilling Co. Boyles Bros Property BLM
 Geologist S.C. MULLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING Angular Subangular Subrounded Rounded	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL				
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed. Meta. Ign.	Most abund.	TOTAL %	Vitrinite	Clarinite	Durinite	Fusinite	
OVER BURDEN ↑	0	ALLUVIUM - SILT LOAM, YELLOW-BROWN, OXIDIZED	x	x				x	WELL	5			95											
			x					x	WELL	3			98											
	10		x					x	WELL	3			98											
			x					x	WELL	3			98											
	20		x					x	WELL	3			98											
			x					x	WELL	3			98											
	30	SLTST, DK GRAY	x					x	WELL	20	5	75		0						0				
			x					x	WELL	20	5	75		0						0				
			x					x	WELL	20	5	75		0						0				
	40		x					x	WELL	20	5	75		0						0				
			x					x	WELL	20	5	75		0						0				
	50	SLTST, DK GRAY W/MINOR SH, BLACK, BENT	x					x	WELL	25		75		0						0				
		x					x	WELL	25		75		0						0					
		x					x	WELL	25		75		0						0					
60	SS, WHITE - LT BROWN W/ SLTST, LT BROWN, INTBD	x					x	WELL	60		40		0						0					
		x					x	WELL	60		40		0						0					
		x					x	WELL	60		40		0						0					
70		x					x	WELL	60		40		0						0					
		x					x	WELL	60		40		0						0					
80		x					x	WELL	60		40		0						0					

Project No. H50146

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE

EXHIBIT 4 LITHOLOGIC LOGDate 10-01-75Hole No. Y-4 Elev. 6418' Total Depth 757' Location SE 1/4, SE 1/4, SE 1/4, SW 1/4, SEC 6 T6N, R93WProperty BLMCounty MOFFAT State COLO Sponsor USGS Drilling Co. BOYLES BROSGeologist S.C. MULLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL			
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed. Meta. Ign.	Most abund.	TOTAL %	Vitrinite	Clarinite	Durinite	Fusinite
80	...	SS, WHITE-LT BROWN w/ SLTST, LT BROWN INTBD	X					X	WELL	70			30			0			0				
	...	" "	X					X	WELL	70			30			0			0				
90	...	" "	X					X	WELL	70			30			0			0				
	...	" "	X					X	WELL	70			30			0			0				
100	...	" "	X					X	WELL	70			30			0			0				
	...	" "	X					X	WELL	70			30			0			0				
	...	" "	X					X	WELL	70			30			0			0				
110	COAL	COAL w/ SH, DK GREY, CARB INTBD	X						WELL	2			5			0			93	X			
	COAL	" "	X						WELL	2			10			0			88	X			
	COAL	" "	X						WELL	3			40			0			57	X			
120	COAL	" "	X						WELL	5			50			0			45	X			
	SS	SS, LT GREY, SILTY	X					X	WELL	65	5	30				0			0				
	SS	" "	X					X	WELL	65	5	30				0			0				
130	SS	" "	X					X	WELL	65	5	30				0			0				
	COAL	COAL											5			0			95	X			
140	COAL	" "											5						95	X			
	SS	SLTST, BROWN-GREY, SANDY w/ SH, DK BLUE-GREY, CARB INTBD	X					X	WELL	60			40			0			0				
	SS	" "	X					X	WELL	65			35			0			0				
150	SS	" "	X					X	WELL	62	3	35				0			0				
	SS	" "																					
160	SH	SH, BROWN-GREY	X						WELL	5			95			0			0				

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE

EXHIBIT 4 LITHOLOGIC LOG

 Project No. H50146

 Hole No. 44 Elev. 6418' Total Depth 757' Location SE 1/4, SE 1/4, SE 1/4, SW 1/4, SEC 6, T6N, R93W

 Date 10-01-75

 County MOFFAT

 State COLORADO

 Sponsor USGS

 Drilling Co. BOYLES BROS.

 Property BLM

 Geologist S.C. MULLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUNDING			SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL			
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0	Angular	Subangular	Subrounded	Rounded	Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed. Meta. Ign.	Most abund.	TOTAL %	Vitrain	Clarain	Durain	Fusain
160		SH, BROWN-GREY, SANDY	x							x	WELL	25			75			0			0				
			x							x	WELL	25			75			0			0				
170		COAL	x								WELL				2			0			98	x			
		"	x								WELL				2			0			98	x			
		SH, DK GREY, CARB W/ COAL INTBD	x								WELL				70			0			30				
			x								WELL				75			0			25				
180		SLTST, LT BROWN W/ SH, DK GREY, CARB INTBD	x							x	WELL	50			49			0			1				
		"	x							x	WELL	55			44			0			1				
		COAL W/ SH, DK GREY, CARB INTBD	x								WELL				55			0			45	x		x	
190		SLTST, LT BROWN W/ SH, DK GREY, CARB & MINOR COAL INTBD	x							x	WELL	50			47			0			3	x		x	
		SLTST, LT BROWN	x							x	WELL	65			35			0			0				
			x							x	WELL	60			40			0			0				
200		"	x							x	WELL	60			40			0			0				
		SLTST, LT BROWN W/ SH, DK GREY, CARB & COAL INTBD	x	x						x	MED	50			25	3		0			22	x		x	
			x	x						x	MED	60			35	1		0			4	x		x	
210		SH, DK GREY, CARB W/ MINOR SLTST, BROWN & COAL	x	x						x	MED	20			70	1		3			CNT	6	x		
		SLTST, BROWN W/ MINOR SH, DK GREY, CARB & COAL	x	x	x					x	POOR	35			59	2		0			4	x			
220		"	x	x	x					x	POOR	40			54	2		0			4	x			
		SLTST, GREY	x								WELL	55			5	40		0			0				
			x								WELL	55			5	40		0			0				
230		SLTST, BROWN W/ SH, DK GREY-GREY, CARB & MINOR COAL INTBD	x								WELL	42			3	50	2				3	x			
			x								WELL	42			4	50	1				3	x			
240		SLTST, BROWN	x																						

Project No. H50146

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE

EXHIBIT 4 LITHOLOGIC LOGDate 10-01-75Hole No. 4-4 Elev. 6418' Total Depth 757' Location SE 1/4, SE 1/4, SE 1/4, SW 1/4, SEC 6, T6N, R93WProperty BLMCounty MOFFAT State COLO Sponsor USGS Drilling Co. BOYLES BROSGeologist J.C. MULLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL		
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed. Meta. Ign.	Most abund.	TOTAL %	Vitrain	Clarain	Durain
240	SLTST, BROWN w/ MINOR SH, DK GRAY - BLUE INTBD	x					x	WELL	55	5	40				0			0			
		x					x	WELL	55	5	40				0			0			
250	SH, BLUE-GRAY, BENT(?) w/ MINOR SLTST, BROWN INTBD	x					x	WELL	20	5	75				0			0			
		" "	x					x	WELL	20	2	78				0			0			
		x					x	WELL	20	2	78				0			0			
260	SLTST, BROWN w/ MINOR SH, DK GRAY - BLUE INTBD	x					x	WELL	50	5	45				0			0			
		x					x	WELL	50	5	45				0			0			
	" "	x					x	WELL	45	5	50				0			0			
270		x	x				x	MED-WELL	55	5	40				0			0			
		x	x				x	MED-WELL	55	8	37				0			0			
280	" "	x	x				x	MED-WELL	55	8	37				0			0			
		COAL w/ SH, DK GRAY, CARB INTBD	x	x				x	MED	3		17				0			80	x	x	
290										0		2				0			98	x	x	
		COAL								0		0				0			100	x		
		"								0		0				0			100	x		
300		COAL w/ SH, DK GRAY, CARB INTBD		x	x			x	MED	5		15				0			80	x	x	
WATER	SH, BLUE-GRAY w/ MINOR SLTST, BROWN INTBD	x					x	WELL	15	5	80				0			0			
310	" "	x					x	WELL	15	5	80				0			0			
		COAL w/ SS, S:P INTBD	x					x	WELL	10	10	5				0			75	x		
320		" "	x					x	WELL	10	10	5				0			75	x		

Project No. H50146

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE

EXHIBIT 4 LITHOLOGIC LOGDate 10-01-75Hole No. Y-4 Elev. 6410' Total Depth 757' Location SE 1/4, SE 1/4, SE 1/4, SW 1/4, SEC 6, T6N, R93WProperty BLMCounty MOFFAT State COLO Sponsor USGS Drilling Co. BOXER'S BROS.Geologist S.C. MULLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING	SORTING (poor, med., well)	TOTAL PERCENTI MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL			
			.06-.25	.25-.5	.5-1.0	>1.0				Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed. Meta. Ign.	Most abund.	TOTAL %	Vitrain	Clarain	Durain	Fusain
320		COAL w/ SS, S&P INTBD	x					x	WELL	10		10	5			0			75	x			
		SH, DK GREY, CARB w/ MINOR COAL	x					x	WELL	5		5	80			0			10	x			
		" "	x					x	WELL	5		5	87			0			3	x			
330		" "	x					x	WELL	5		5	87			0			3	x			
		COAL w/ SS, GREY INTBD	x					x	WELL	10		15	0			0			75	x			
		" "	x					x	WELL	20		20	0			0			60	x			
340		SS, GREY - S&P w/ COAL INTBD	x	x				x	MED	25		40	0			0			35		x		
		" "	x	x				x	MED	25		30	10			0			35		x		
		SS, GREY w/ SH, DK GREY CARB AND COAL INTBD	x					x	WELL	30		30	17	3		0			20	x	x		
350		" "	x					x	WELL	27		30	25	3		0			15	x	x		
		SH, DK GREY, SANDY w/ SS, GREY & YELLOW-BROWN INTBD	x					x	WELL	10		15	72			0			3		x		
360		" "	x					x	WELL	15		20	65			0			0				
		" "	x					x	WELL	15		20	65			0			0				
		SH, GREY, SANDY w/ SS, S&P INTBD	x					x	WELL	30		30	32	3	2				3	x			
370		SS, S&P w/ SH, GREY, SANDY INTBD	x					x	WELL	40		40	19		1	0			0				
		" "	x					x	WELL	40		40	13	2		0			5	x			
380		" "	x					x	WELL	40		40	13	2		0			5	x			
		COAL, LIGNITIC w/ SH, DK GREY, CARB & SS, S&P INTBD	x					x	WELL	15		15	10	3					57	x	x		
		" "	x					x	WELL	15		15	10	3					57	x	x		
390		SH, DK GREY, SANDY & CARB	x					x	WELL	5		5		86	1				3	x	x		
		" "	x					x	WELL	5		5		80	2				8	x	x		
		" "	x					x	WELL	5		5		80	2				8	x	x		
400		COAL w/ SH, DK GREY, CARB & SS, S&P INTBD	x					x	WELL	10		10		33	1	1			45	x	x	x	

Project No. H50146

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE

EXHIBIT 4 LITHOLOGIC LOGDate 10-01-75Hole No. Y-4 Elev. 6418' Total Depth 757' Location SE 1/4, SE 1/4, SE 1/4, SW 1/4, SEC 6, T6N, R93WProperty BLMCounty MOFFAT State COLO Sponsor USGS Drilling Co. BOYLES BROS.Geologist S.C. MULLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING			SORTING (poor, med., well)	TOTAL PERCENTI MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL				
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0	Angular	Subangular	Subrounded		Rounded	Quartz	Feldspar	Mafica	Clay	Pyrite	Others	TOTAL %	Sed.	Meta.	Ign.	Most abund.	TOTAL %	Vitrain	Clarain
400		COAL w/ SH, DK GRAY, CARB INTBD	x						x		WELL	1			47	2		0					50	x	x	x
		COAL										3		1	4	2	1	0					89	x	x	x
410		"										3		1	4	2	1	0					89	x	x	x
BURN → ZONE?		SH, DK GRAY, CARB w/ COAL & MINOR SS, S&P & BROWN-ORANGE (OXIDIZED) INTBD	x						x	WELL	5	5	79			1	0						10	x		x
			x						x	WELL	10	10	63			2	0						15	x		x
420		SS, S&P w/ COAL, MINOR SH, DK GRAY, CARB & SS, BROWN-ORANGE (OXIDIZED) INTBD	x						x	WELL	25		22	25			3	0					25	x		
		" "	x						x	WELL	30		29	15			1	0					25	x		
430		" "	x						x	WELL	24		24	10			2	0					40	x		
		SH, DK GRAY, CARB w/ MINOR COAL & SS, S&P INTBD	x						x	WELL	10		10	70			2	0					8	x		x
		" "	x						x	WELL	3		2	92				0					3	x		
440		" "	x						x	WELL	10		10	73	2			0					5	x	x	x
		" "	x						x	WELL	2		2	90	1			0					5	x		
450		" "	x						x	WELL	1		1	97				0					1		x	
		" "	x						x	WELL	3		3	90				0					4		x	x
460		" "	x						x	WELL	1		1	83				0					15		x	
		COAL													2											
															2	1		0					97	x		x
470		"													8	1		0					91		x	x
		"													1	1							98		x	x
480																										

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE

EXHIBIT 4 LITHOLOGIC LOG

 Project No. H50146

 Date 10-01-75

 Hole No. Y-4 Elev. 6410' Total Depth 751' Location SE 1/4, SE 1/4, SE 1/4, SW 1/4, SEC 6, T6N, R93W Property BLM

 County MOFFAT State COLO Sponsor USGS Drilling Co. BOYLES BROS Geologist S.C. MULLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL			
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed. Mcta. Ign.	Most abund.	TOTAL %	Vitrain	Clarain	Durain	Fusain
480		COAL												3	1	0			96				XX
														3	1	0			96				XX
		SLTST, GREY, CARB W/ SH, DK GREY, CARB, COAL & SS, S&P INTBD	X					X	WELL	20	20	49	1	0					10				XX
490			X					X	WELL	25	25	47		0					3				X
		" "	X					X	MED- WELL	40	34	20		0					6				XX
500			X					X	MED- WELL	30	25	30		0					15				XX
		" "	X					X	MED- WELL	25	25	25	1	0					24				X
510			X	X	X			XX	POOR- MED	40	20	18	1	1	X	GREY			20				XX
		" "	X	X	X			X	MED	40	20	24	1	0					15				X
520			X					X	MED	40	20	28		2	0				10				XX
		" "	X	X	X			XX	POOR- MED	40	25	32		0					3				X
530			X					X	WELL	40	25	34		0					1				X
		COAL W/ SLTST, GREY, CARB & SS, S&P INTBD	X					X	WELL	30	15	15		0					40	X			X
540		" "	X					X	WELL	30	15	20		0					35				XX
		SS, S&P W/ SLTST, GREY, CARB & COAL INTBD	X					X	WELL	45	30	10							15				XX
		" "	X					X	WELL	45	30	10		0					15				XX
550			X					X	WELL	45	30	10		0					15				XX
		" "	X					X	WELL	45	30	10		0					15				XX
		SLTST, GREY, CARB W/ SS, S&P, & COAL INTBD	XX					X	WELL	30	30	30		0					10				XX
560			X					X	WELL	30	30	30		0					10				XX

Project No. H50146

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE

EXHIBIT 4 LITHOLOGIC LOGDate 10-01-75Hole No. Y-4 Elev. 6418' Total Depth 757' Location SE 1/4, SE 1/4, SE 1/4, SW 1/4, SEC 6, T6N, R93WProperty BLMCounty MOFFAT State COLORADO Sponsor USGS Drilling Co. BOYLES BROS.Geologist S.C. MULLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUNDING Angular Subangular Subrounded Rounded	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL				
			.06-.25	.25-.5	.5-1.0	>1.0	Quartz			Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed.	Meta.	Ign.	Most abund.	TOTAL %	Vitrain	Clarain	Durain	Fusain
560		SH, GREY W/ SH, DK GREY, CARB INTBD	x					x	WELL	3		3	88	1		0				5	x		x	
		" "	x					x	WELL	1		1	98			0				0				
570		SLTST, GREY W/ SH, DK GREY, CARB INTBD	x					x	WELL	20		5	72			0				3		x		
		" "	x					x	WELL	25		15	58			0				2		x		
580		" "	x					x	WELL	50		15	35			0				0				
		SS, S&P W/ SLTST, GREY, CARB & MINOR COAL INTBD	x					x	WELL	45		37	8			0				10			xx	
590		" "	x					x	WELL	45		33	5		2	0				15			xx	
		" "	x					x	WELL	45		33	5		2	0				15			xx	
		COAL W/ SS, S&P & SLTST, GREY, CARB INTBD	x					x	WELL	10		10	8		2	0				70			xx	
600		" "	x					x	WELL	20		20	15		0	0				45			xx	
		" "	x					x	WELL	20		20	25		0	0				35			xx	
610		SLTST, GREY, CARB W/ MINOR COAL	x	x				x	MED	30		23	30		2	0				15			xx	
		" "	x	x				x	MED	30		24	25		1	0				20			xx	
		COAL W/ SH, GREY INTBD	x						WELL	3		3	29			0				65			xx	
620		" "	x						WELL	3		3	29			0				65			xx	
		SH, DK GREY, CARB	x										98			0				2			x	
		" "	x										100			0				0				
630		" "	x										100			0				0				
		SLTST, GREY CARB. W/ SH, DK GREY CARB & MINOR COAL INTBD	x	x				x	MED	30		15	42		1	0				12			x	
		" "	x	x				x	MED	30		15	42		1	0				12			x	
640		SS, S&P W/ SH, DK GREY, CARB & MINOR COAL INTBD	x					x	WELL	45		30	20			0				5			x	

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE

EXHIBIT 4 LITHOLOGIC LOG

 Project No. H50146

 Date 10-01-75

 Hole No. Y-4 Elev. 6410' Total Depth 757' Location SE 1/4, SE 1/4, SW 1/4, SEC 6, T6N, R93W Property BLM

 County MOFFAT State COLO Sponsor USGS Drilling Co. BOYLES, BROS. Geologist S.C. MULLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL			
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed. Mela. Ign.	Most abund.	TOTAL %	Vitrinite	Clarinite	Durinite	Fusinite
640		SS, S&P w/ SH, GREY & MINOR SS, BUFF INTBD	X	X				X	MED	50		25	25			0			0				
		SH, LT-DK GREY w/ SLTST, S&P & COAL INTBD	X					X	WELL	30		25	30			0			15			X	
650		COAL w/ SLTST, S&P INTBD	X					X	WELL	5		5	4		1	0			85			XX	
		COAL	X					X	WELL	1			1			0			98			X	
660		"											1	1		0			98			XX	
		"											1	1		0			98			XX	
		SLTST, DK GREY, CARB ?	X					X	WELL	30			70			0			0				
670		"	X					X	WELL	30			65			0			5			XX	
		"	X					X	WELL	30			65			0			5			XX	
		SLTST, BROWN w/ SH, LT GREY & COAL INTBD	X					X	WELL	40			18		2	0			40			X	
680		"	X					X	WELL	30			28		2	0			40			X	
		COAL w/ SLTST, BROWN & SH, LT GREY INTBD	X					X	WELL	20			18		2	0			60			XX	
690		SLTST, LT GREY & DK GREY, CARB w/ SS, S&P & COAL INTBD	X					X	WELL	35		15	15			0			35			X	
		"	X					X	WELL	33		20	15		2	0			30			X	
700		"	X					X	WELL	30		15	15		5	0			35			XX	
		"	XXX					XX	POOR	40		25	24		5	1	X	Car	5			X	
710		"	XX					X	MED	40		25	25	1	5				4			X	
		"	XX					X	MED	40		25	25	1	5				4			X	
720		SS, S&P w/ MINOR COAL & SLTST, LT BROWN INTBD	X					X	WELL	65		29	5		3				3			X	

Project No. H50146

Hole No. Y-4 Elev. 6418' Total Depth 757' Location SE 1/4, SE 1/4, SE 1/4, SW 1/4, SEC 6, T6N, R93W Property BLM

County MOFFAT State COLO Sponsor USGS Drilling Co. BOYLE'S BROS Geologist S.C. MULL

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING			SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL			
			.0025-.125	.125-.25	.25-.5	.5-1.0	>1.0	Angular	Subangular	Subrounded		Rounded	Quartz	Feldspar	Malice	Clay	Pyrite	Others	TOTAL %	Sed.	Meta.	Ign.	Most abund.	TOTAL %	Vitrain
720		SS, SS P W/MINOR COAL & SLTST, LT BROWN INTBD	X						X	WELL	60	22	5		3	0						10		X	
		" "	X						X	WELL	60	25	5		3	0						7		X	
730		" "	X	X	X			X	X	POOR	30	25	30	2	3	0						10		X	
		" "	X						X	WELL	60	27	5		3	0						5		X	
740		" "	X						X	WELL	60	25	5		3	0						7		X	
		" "	X						X	WELL	60	25	5		3	0						7		X	
750		" "	X						X	WELL	60	25	5		3	0						7		X	
		SS, LT GRAY, CARB(?)	X						X	WELL	75	15										10		X	
		" "	X						X	WELL	75	15										10		X	
760																									
770																									
780																									
790																									
800																									



C 364 F SP 117600

COMPANY

CSMRI

BORE HOLE

Y-4

AREA

Yampa valley

COUNTY

Moffat

SECTION

TOWNSHIP

RANGE

Colorado

Top of casing

DATE 10-10-75

MOI 4-4

SEC

TWP

RANGE

Yampa Valley

Moffat

Colorado

CSMRI

DATE 10-10-75

TOTAL FOOTAGE LOGGED

740

TO CORRECTION

752

BORE HOLE FLUID

Air H₂O

DENSITY

RESISTIVITY

OPERATOR

J. Hollander

UNIT NO.

75-28

LOCATION

Cray Colo

TIME IN

0.8

TIME OUT

2.00

INITIAL RUN

TO LOGGED

LAMMA SCALE

CONSTANT

CALIBRATION & PROBE DATA

SOURCE NO

A453

PROBE NO

8014-101

DATE

10-20-49

TYPE & SIZE

XTAL

17 sec

WATER FACTOR

1.14

RES SCALE

10 ohm per 1 inch

S.P.

Me/in

Density

SCALE

25K

LOGGING SPEED

5 Sec 20 Ft/Min

FROM

TO

TOTAL

GAMMA BEAMS

Initial run off scale

SCALE

5K

LOGGING SPEED

5 Sec 20 Ft/Min

FROM

TO

TOTAL

SCALE

LOGGING SPEED

5 Sec 20 Ft/Min

FROM

TO

TOTAL

SCALE

LOGGING SPEED

5 Sec 20 Ft/Min

FROM

TO

TOTAL

LOGGING

1.6

TOTAL

2.5

ROUNDTRIP

MILEAGE

46

CHARGEABLE

STANDBY

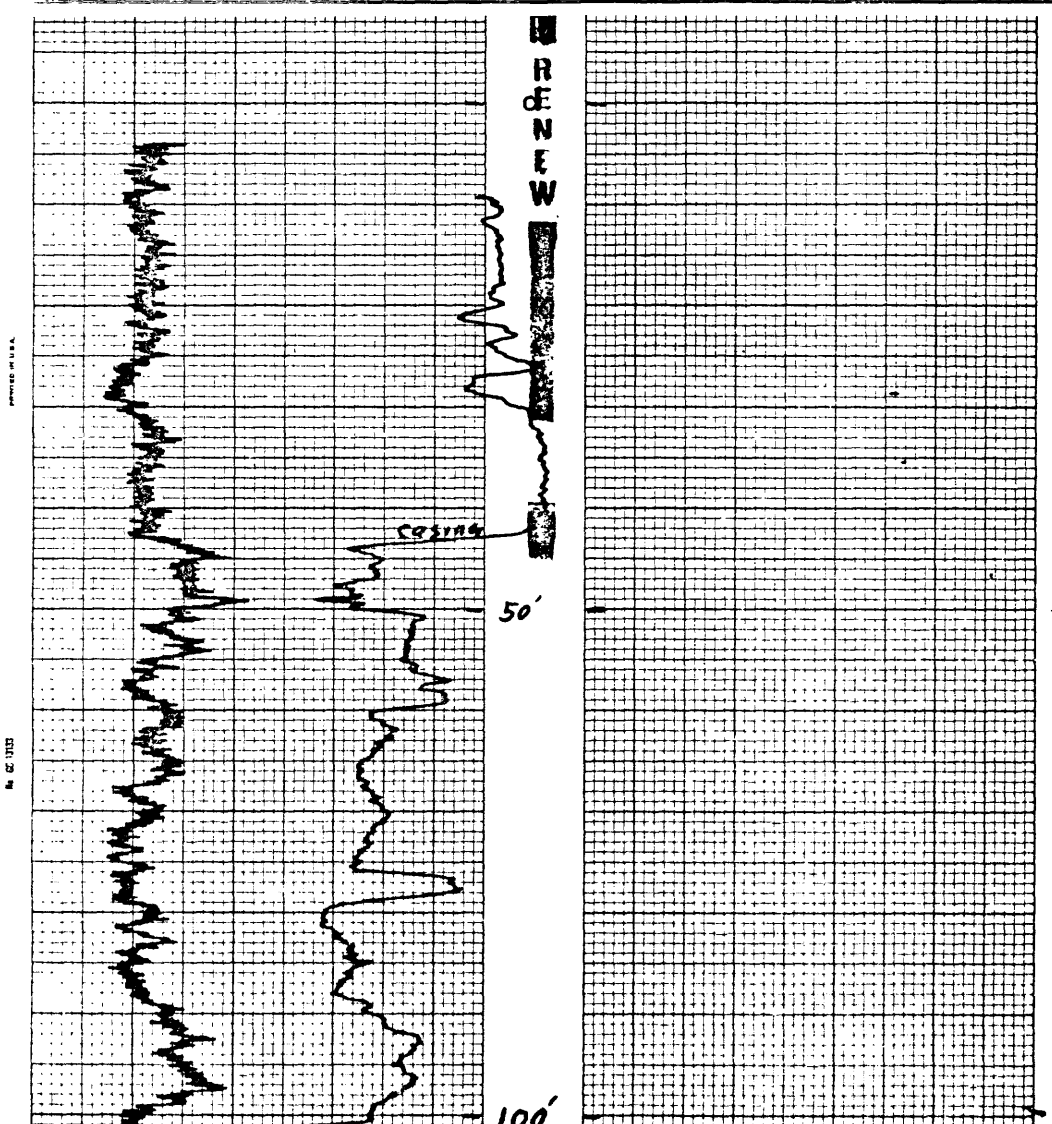
Not

SELF POTENTIAL

DENSITY

NATURAL GAMMA RAY
COUNTS PER SECOND

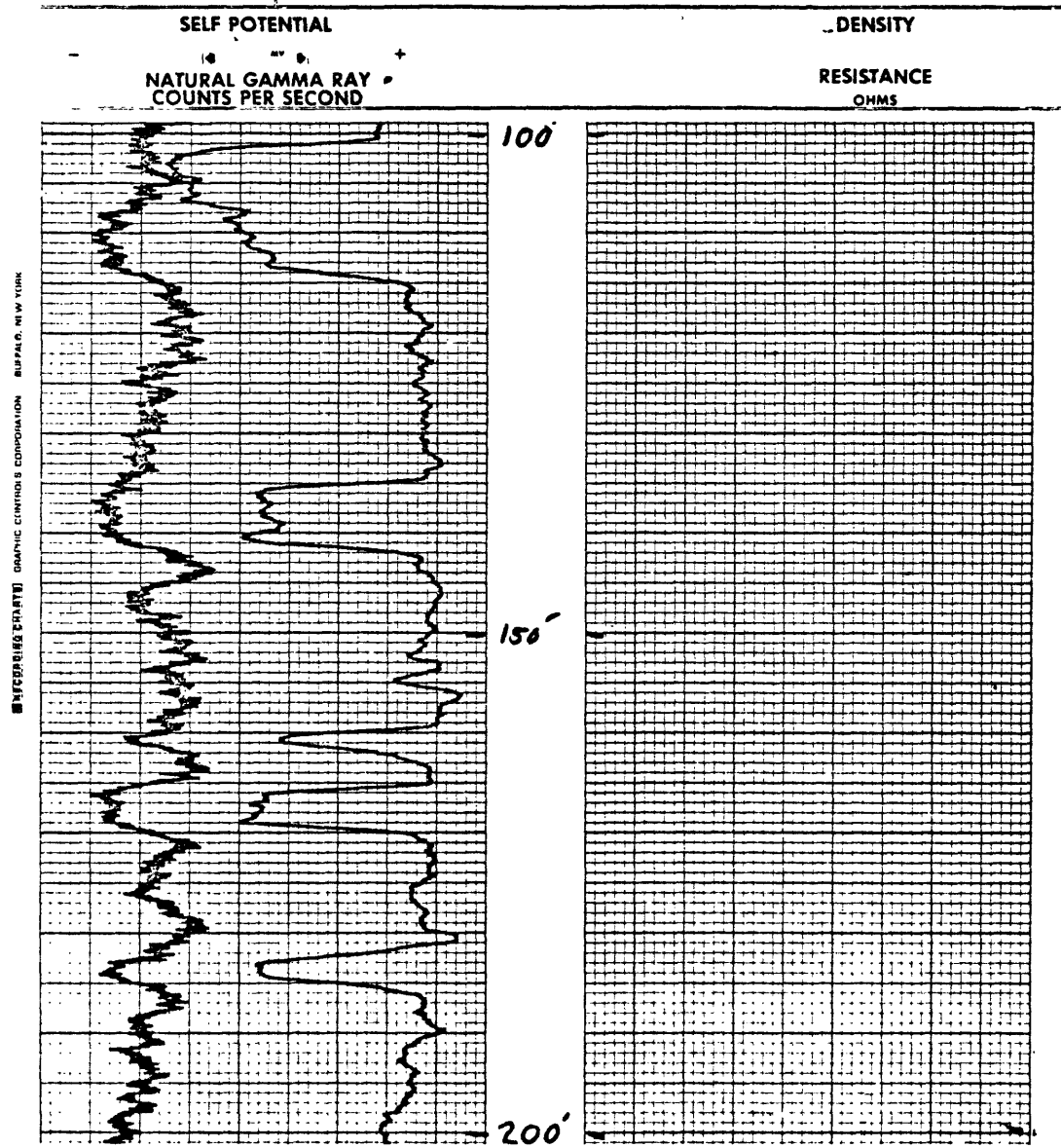
RESISTANCE
OHMS



COMPANY CSMRI BORE HOLE Y-4 AREA Yampa valley COUNTY Moffat SECTION Township		DATE 10-10-75 STATE Colorado LOG MEASURED FROM Top of Casing		AREA Yampa Valley COUNTY Moffat STATE Colorado COMPANY CSMRI DATE 10-10-75 TOTAL FOOTAGE LOGGED 740		BIT SIZE 5 7/8 CASING 4 3/4 BORE HOLE FLUID Air & H ₂ O NEUTRITY 75-28 OPERATOR J. Hollander UNIT NO. 75-28 LOCATION Craig Colo DRIVE 0.8 TIME IN 24.24 STAND BY 0 TIME OUT 2.00 LOGGING 1.6 TOTAL 2.5 SOUNDING 46 CHARGEABLE STANDST	
--	--	--	--	--	--	--	--

INITIAL RUN 740 DENSITY SCALE 25K LOGGING SPEED 5 Sec 20 Ft/Min FROM TO TOTAL 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100	INITIAL RUN 740 DENSITY SCALE 5K LOGGING SPEED 5 Sec 20 Ft/Min FROM TO TOTAL 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100	INITIAL RUN 740 DENSITY SCALE 5K LOGGING SPEED 5 Sec 20 Ft/Min FROM TO TOTAL 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100
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SOURCE NO A453 MOORE NO 8010-101 DEPT 10-20-49 TYPE & SIZE XT-1 7/8 x 1 1/4 DRILL TIME 17 sec WATER FACTOR 1.14 PER SCALE 10	SOURCE VALUE 4 Mci PROBE LIFE 15/6 TYPE & SIZE 7/8 x 1 1/4 WATER FACTOR 1.0
--	--



Denver, Colo.

C 304 P SP 117400

DATE 10-10-75

COMPANY CSMRI

BORE HOLE Y-4

AREA Yampa valley

COUNTY Moffat

STATE Colorado

SECTION

TOWNSHIP

RANGE

LOG MEASURED FROM Top of casing

SEC 4

TWP

RANGE

BIT SIZE 7 5/8

CASING 43 FT

BORE HOLE FLUID Air + H₂O

DENSITY

VISCOSITY

STATE Colorado

COMPANY CSMRI

DATE 10-10-75

TOTAL FOOTAGE LOGGED 740

OPERATOR J. Hollander

UNIT NO 75-28

LOCATION Craig Colo

DRIVE 0.8

TIME IN 24.24

STAND BY 0

TIME OUT 2.00

LOGGING

1.6

2.5

46

BOUNDSTRIP MILEAGE

CHARGEABLE STANDBY

INITIAL RUN

TO LOGGED 740

DAMMA SCALE

10 Cps Per In

LOGGING SPEED 20 Ft/Min

LIMIT CONSTANT 2

CALIBRATION & PROBE DATA

SOURCE NO A453

SOURCE VALUE 4 Mci

PROBE NO 8010-101

PROBE SIZE 1 5/8

QUALITY XTal

TYPE & SIZE 7/8 x 1 1/4

DEAD TIME 19 sec

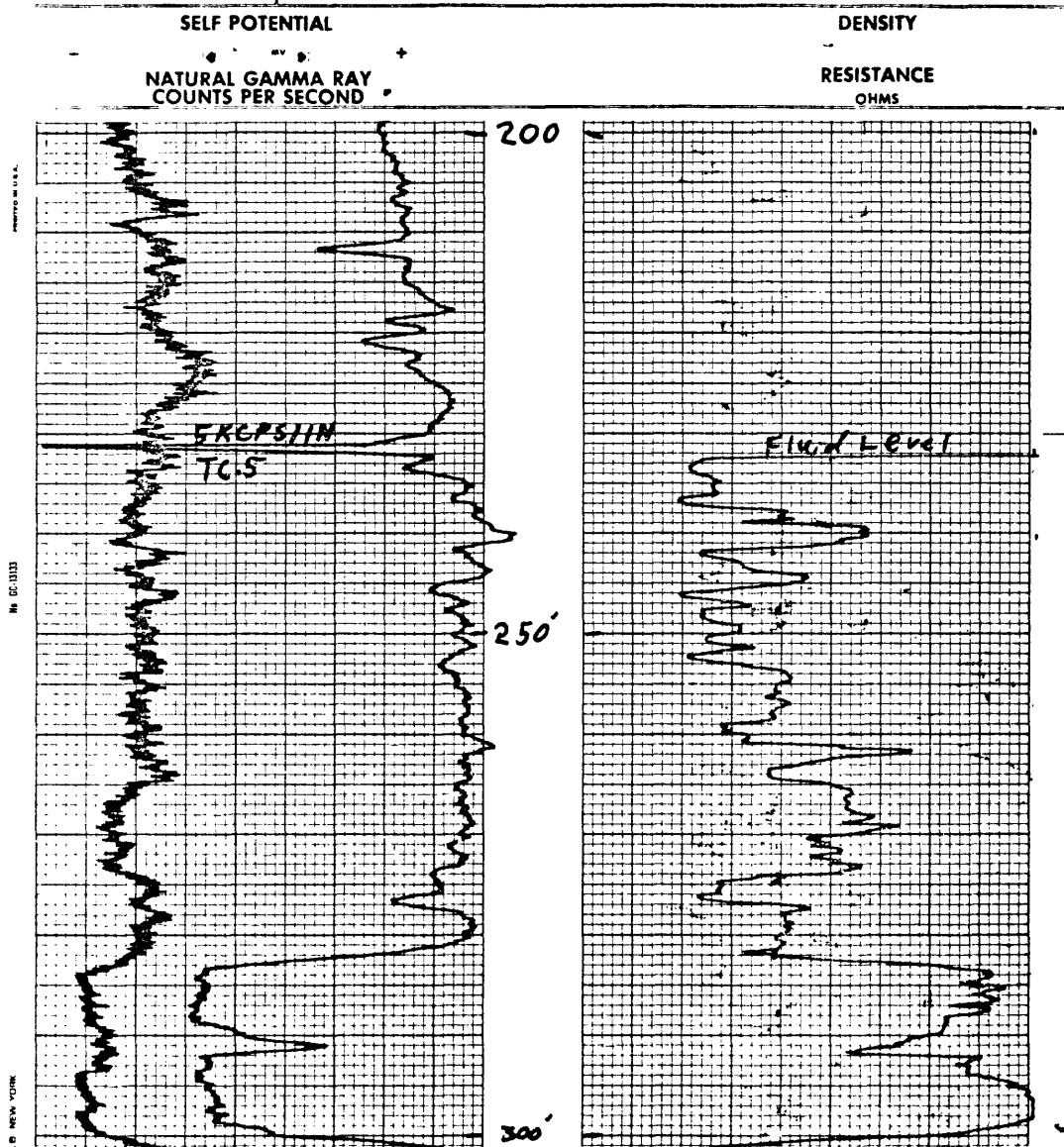
K FACTOR 1.59 x 10⁻⁵

WATER FACTOR 1.14

AIR FACTOR 1.0

RES SCALE 10

SP





C 368 E 30-117MB

DATE 10-10-75

AREA Yampa Valley
TOWNSHIP Moffat
COUNTY Colorado
STATE Colorado
LOG MEASURED FROM TOP OF Casing
TOTAL FOOTAGE LOGGED 740

BORE HOLE 548
BORE HOLE DEPTH 43 FT
BORE HOLE FLUID Air + H₂O
DENSITY
VISCOSITY
RESISTIVITY
OPERATOR J. Hollander
UNIT NO 75-28
LOCATION Craig Colo
DEVI 0.8
TIME IN 24.24
TIME OUT 2.00
STAND BY 0
LOGGING 1.6
TOTAL 2.5
ROUNDTRIP MILEAGE 46
CHARGEABLE STANDBY

COMPANY CSMRI
BORE HOLE Y-4

AREA Yampa valley
COUNTY Moffat

SECTION TOWNSHIP STATE Colorado
LOG MEASURED FROM TOP OF Casing

INITIAL RUN
TB LOGGED 740
GAMMA SCALE
TIME CONSTANT 2
CALIBRATION & PROBE DATA
SOURCE NO A453
MOB NO 8010-101
DEVI 0.8
DEAD TIME 17 sec
WATER FACTOR 1.14
RES SCALE 10
gms per 1 inch

Density

SCALE 25K

LOGGING SPEED 20

FROM TO

TOTAL

GAMMA ROUNDS

SCALE 5K

LOGGING SPEED 20

FROM TO

TOTAL

SCALE

LOGGING SPEED

FROM TO

TOTAL

SCALE

LOGGING SPEED

FROM TO

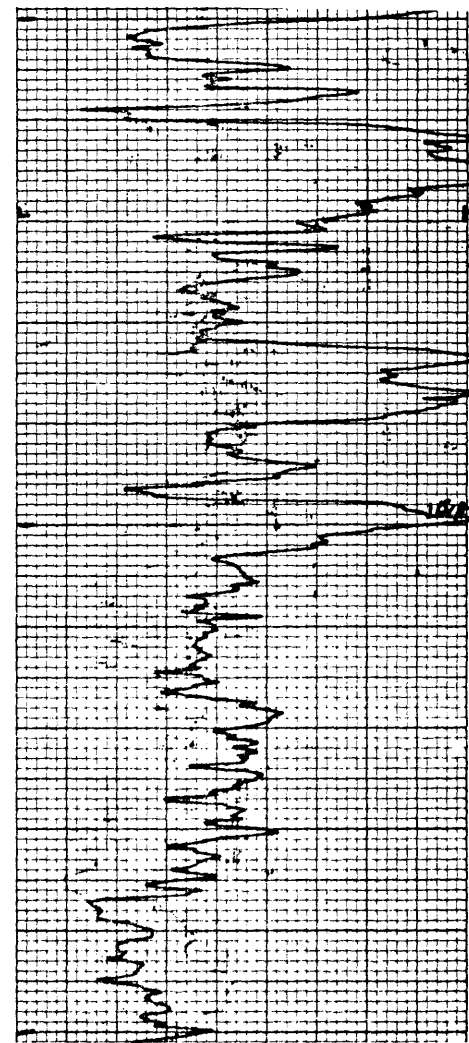
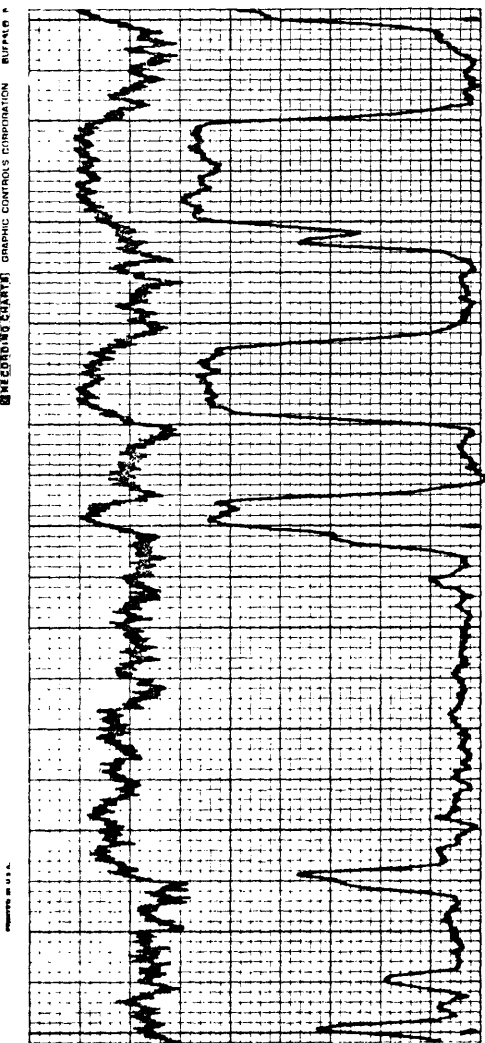
TOTAL

SELF POTENTIAL

DENSITY

NATURAL GAMMA RAY
COUNTS PER SECOND

RESISTANCE
OHMS





C 346 I SP 117400

COMPANY

CSMRI

BORE HOLE

Y-4

AREA

Yampa valley

COUNTY

MoFFat

SECTION

TOWNSHIP

RANGE

Colorado

Top of Cassing

INDEX NO

Y-4

SEC

TWP

RANGE

AREA

Yampa Valley

COUNTY

MoFFat

STATE

Colorado

COMPANY

CSMRI

DATE

10-10-75

TOTAL FOOTAGE LOGGED

740

T.D. DRILLED

752

BIT SIZE

5 7/8

BORE HOLE FLUID

air + H₂O

DENSITY

VISCOSITY

RESISTIVITY

OPERATOR

J. Hollander

UNIT NO

75-28

LOCATION

Craig Colo

DEPTH

0.8

STAND BY

0

TOTAL

1.6

ROUNDTRIP

MILES

46

CHARGEABLE

STANDBY

TIME IN

24.24

TIME OUT

2.00

INITIAL RUN

LOGGED 740

GAMMA SCALE

CONSTANT 2

LOGGING SPEED

20

FT/MIN

CALIBRATION & PROBE DATA

SOURCE NO

A453

SOURCE VALUE

4 Mci

PROBE NO

8010-101

PROBE SIZE

8020-49

DEFLECTOR

Xtal

19 sec

WATER FACTOR

1.14

RES SCALE

10

gms per 1

MB/IN

Density

SCALE 25K

LOGGING SPEED

20

FT/MIN

FROM

TO

TOTAL

GAMMA BEGINS

SCALE 5K

LOGGING SPEED

20

FT/MIN

FROM

TO

TOTAL

SCALE

LOGGING SPEED

20

FT/MIN

FROM

TO

TOTAL

SCALE

LOGGING SPEED

20

FT/MIN

FROM

TO

TOTAL

SELF POTENTIAL

NATURAL GAMMA RAY
COUNTS PER SECOND

DENSITY

RESISTANCE
OHMS

84 60 0112

400'

450'

500'

400'

450'

500'



C 244 2 1P 112499

J. J. G.

DOVE

Figure 1. Schematic diagram of the experimental setup. The subject is seated in a chair and views the target through a video camera. The target is a light source that is controlled by a computer. The subject's hand is positioned on a horizontal surface. The distance between the hand and the target is 10 cm. The target is a light source that is controlled by a computer. The subject's hand is positioned on a horizontal surface. The distance between the hand and the target is 10 cm.

CALIBRATION & PROBE DATA

RES SCALE

39

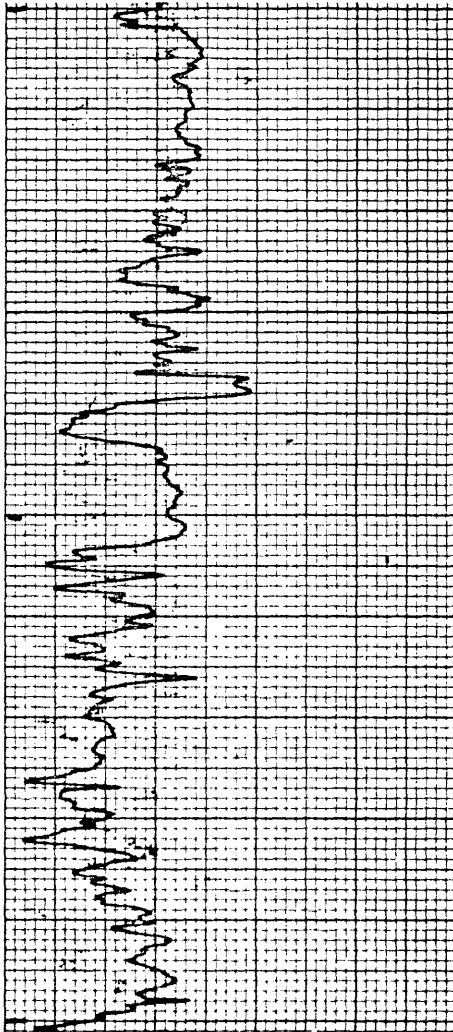
1.0

100% of the total sample

Source: Authors' calculations.

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RÉSISTANCE
OHMS





Century Geophysical Corporation
Denver, Colo.

C 364 E SP 117488
COMPANY

CSMRI
Y-4

BORE HOLE

AREA
Yampa valley

COUNTY
MoFFat

SECTION
TOWNSHIP
RANGE
STATE
Colorado
LOG MEASURED FROM
TOP OF Casing

DATE
10-10-75

HOLE NO 9-4	T.D. DRILLED 752
SEC TWP RANGE	BIT SIZE 5 7/8 IN CANNING 43 FT
AREA Yampa Valley	BORE HOLE FLUID AIR + H ₂ O
COUNTY MoFFat	DENSITY
STATE Colorado	VISCOSITY
COMPANY CSMRI	OPERATOR J. Hollander
DATE 10-10-75	UNIT NO 75-28
TOTAL FOOTAGE LOGGED 740	LOCATION Craig Colo
	DRIVE 0.8
	TIME IN 24.24
	STAND BY 0
	TIME OUT 2.00
	TOTAL 1.6
	ROUNDTRIP 2.5
	MILEAGE 46
	CHARGEABLE STANDBY

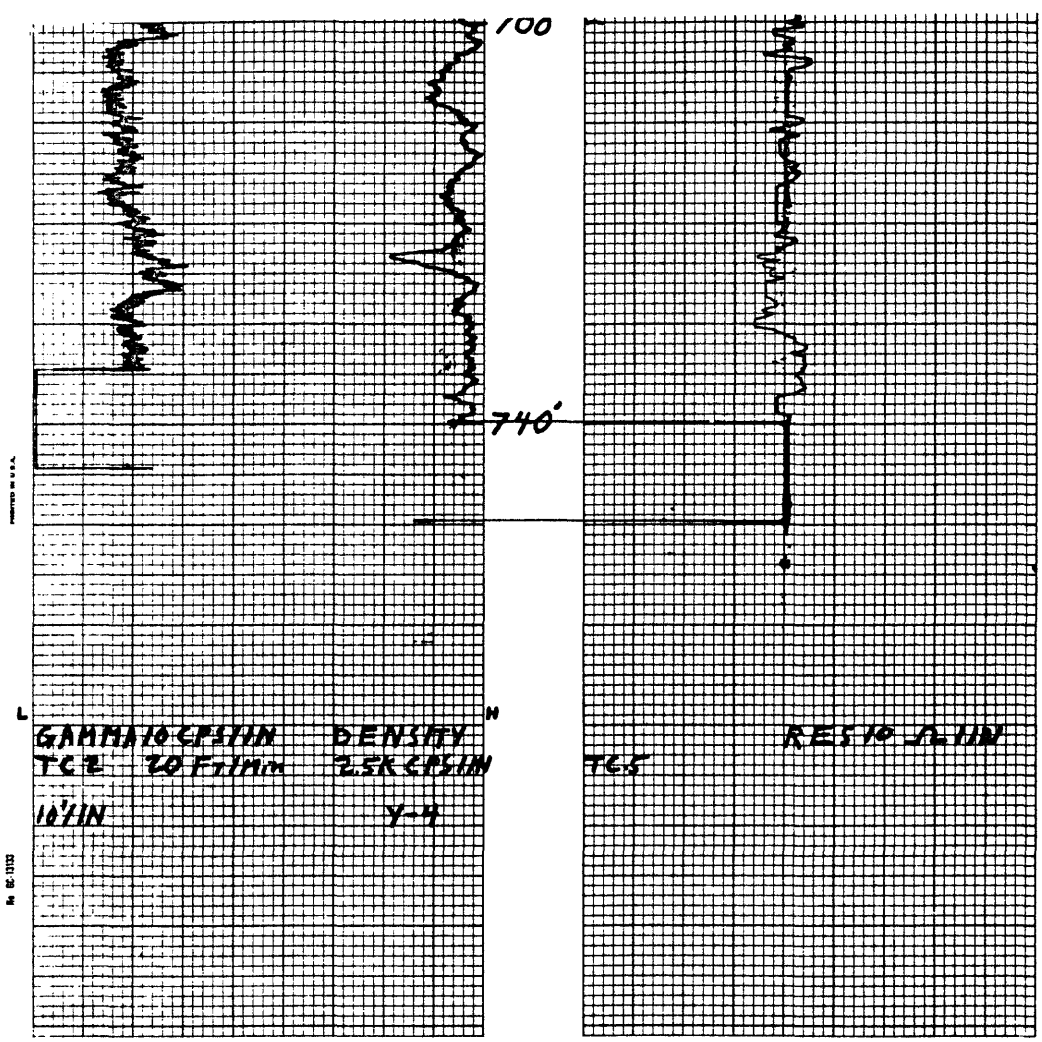
INITIAL RUN		DENSITY		GAMMA PERMS		SCALE		GAMMA PERMS		SCALE		GAMMA PERMS		SCALE	
T.D. LOGGED 740	SCALE 25K	LOGGING SPEED 20	LOGGING SPEED 20	LOGGING SPEED 20	LOGGING SPEED 20	LOGGING SPEED 20	LOGGING SPEED 20	LOGGING SPEED 20	LOGGING SPEED 20	LOGGING SPEED 20	LOGGING SPEED 20	LOGGING SPEED 20	LOGGING SPEED 20	LOGGING SPEED 20	LOGGING SPEED 20
GAMMA SCALE	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED
TIME CONSTANT 2	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED
CALIBRATION & PROBE DATA	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED
SOURCE NO A453	SOURCE VALUE 4 Mci	SOURCE NO A453	SOURCE VALUE 4 Mci	SOURCE NO A453	SOURCE VALUE 4 Mci	SOURCE NO A453	SOURCE VALUE 4 Mci	SOURCE NO A453	SOURCE VALUE 4 Mci	SOURCE NO A453	SOURCE VALUE 4 Mci	SOURCE NO A453	SOURCE VALUE 4 Mci	SOURCE NO A453	SOURCE VALUE 4 Mci
BORE HOLE 8018-101	PROBE SIZE 15/8	BORE HOLE 8018-101	PROBE SIZE 15/8	BORE HOLE 8018-101	PROBE SIZE 15/8	BORE HOLE 8018-101	PROBE SIZE 15/8	BORE HOLE 8018-101	PROBE SIZE 15/8	BORE HOLE 8018-101	PROBE SIZE 15/8	BORE HOLE 8018-101	PROBE SIZE 15/8	BORE HOLE 8018-101	PROBE SIZE 15/8
DETECTOR XTal	PROBE SIZE 15/8	DETECTOR XTal	PROBE SIZE 15/8	DETECTOR XTal	PROBE SIZE 15/8	DETECTOR XTal	PROBE SIZE 15/8	DETECTOR XTal	PROBE SIZE 15/8	DETECTOR XTal	PROBE SIZE 15/8	DETECTOR XTal	PROBE SIZE 15/8	DETECTOR XTal	PROBE SIZE 15/8
DEAD TIME 14 sec	PROBE SIZE 15/8	DEAD TIME 14 sec	PROBE SIZE 15/8	DEAD TIME 14 sec	PROBE SIZE 15/8	DEAD TIME 14 sec	PROBE SIZE 15/8	DEAD TIME 14 sec	PROBE SIZE 15/8	DEAD TIME 14 sec	PROBE SIZE 15/8	DEAD TIME 14 sec	PROBE SIZE 15/8	DEAD TIME 14 sec	PROBE SIZE 15/8
WATER FACTOR 1.14	PROBE SIZE 15/8	WATER FACTOR 1.14	PROBE SIZE 15/8	WATER FACTOR 1.14	PROBE SIZE 15/8	WATER FACTOR 1.14	PROBE SIZE 15/8	WATER FACTOR 1.14	PROBE SIZE 15/8	WATER FACTOR 1.14	PROBE SIZE 15/8	WATER FACTOR 1.14	PROBE SIZE 15/8	WATER FACTOR 1.14	PROBE SIZE 15/8
RES SCALE 10	PROBE SIZE 15/8	RES SCALE 10	PROBE SIZE 15/8	RES SCALE 10	PROBE SIZE 15/8	RES SCALE 10	PROBE SIZE 15/8	RES SCALE 10	PROBE SIZE 15/8	RES SCALE 10	PROBE SIZE 15/8	RES SCALE 10	PROBE SIZE 15/8	RES SCALE 10	PROBE SIZE 15/8

SELF POTENTIAL

DENSITY

NATURAL GAMMA RAY
COUNTS PER SECOND

RESISTANCE
OHMS





Century Geophysical Corporation
Denver, Colo.

C 366 E SP 117400

COMPANY

CSMRI
Y-4

BORE HOLE

AREA

Yampa valley

COUNTY

MoFFat

SECTION

TOWNSHIP

RANGE

STATE

Colorado

LOG MEASURED FROM

Top of casing

HOLE NO

9-4

SEC

TWP

RANGE

AREA

COUNTY

STATE

COMPANY

DATE

TOTAL TO DATE LOGGED

740

740

740

740

740

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740

YTD DRILLED

752

BIT SIZE

5 7/8

CASING

43 FT

BORE HOLE FLUID

air + H₂O

DENSITY

RESISTIVITY

OPERATOR

J. Hollander

UNIT NO

7528

LOCATION

Crig Colo

DRIVE

0.8

TIME IN

24.24

STAND BY

0

TIME OUT

2.00

LOGGING

1.6

TOTAL

2.5

ROUNDTRIP

MILEAGE

46

CHARGEABLE

STANDBY

Mrs

SELF POTENTIAL

DENSITY

NATURAL GAMMA RAY
COUNTS PER SECOND

RESISTANCE
OHMS

RECORDING CHARTS GRAPHIC CONTROLS CORPORATION BUFFALO, NEW YORK

Project No. H50146

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE

EXHIBIT 5 LITHOLOGIC LOGDate 11-23-75Hole No. V-5 Elev. 6670' Total Depth 620' Location SE 1/4, NE 1/4, SE 1/4, SW 1/4 SEC 32, T7N, R93W Property BLMCounty MOFFAT State COLORADO Sponsor USGS Drilling Co. IRON CLAD Geologist S. C. MULLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL				
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed.	Meta.	Ign.	Most abund.	TOTAL %	Vitrinite	Charinite	Fusinite
OVERBURDEN	0	② ALLUVIUM - LOAMY SAND, YELLOW, OXIDIZED, CGL	x	x	x	x		x	x	MED-POOR	85		10			5	x	x		CNT				
	↑	② SS, TAN		x				x	WELL	95				2	3	x				CNT	0			
		SS, YELLOW-TAN			x	x		x	POOR	95	1					4	x			CNT	0			
	10	" "			x			x	WELL	99	1					0					0			
	20	" "		x	x	x		x	POOR	93	3					4	x			CNT	0			
		" "		x	x			x	MED.	93	2				1	4	x			CNT	0			
	30	SS, ORANGE (OXIDIZED)	x	x	x			x	POOR	93	3				2	2	x			CNT	0			
		SS, ORANGE-BROWN (OXIDIZED) W/MINOR SH, LTG	x	x	x			x	POOR	88	3	5			2	2	x			CNT	0			
	40	② SS, TAN (NONOXIDIZED), CONGLOMERATIC	x		x			x	POOR	83	5					12	x	x		CNT	0			
		SS, ORANGE-BROWN (OX)	x	x				x	MED	91	1				1	7	x			CNT	0			
	50	SS, TAN (NON-OXIDIZED)	x					x	WELL	99						0					0			
			x					x	WELL	99	1					0					0			
		SS, TAN-GREEN	x					x	WELL	99	1					0					0			
	60	SS, GREEN W/ MINOR SH, RED-BROWN (REDUCED)	x	x				x	MED	45	15	25	15			0					0			
SH, RED-BROWN, BENT		x							WELL				100			0					0			
70	SS, GREEN (REDUCED)	x					x	WELL	97				3		0						0			
	" "	x					x	WELL	97				3		0						0			
	" "	x					x	WELL	97				3		0						0			
80																								

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL		
			.0025-.125	.125-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed. Meta. Ign.	Most abund.	TOTAL %	Vitrinite	Clasinite	Parafinite
80	[dots]	SS, DK GREEN (REDUCED)	X	X				X	MED 98					1		1	X	CNT	0			
		" "	X		X			X	MED 93					1		6	X	GRY	0			
90	[dots]	" "	X	X		X		X	POOR 94					1		5	X	CNT	0			
			X					X	WELL 99					1		0			0			
100	[dots]	SS, GREEN W/ MINOR SH, GR	X	X		X		X	POOR 79				20	1		0			0			
	[dots]	SS, GREEN (REDUCED)	X	X				X	MED 95							5	X	CNT	0			
110	[dots]	" "	X	X				X	MED 98							2	X	CNT	0			
			X					X	WELL 98							2	X	CNT	0			
120	[dots]	SS, GREEN (REDUCED), CLAY-RICH LAYERS (?), LT BROWN	X					X	WELL 88				10			2	X	CNT	0			
		" "	X					X	WELL 88				10			2	X	CNT	0			
130	[dots]	" "	X					X	WELL 88				10			2	X	CNT	0			
			X	X				X	MED 88				10			2	X	CNT	0			
140	[dots]	SS, BLUE-GRAY, CLAY-RICH	X					X	WELL 80				20			0			0			
		" "	X					X	WELL 80				20			0			0			
150	[dots]	SILTST, DK GRAY, SANDY	X					X	WELL 90				60			0			0			
		" "	X					X	WELL 90				60			0			0			
160	[dots]																					

Project No. H50146

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE

EXHIBIT 5 LITHOLOGIC LOGDate 11-23-75Hole No. 45 Elev. 6670' Total Depth 620' Location SE 1/4, NE 1/4, SE 1/4, SW 1/4, T7N, R93WProperty BLMCounty MOFFAT State COLORADO Sponsor USGS Drilling Co. IRON CLADGeologist S.C. MULLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING			SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL				
			.06-.125	.125-.25	.25-.5	.5-1.0	>1.0	Angular	Subangular	Subrounded		Rounded	Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed.	Meta.	Ign.	Most abund.	TOTAL %	Vitrain	Clarain
160		SLTST, DK GREY W/MINOR SH, BLACK, BSNT	x						x		WELL	30		70			0					0				
		SLTST, DK GREY, SANDY	x						x		WELL	40		60			0					0				
170		" "	x						x		WELL	40		60			0					0				
			x							x		WELL	40		60			0					0			
180		" "	x						x		WELL	40		60			0					0				
		" "	x						x		WELL	40		60			0					0				
190		SLTST, DK GREY W/MINOR SH, BLACK, BSNT	x						x		WELL	30		70			0					0				
		" "	x						x		WELL	30		70			0					0				
			x							x		WELL	30		70			0					0			
200		" "	x						x		WELL	30		70			0					0				
			x							x		WELL	35		65			0					0			
210		SH, DK BRN, CARBW/COAL & MINOR SS, S & P	x						x		WELL	30	20	25			0					25	x			
		SLTST, LT GREY, SANDY	x						x		WELL	45		55			0					0				
220		SLTST, LT GREY, SANDY W/ MINOR SH, DK GREY, CARB(?)	x						x		WELL	40		60			0					0				
			x							x		WELL	45		55			0					0			
230		SLTST, LT GREY, SANDY	x						x		WELL	45		55			0					0				
		SLTST, GREY W/ MINOR SH, DK GREY, CARB(?)	x						x		WELL	40		60			0					0				
			x							x		WELL	45		55			0					0			
240		SLTST, LT GREY, SANDY	x						x		WELL	45		55			0					0				

Project No. H50146

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE

EXHIBIT 5 LITHOLOGIC LOGDate 11-23-75Hole No. V-5 Elev. 6670' Total Depth 620' Location SE 1/4, NE 1/4, SE 1/4, SW 1/4, SEC 32, T7N, R93WProperty BLMCounty MOFFAT State COLO. Sponsor USGS Drilling Co. IRON CLADGeologist S.C. MULLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL			
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed. Mela. Ign.	Most abund.	TOTAL %	Vitrain	Clarain	Durain	Fusain
240		SLTST, GRAY W/ COAL & MINOR SH, DK GRAY, CARB	X						X WELL	5			75			0			20				X
		" "	X						X WELL	25			35			0			40	X			X
250		" "	X						X WELL	25			55			0			20	X			X
		" "	X						X WELL	10			70			0			20	X			X
260		SH., DK GRAY, CARB W/ COAL INTBD	X						WELL				55			0			15	X			
		" "	X						WELL				90			0			10	X			X
270		SS, LT GRAY, SILTY W/ SH, DK GRAY, CARB INTBD	X	X				X	MED	60			40			0			0				
		SS, GRAY	X					X	WELL	85	15					0			0				
280		SS, GRAY W/ CLYST, DK GRAY INTBD	X	X				X	MED	80	10	10				0			0				
		" "	X	X				X	MED	65	15	20				0			0				
290		SS, GRAY	X					X	WELL	75	25					0			0				
		" "	X					X	WELL	75	25					0			0				
WATER 300		SS, GRAY W/ CLYST, GRAY INTBD	X	X				X	MED	65	15	20				0			0				
		" "	X	X				X	MED	65	15	20				0			0				
310		SLTST, GRAY, SANDY	X	X				X	MED	40	15	45				0			0				
		SLTST, DK GRAY, CLAY?, CARB?	X					X	WELL	10	10	80				0			0				
320																							

Project No. H50146

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE

EXHIBIT 5 LITHOLOGIC LOGDate 11-23-75Hole No. Y-5 Elev. 6670' Total Depth 620' Location SE 1/4, NE 1/4, SE 1/4, SW 1/4, T7N, R93WProperty BLMCounty MOFFAT State COLORADO Sponsor USGS Drilling Co. IRON CLADGeologist J.C. Mueseler

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL			
			.06-.125	.125-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafica	Clay	Pyrite	Others	TOTAL %	Sed. Mica. Ign.	Most abund.	TOTAL %	Vitrain	Clarain	Durain	Fusain
320		SLTST, DK GREY, CLAY↑, CARB (?)	X					X	WELL	5			95			0			0				
		SLTST, LT GREY, SANDY	X					X	WELL	25	5	70				0			0				
330			X					X	WELL	25	5	70				0			0				
		COAL	X					X	WELL	1				0		0			99	X			
		"							WELL					0		0			100		X		
340		SS, S&P w/ SH, DK GRLY, CARB & MINOR COAL INTBD	X					X	WELL	15	30	15				0			10				
		COAL	X					X	WELL	7				1		0			92		X		
350		SLTST, DK GREY, CARB w/ SS, S&P & COAL INTBD	X					X	WELL	30	20	25				0			25		X		
		" "	X					X	WELL	20	15	25				0			40		X		
WATER 360		SLTST, DK GREY, CARB(?)	X	X				X	MED	10			90			0			0				
		SS, S&P w/ SH, DK GREY, CARB & COAL INTBD	X					X	WELL	35	20	25				0			20		X		
370		" "	X					X	WELL	35	20	25				0			20		X		
		" "	X					X	WELL	20	14	33							33		X		
380		" "	X					X	WELL	20	14	33							33		X		
		" "	X					X	WELL	20	14	33							33		X		
390		" "	X					X	WELL	20	14	33							33		X		
		" "	X					X	WELL	20	14	33							33		X		
400		" "	X					X	WELL	20	14	33							33		X		

POOR RECOVERY;
PROBABLY HIGH CONTM

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE

EXHIBIT 5 LITHOLOGIC LOG

 Project No. H50146

 Date 11-23-75

 Hole No. 4-5 Elev. 6670' Total Depth 620' Location SE 1/4, NE 1/4, SE 1/4, SW 1/4, SEC 32, T7N, R93W Property BLM

 County MOFFAT State COLO. Sponsor USGS Drilling Co. IRON CLAD Geologist S.C. MULLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING Angular Subangular Subrounded Rounded	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL			
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed. Mela. Ign.	Most abund.	TOTAL %	Vitrain	Clarain	Durain	Fusain
400		SH, DK GREY, CARB W/ COAL & SS, S&P INTBD	X					X	WELL	13		12	40			0				35		X	
		" "	X					X	WELL	13		12	40			0				35		X	
410		" "	X					X	WELL	13		12	40			0				35		X	
		SH, DK GREY, CARB	X						WELL				100			0				0			
420		SH, DK GREY, CARB W/ SS, S&P INTBD	X					X	WELL	13		12	75			0				0			
		SS, S&P W/ SH, DK GREY, CARB INTBD	X					X	WELL	30		30	40			0				0			
430		" "	X	X				X	MED.	40		40	15			3	X	X	CHT 2			X	
		" "	X	X				X	MED	34		34	25			5	X	X	CHT 2			X	
440		" "	X	X				X	MED.	25		25	43			5	X	X	CHT 2			X	
		COAL W/ MINOR SS, S&P INTBD	X					X	WELL	4		4				0				92		X	
450		" "	X					X	WELL	4		4				0				92		X	
		SS, S&P W/ MAJOR SH, DK GR, CARB & MINOR COAL INTBD	X					X	WELL	25	25		40			5	X		CHT 5			X	
460		SS, GREY-WHITE & COAL INTBD	X	X				X	MED- WELL	59						1	X		CHT 40			X	
		SS, GREY-WHITE & COAL INTBD W/ MINOR SH, DK GREY, CARB	X	X	X			X	POOR	45			10							45		X	
470		" "	X	X	X			X	POOR	65			25							10		X	
		" "	X	X	X			X	POOR	65			25							10		X	
480																							

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL			
			.06-.125	.125-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed. Meta. Ign.	Most abund.	TOTAL %	Vitrain	Clarain	Durain	Fusain
480		SS, WHITE W/ MINOR COAL INTBD	X	X	X	X			POOR	92						5	X	X	CHT	3	X		
		SS, WHITE W/ MINOR COAL & SH, DK GRAY, CARB INTBD	X	X	X	X			POOR	82			10			5	X	X	CHT	2	X		
490		SS, WHITE W/ MINOR COAL INTBD	X	X	X	X			POOR	95						3	X	X	CHT	2	X		
		" "	X	X	X	X			POOR	92						3	X	X	CHT	5	X		
500		" "	X	X					MED	91						1	X	X	CHT	8	X		
		SS, WHITE, CGL W/ COAL & SH, DK GRAY, CARB INTBD	X	X	X	X			POOR	70			10			10	X	X	CHT	10	X		
510		SS, WHITE W/ MAJOR COAL INTBD	X	X	X				POOR	52						3	X		CHT	45	X		
		COAL W/ SS, WHITE INTBD	X	X	X				POOR	30						0				70	X		
520		SS, WHITE, CGL W/ COAL & SH, DK GRAY, CARB INTBD	X	X	X				POOR	60			20			10	X	X	CHT	10	X		
		" "	X	X	X				POOR	55			10			10	X	X	CHT	25	X		
530		COAL W/ SS, WHITE INTBD	X	X	X				POOR	32						3	X	X	CHT	65	X		
		" "	X	X	X				POOR	40						5	X	X	CHT	55	X		
540		SS, GRAY-WHITE, SILTY W/ MINOR COAL INTBD	X	X	X	X			POOR	70			20			5	X	X	CHT	5	X		
		" "	X	X	X				MED-WELL	75			10			5	X	X	CHT	10	X		
550		" "	X	X					MED	65			15			10	X	X	CHT	10	X		
		SILTST, GRAY, SANDY W/ MINOR COAL INTBD	X						WELL	20			72			3	X	X	CHT	5	X		
560																							

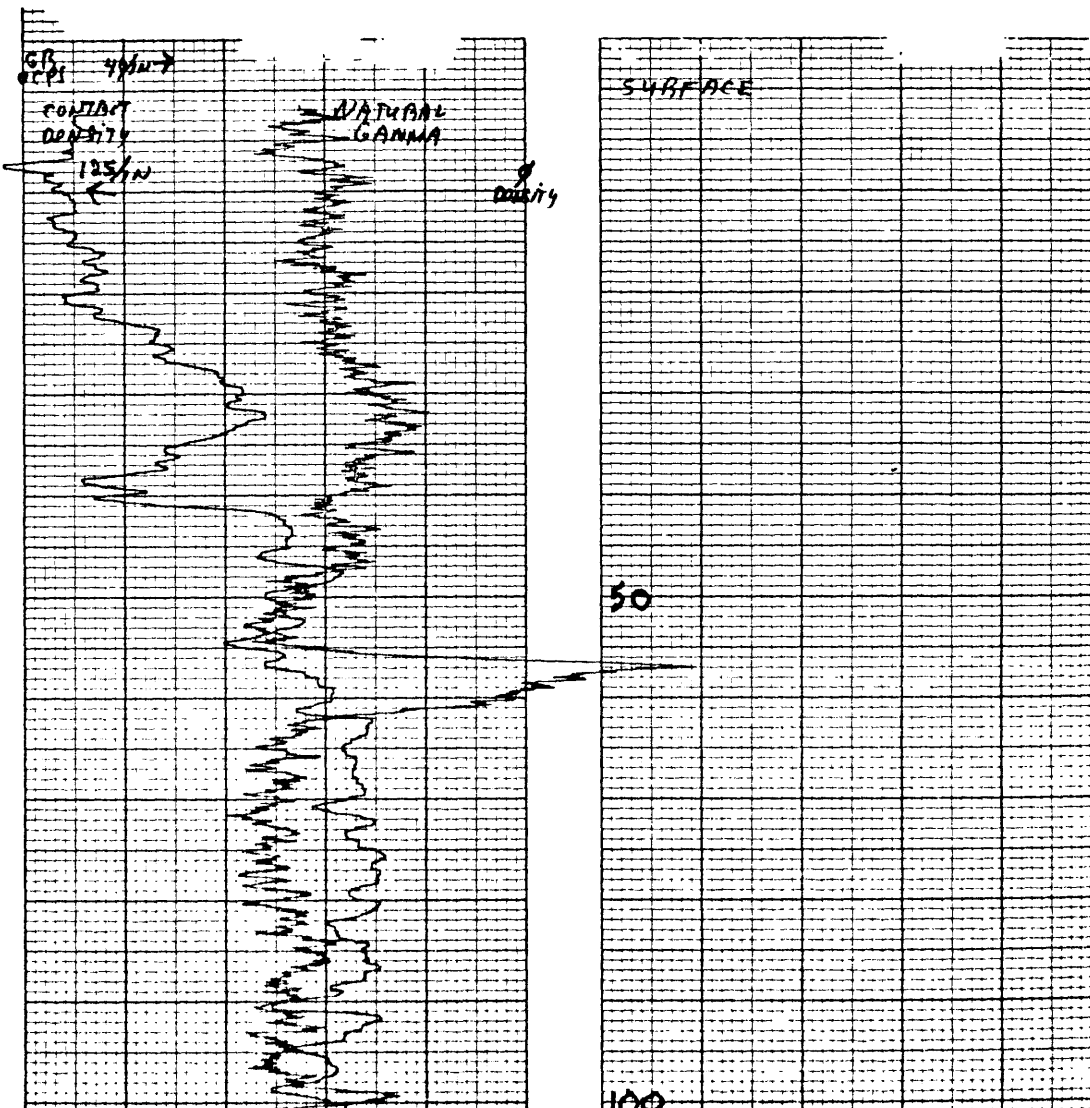
Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL			
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed. Meta. Ign.	Most abund.	TOTAL %	Vitrinite	Clarinite	Durinite	Fusinite
560		SS, GREY-WHITE, SILTY	x x x					x	POOR	75			17			7	x x	Chr	41	x			
		SILTST, GREY-WHITE, SANDY W/ COAL INTBD	x x x					x	POOR	30			60			0			10	x			
570		SS, GREY-WHITE W/ COAL INTBD	x x x					x	POOR	67			5			13	x x	Chr	15	x			
		SS, GREY-WHITE W/ COAL & SH, DK GREY, CARB INTBD	x x x x					x	POOR	45			15			20	x x	Chr	20	x			
580		COAL								3			3						94	x			
		SS, GREY-WHITE W/ COAL & SH, DK GRLY, CARB INTBD	x x x x					x x	POOR	55	10	15				10	x x	Chr	10	x			
			x x x x					x x	POOR	50	5	10				10	x x	Chr	25	x			
590		" "	x x x x					x x	POOR	40	10	10				5	x x	Chr	35	x			
			x x x x					x x	POOR	55	10	15				10	x x	Chr	10	x			
600		COAL								5			5						90	x			
		"								5			5						90	x			
		SS, GREY-WHITE W/ SH, DK GREY, CARB INTBD	x x x x x					x x	EX-POOR	70			20						10	x			x
		COAL W/ SH, DK GREY, CARB INTBD											25						75	x			
													25						75	x			
610		SS, GREY-WHITE W/ COAL INTBD	x x x x x					x x	EX-POOR	70			15						20	x			
		COAL											5	1					94	x			
		SS, GREY, CGL W/ MINOR COAL INTBD	x x x					x x	POOR	50	5					25	x x	Chr	20				
			x x x					x x	POOR	50	5					25	x x	Chr	20				
620																							
630																							
640																							

(PROBABLE BURN ZONE)
 LOST 5,000 GAL. WATER

Geo Dynamics

casper wyoming 82601

COMPANY <u>Coleman School of Mines</u>	
HOLE # OR NAME <u>Y-5</u>	ELEVATION <u>6670'</u>
FIELD <u>Moffat</u>	STATE <u>Colo</u>
COUNTY <u>Moffat</u>	
LOCATION <u>SE 1/4, NE 1/4, SE 1/4, SECTION 32</u>	
TOWNSHIP <u>7N</u> RANGE <u>93W</u>	
LOG TYPE <u>ES-GR-Density</u>	RUN <u>1</u>
WELL # <u>1</u>	TOOL # & MODEL <u>EGYC</u>
DATE <u>3 Dec 1978</u>	DIAMETER, INCHES <u>1 3/4</u>
DEPTH DRILLED <u>620.0</u>	GR DETECTOR <u>EGIN7</u>
DEPTH LOGGED <u>614.0</u>	SIZE CRISTAL, INCHES <u>1.84500</u>
BOTTOM LOGGED INTERVAL <u>NONE</u>	K FACTOR <u>1.23100</u>
TOP LOGGED INTERVAL <u>NONE</u>	DRALTIME, SECONDS <u>8.50</u>
FLUID LEVEL <u>297.0</u>	TIME CONSTANT (GR) <u>1</u>
TYPE HOLE FLUID <u>NATURAL GROUNDWATER</u>	SCALE, CIS (GR) <u>40/10</u>
BIT GRADE <u>5.0</u>	ZERO PLACEMENT (GR) <u>10FT</u>
CASING <u>NONE</u>	WATER FACTOR <u>1.157</u>
TRUCK # <u>1</u>	RESISTIVITY TYPE <u>SIMPLE POINT</u>
LOGGING SPEED, FT/MIN <u>15</u>	SPACING, INCHES <u>NONE</u>
RECORDED DEPTH SCALE, FT/IN. <u>10</u>	SCALE, OHMS/INCH <u>80</u>
	ZERO <u>10FT</u>
	S P SCALE, MT/INCH <u>NONE</u>
REMARKS:	



Geo Dynamics

casper wyoming 82601

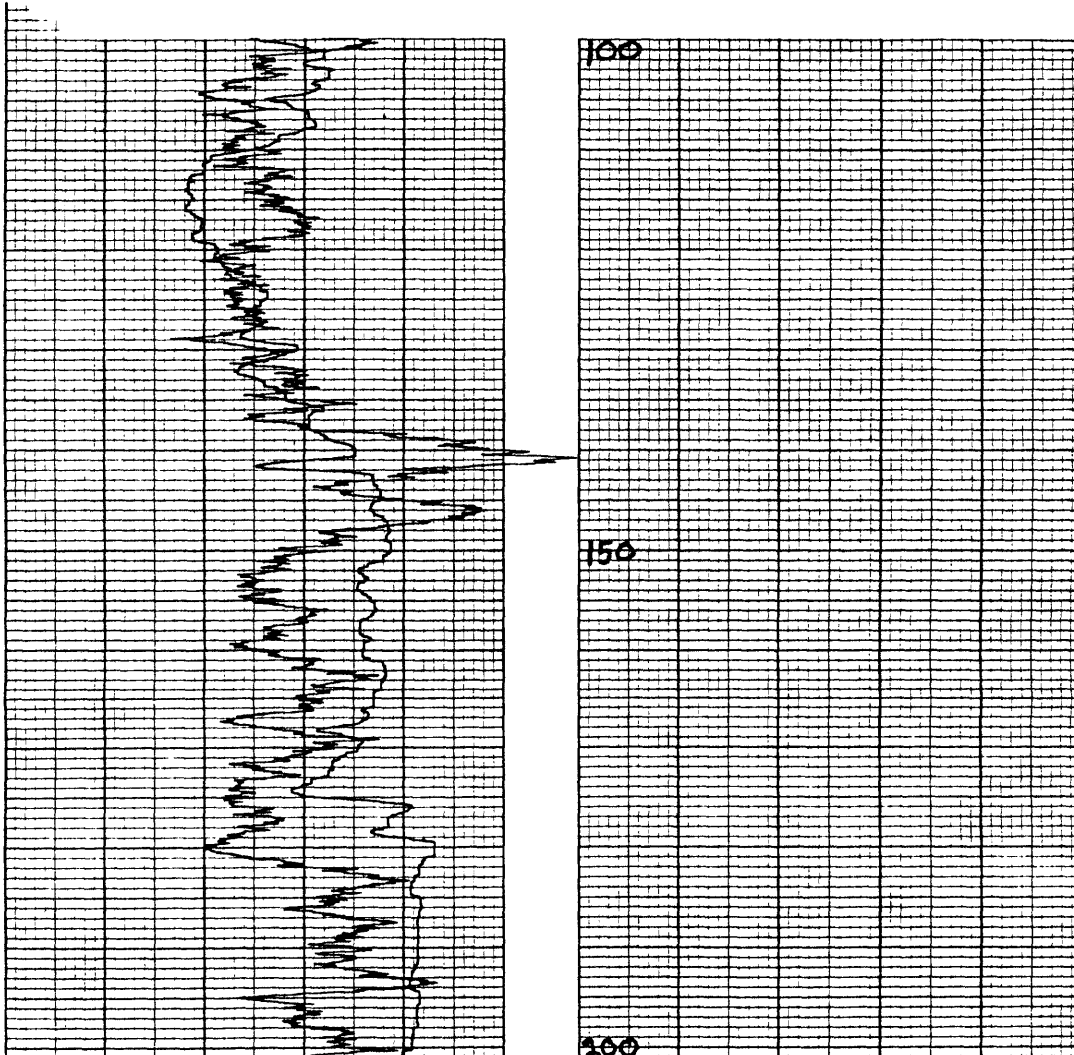
EXHIBIT 5

COMPANY <u>Colorado School of Mines</u>	
HOLE # OR NAME <u>Y-5</u>	ELEVATION <u>6660'</u>
FIELD <u>Moffat</u>	STATE <u>Co</u>
COUNTY <u>Moffat</u>	

LOCATION <u>SE 1/4, NE 1/4, SE 1/4, SW 1/4</u>	SECTION <u>32</u>	TOWNSHIP <u>7N</u>	RANGE <u>93W</u>
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<table> <tr><td>LOG TYPE</td><td><u>ES-GR-Resistivity</u></td></tr> <tr><td>RUN #</td><td><u>1 & 2</u></td></tr> <tr><td>DATE</td><td><u>3 Dec 1978</u></td></tr> <tr><td>DEPTH DRILLED</td><td><u>480.0</u></td></tr> <tr><td>DEPTH LOGGED</td><td><u>414.0</u></td></tr> <tr><td>BOTTOM LOGGED INTERVAL</td><td><u>NONE</u></td></tr> <tr><td>TOP LOGGED INTERVAL</td><td><u>NONE</u></td></tr> <tr><td>FLUID LEVEL</td><td><u>297.0</u></td></tr> <tr><td>TYPE HOLE FLUID</td><td><u>NATURAL GAS/WATER</u></td></tr> <tr><td>BIT GAUGE</td><td><u>5.0</u></td></tr> <tr><td>CASING</td><td><u>NONE</u></td></tr> <tr><td>TRUCK #</td><td><u>1</u></td></tr> <tr><td>LOGGING SPEED, FT/MIN</td><td><u>15</u></td></tr> <tr><td>RECORDER DEPTH SCALE, FT/IN.</td><td><u>10</u></td></tr> </table>	LOG TYPE	<u>ES-GR-Resistivity</u>	RUN #	<u>1 & 2</u>	DATE	<u>3 Dec 1978</u>	DEPTH DRILLED	<u>480.0</u>	DEPTH LOGGED	<u>414.0</u>	BOTTOM LOGGED INTERVAL	<u>NONE</u>	TOP LOGGED INTERVAL	<u>NONE</u>	FLUID LEVEL	<u>297.0</u>	TYPE HOLE FLUID	<u>NATURAL GAS/WATER</u>	BIT GAUGE	<u>5.0</u>	CASING	<u>NONE</u>	TRUCK #	<u>1</u>	LOGGING SPEED, FT/MIN	<u>15</u>	RECORDER DEPTH SCALE, FT/IN.	<u>10</u>	<table> <tr><td>RUN</td><td><u>1</u></td><td><u>2</u></td></tr> <tr><td>TOOL # & MODEL</td><td><u>EG-1C</u></td><td><u>D-1</u></td></tr> <tr><td>DIAMETER, INCHES</td><td><u>1 3/4</u></td><td><u>1 3/4</u></td></tr> <tr><td>OR DETECTOR</td><td><u>SCIN7</u></td><td>DENSITY DETECTOR <u>S.M.</u></td></tr> <tr><td>SIZE CRYSTAL, INCHES</td><td><u>1 X 4.500</u></td><td><u>1 X 6.500</u></td></tr> <tr><td>K FACTOR</td><td><u>1.23 X 10⁻¹</u></td><td></td></tr> <tr><td>DEADTIME, SECONDS</td><td><u>0.5</u></td><td></td></tr> <tr><td>TIME CONSTANT (GR)</td><td><u>1</u></td><td>DENSITY <u>1</u></td></tr> <tr><td>SCALE, CFS (GR)</td><td><u>40/10</u></td><td>DENSITY <u>125/10 + 350/10</u></td></tr> <tr><td>ZERO PLACEMENT (GR)</td><td><u>100T</u></td><td>DENSITY <u>RIGHT</u></td></tr> <tr><td>WATER FACTOR</td><td><u>1.157</u></td><td></td></tr> <tr><td>RESISTIVITY TYPE</td><td><u>SINGLE POINT</u></td><td></td></tr> <tr><td>SPACING, INCHES</td><td><u>NONE</u></td><td></td></tr> <tr><td>SCALE, OHMS/INCH</td><td><u>80</u></td><td></td></tr> <tr><td>ZERO</td><td><u>100T</u></td><td></td></tr> <tr><td>S P SCALE, MV/INCH</td><td><u>NONE</u></td><td></td></tr> </table>	RUN	<u>1</u>	<u>2</u>	TOOL # & MODEL	<u>EG-1C</u>	<u>D-1</u>	DIAMETER, INCHES	<u>1 3/4</u>	<u>1 3/4</u>	OR DETECTOR	<u>SCIN7</u>	DENSITY DETECTOR <u>S.M.</u>	SIZE CRYSTAL, INCHES	<u>1 X 4.500</u>	<u>1 X 6.500</u>	K FACTOR	<u>1.23 X 10⁻¹</u>		DEADTIME, SECONDS	<u>0.5</u>		TIME CONSTANT (GR)	<u>1</u>	DENSITY <u>1</u>	SCALE, CFS (GR)	<u>40/10</u>	DENSITY <u>125/10 + 350/10</u>	ZERO PLACEMENT (GR)	<u>100T</u>	DENSITY <u>RIGHT</u>	WATER FACTOR	<u>1.157</u>		RESISTIVITY TYPE	<u>SINGLE POINT</u>		SPACING, INCHES	<u>NONE</u>		SCALE, OHMS/INCH	<u>80</u>		ZERO	<u>100T</u>		S P SCALE, MV/INCH	<u>NONE</u>	
LOG TYPE	<u>ES-GR-Resistivity</u>																																																																												
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TIME CONSTANT (GR)	<u>1</u>	DENSITY <u>1</u>																																																																											
SCALE, CFS (GR)	<u>40/10</u>	DENSITY <u>125/10 + 350/10</u>																																																																											
ZERO PLACEMENT (GR)	<u>100T</u>	DENSITY <u>RIGHT</u>																																																																											
WATER FACTOR	<u>1.157</u>																																																																												
RESISTIVITY TYPE	<u>SINGLE POINT</u>																																																																												
SPACING, INCHES	<u>NONE</u>																																																																												
SCALE, OHMS/INCH	<u>80</u>																																																																												
ZERO	<u>100T</u>																																																																												
S P SCALE, MV/INCH	<u>NONE</u>																																																																												

REMARKS:



No. GC-1183

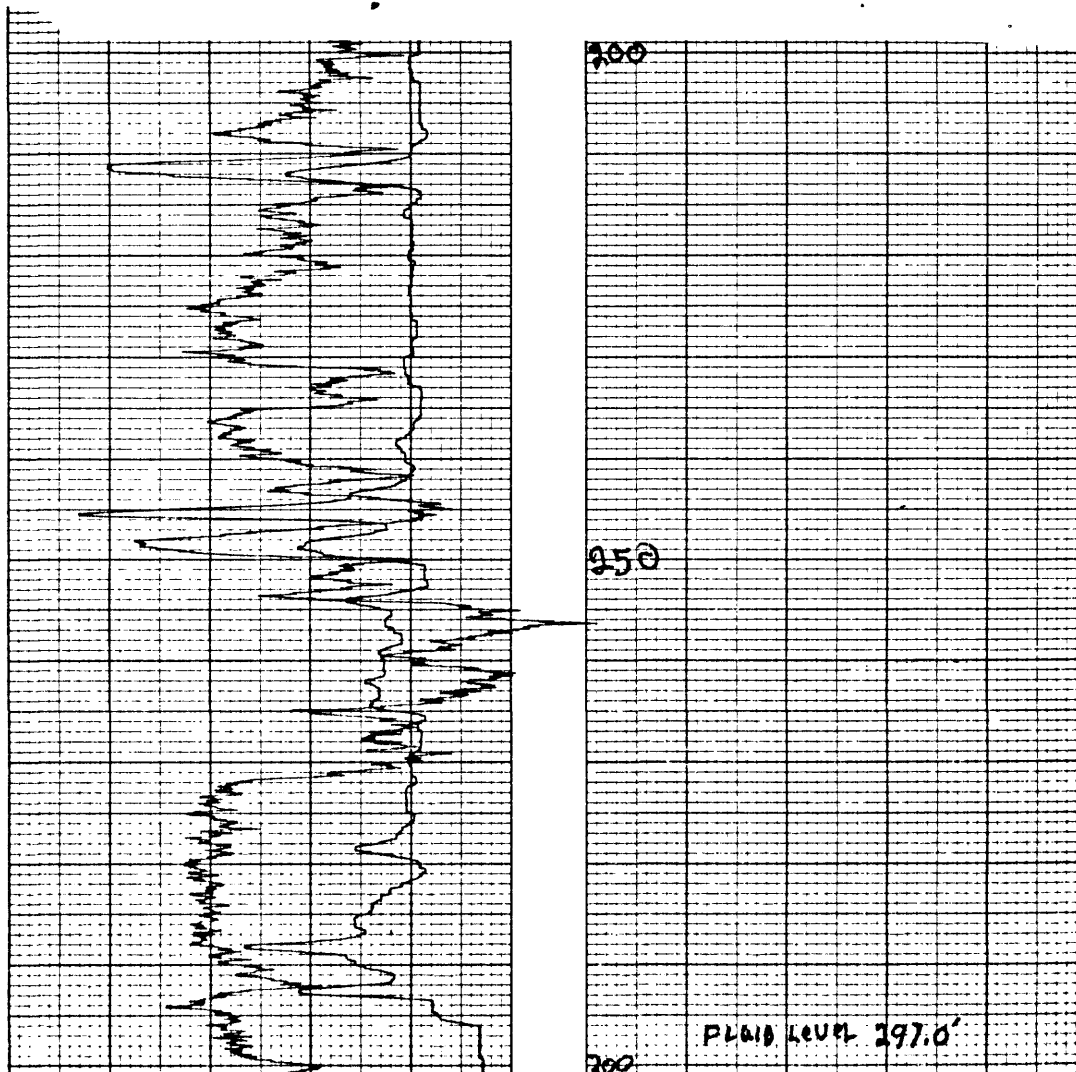
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WYO. 82601

Geo Dynamics

casper wyoming 82601

COMPANY <u>Colorado School of Mines</u>	
HOLE # OR NAME <u>Y-8</u>	ELEVATION <u>6670'</u>
FIELD <u>Wofford</u>	STATE <u>Colo</u>
LOCATION <u>SE 1/4, NE 1/4, SE 1/4, SW 1/4</u> SECTION <u>32</u> TOWNSHIP <u>7N</u> RANGE <u>99W</u>	
LOG TYPE <u>ES-GR-Density</u>	RUN <u>1</u>
RUN # <u>1</u>	TOOL # & MODEL <u>504C</u>
DATE <u>2 Dec 1978</u>	DIAMETER, INCHES <u>1 3/4</u>
DEPTH DRILLED <u>680.0</u>	GR DETECTOR <u>504N7</u> DENSITY DETECTOR <u>G.M.</u>
DEPTH LOGGED <u>614.0</u>	SIZE - CRYSTAL, INCHES <u>1.84500</u>
BOTTOM LOGGED INTERVAL <u>NONE</u>	K FACTOR <u>1.23100-1</u>
TOP LOGGED INTERVAL <u>NONE</u>	DEADTIME, SECONDS <u>8.54</u>
FLUID LEVEL <u>297.0</u>	TIME CONSTANT (OR) <u>1</u> DENSITY <u>1</u>
TYPE HOL. FLUID <u>NATURAL GAS/WATER</u>	SCALE, C/S (OR) <u>40/1.0</u> DENSITY <u>125/1.0 & 250/1.0</u>
BIT GAUGE <u>5.0</u>	ZERO PLACEMENT (OR) <u>40FT</u> DENSITY <u>RIGHT</u>
CASING <u>NONE</u>	WATER FACTOR <u>1.157</u>
TRUCK # <u>1</u>	RESISTIVITY TYPE <u>SINGLE POINT</u>
LOGGING SPEED, FT/MIN <u>18</u>	SPACING, INCHES <u>NONE</u>
RECORDER DEPTH SCALE, FT/IN. <u>10</u>	SCALE, OHM/INCH <u>80</u>
	ZER. <u>100FT</u>
	S P SCALE, MV/INCH <u>NONE</u>
REMARKS:	



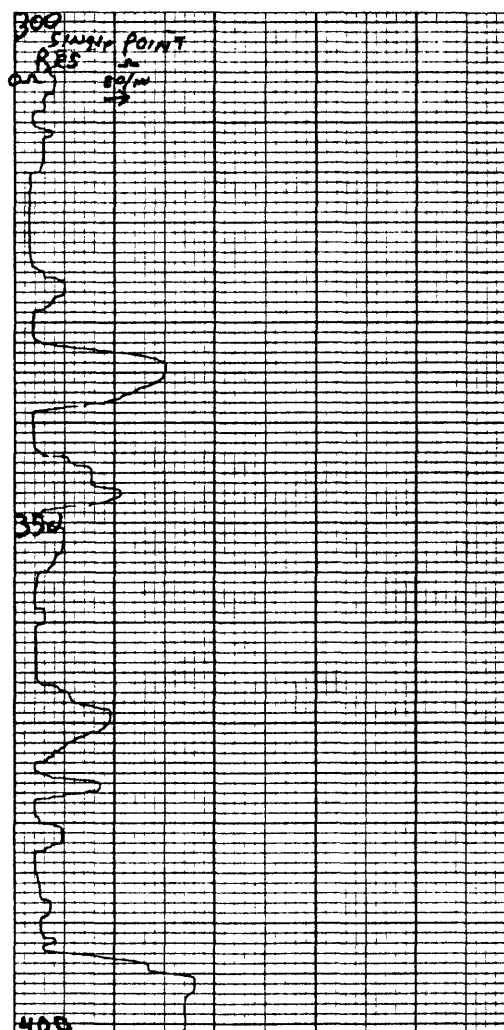
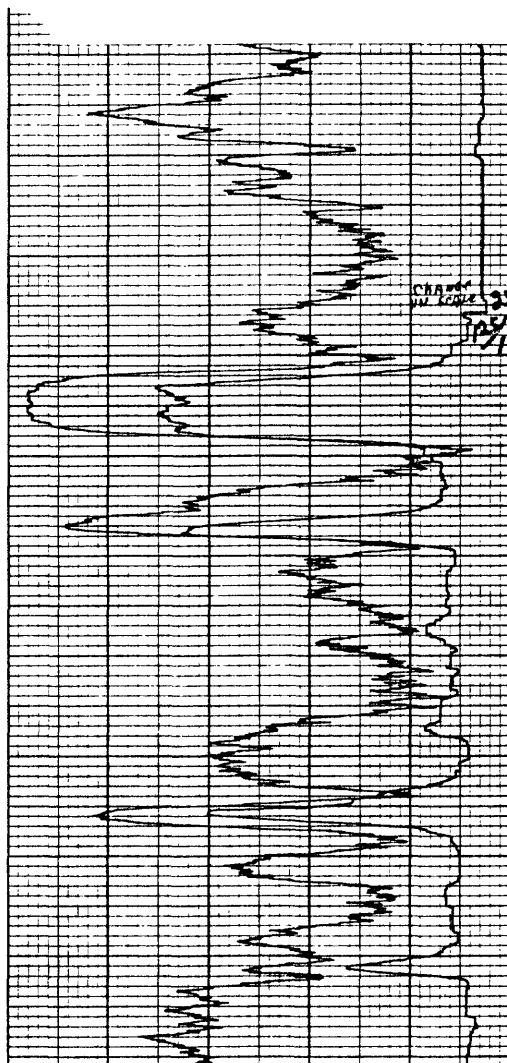
GEO-DYNAMICS GEOPHYSICAL SERVICES, CASPER, WY

No. GC-1785

Geo Dynamics

casper wyoming 82601

COMPANY <u>Colorado School of Mines</u>	
HOLE # OR NAME <u>Y-8</u>	ELEVATION <u>6670'</u>
FIELD <u>Muffat</u>	STATE <u>Colo</u>
COUNTY <u>Muffat</u>	
LOCATION <u>SE 1/4, NE 1/4, SE 1/4, SW 1/4</u> SECTION <u>32</u> TOWNSHIP <u>7N</u> RANGE <u>93W</u>	
LOG TYPE <u>ES-6R- Density</u>	RUN <u>1</u>
RUN # <u>1</u>	TOOL # & MODEL <u>554C</u>
DATE <u>3 Dec 1975</u>	DIAMETER, INCHES <u>1 3/4</u>
DEPTH DRILLED <u>620.0</u>	OR DETECTOR <u>ECIN7</u> DENSITY DETECTOR <u>G.M.</u>
DEPTH LOGGED <u>614.0</u>	SIZE CRISTAL, INCHES <u>1 X 4.5 X 0.1</u>
BOTTOM LOGGED INTERVAL <u>NONE</u>	K FACTOR <u>1.23 X 10^-1</u>
TOP LOGGED INTERVAL <u>NONE</u>	DEADTIME, SECONDS <u>0.54</u>
FLUID LEVEL <u>397.0</u>	TIME CONSTANT (GR) <u>1</u>
TYPE HOLE FLUID <u>NATURAL GRAVIMETER</u>	SCALE, CFS (GR) <u>40/IN</u>
BIT QUAGE <u>5.0</u>	ZERO PLACEMENT (GR) <u>LEFT</u>
CASING <u>NONE</u>	WATER FACTOR <u>1.157</u>
TRUCK # <u>1</u>	RESISTIVITY TYPE <u>SINGLE POINT</u>
LOGGING SPEED, FT/MIN <u>15</u>	SPACING, INCHES <u>NONE</u>
RECORDER DEPTH SCALE, FT/IN. <u>10</u>	SCALE, OHMS/INCH <u>80</u>
	ZERO <u>LEFT</u>
	S P SCALE, MV/INCH <u>NONE</u>
REMARKS:	



Geo Dynamics

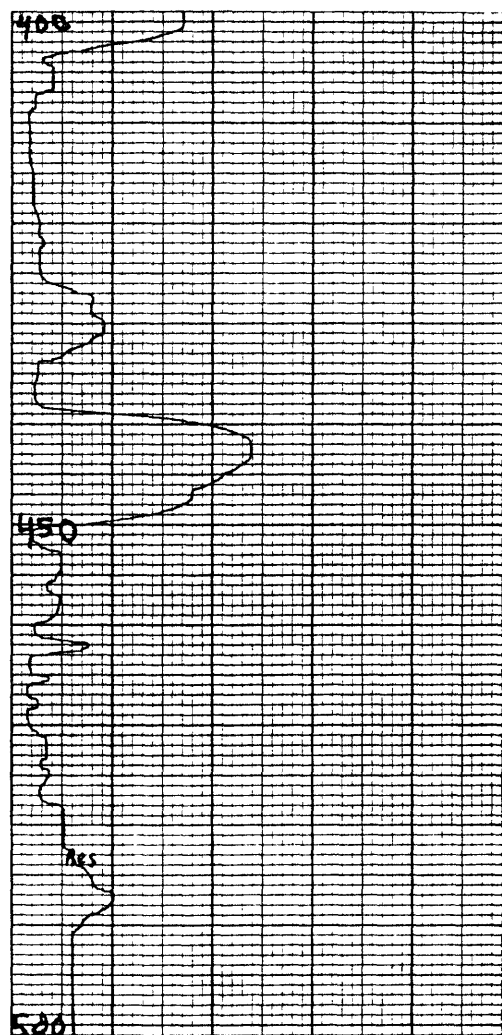
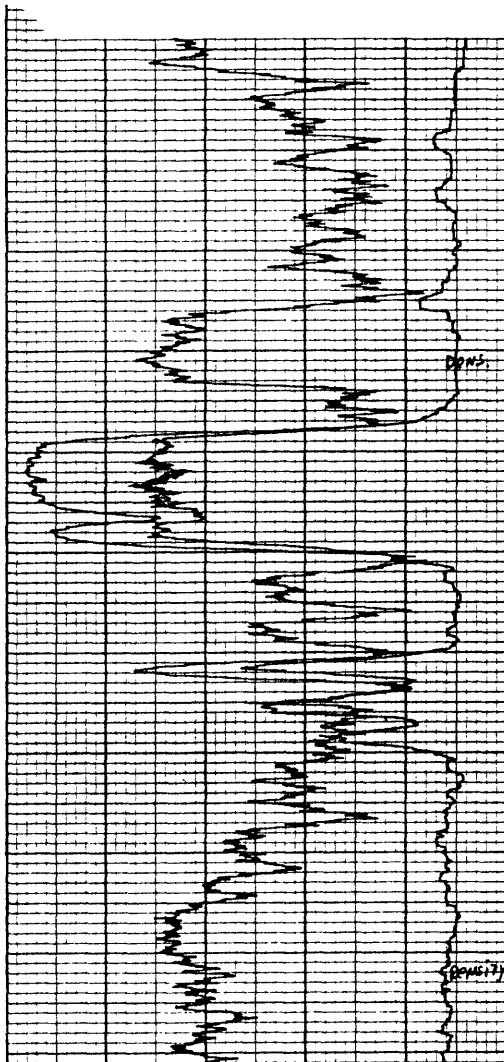
casper wyoming 82601

COMPANY <u>Colorado School of Mines</u>	
HOLE # OR NAME <u>Y-5</u>	ELEVATION <u>6670'</u>
FIELD <u>Moffat</u>	STATE <u>Colo</u>
COUNTY <u>Moffat</u>	

LOCATION <u>SE 1/4, NE 1/4, SE 1/4, SW 1/4</u>	SECTION <u>32</u>	TOWNSHIP <u>7 N</u>	RANGE <u>93 W</u>
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LOG TYPE <u>ES-GR-Density</u>	RUN <u>1</u>
RUN # <u>1</u>	TOOL # & MODEL <u>GR-C</u>
DATE <u>3 Dec 1975</u>	DIAMETER, INCHES <u>1 3/4</u>
DEPTH DRILLED <u>620.0</u>	GR DETECTOR <u>6517</u>
DEPTH LOGGED <u>614.0</u>	SIZE CRYSTAL, INCHES <u>1.45x0.5</u>
BOTTOM LOGGED INTERVAL <u>NONE</u>	K FACTOR <u>1.25x10⁻¹</u>
TOP LOGGED INTERVAL <u>NONE</u>	DEADTIME, SECONDS <u>8.54</u>
FLUID LEVEL <u>397.0</u>	TIME CONSTANT (GR) <u>1</u>
TYPE HOLE FLUID <u>NATURAL GAS/WATER</u>	SCALE, CPS (GR) <u>40/10</u>
BIT GAUGE <u>5.0</u>	ZERO PLACEMENT (GR) <u>LOFT</u>
CASING <u>NONE</u>	WATER FACTOR <u>1.157</u>
TRUCK # <u>1</u>	
LOGGING SPEED, FT/MIN <u>15</u>	RESISTIVITY TYPE <u>SINGLE POINT</u>
RECORDER DEPTH SCALE, FT/IN. <u>10</u>	SPACING, INCHES <u>NONE</u>
	SCALE, OHMS/INCH <u>90</u>
	ZER <u>LOFT</u>
	S P SCALE, MV/INCH <u>NONE</u>

REMARKS:	
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GEO-DYNAMICS GEO

No. GC-27ES

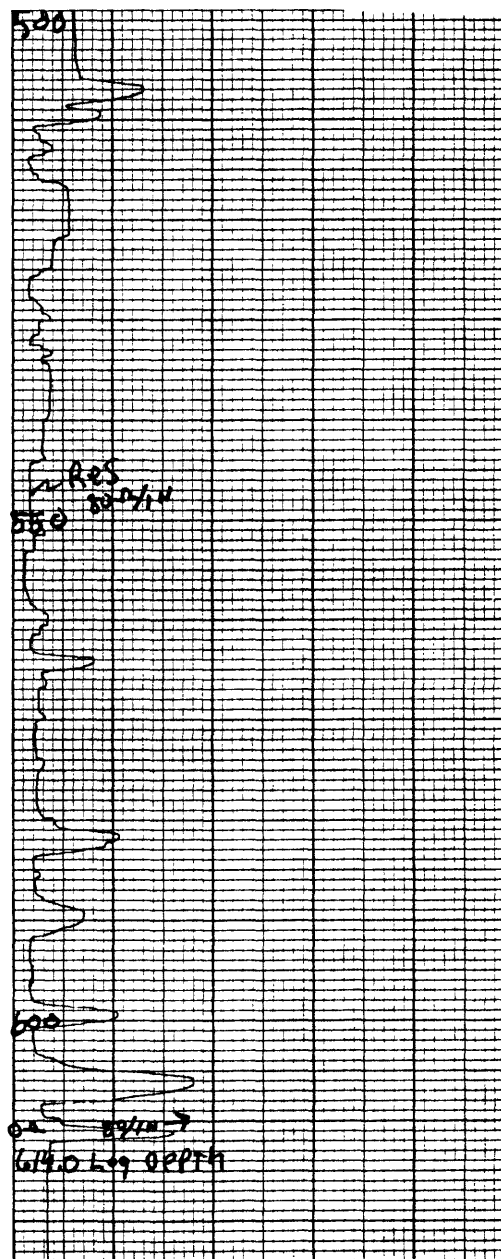
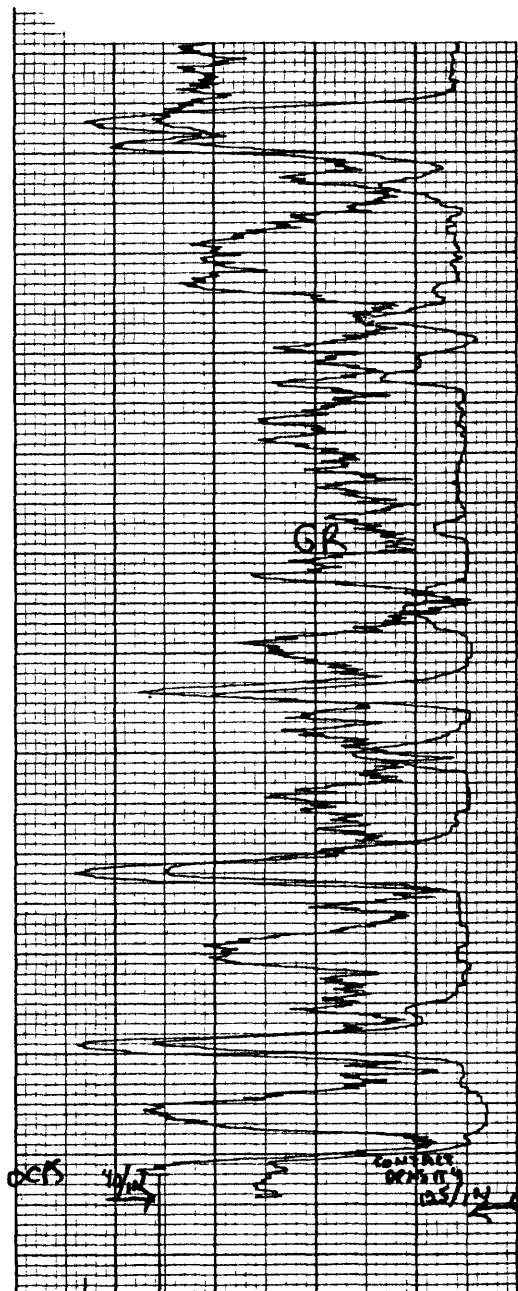
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Geo Dynamics

casper wyoming 82601

EXHIBIT 5

COMPANY <u>Colorado School of Mines</u>		HOLE # OR NAME <u>Y-5</u>		ELEVATION _____	
FIELD _____		COUNTY <u>Moffat</u>		STATE <u>Colo.</u>	
LOCATION <u>SE 1/4, NE 1/4, SE 1/4, SW 1/4</u>		SECTION <u>32</u>		TOWNSHIP <u>7N</u>	
				RANGE <u>93W</u>	
LOG TYPE	<u>ES-GR-Density</u>	RUN	<u>1</u>	<u>2</u>	
WELL #	<u>1</u>	TOOL # & MODEL	<u>564C</u>	<u>P-1</u>	
DATE	<u>3 Dec 1975</u>	DIAMETER, INCHES	<u>1 3/4</u>	<u>1-3/4</u>	
DEPTH DRILLED	<u>614.0</u>	GR DETECTOR	<u>551M7</u>	DENSITY DETECTOR <u>G.M.</u>	
DEPTH LOGGED	<u>614.0</u>	SIZE CRYSTAL, INCHES	<u>1/4 x 5/64</u>	<u>1 x 6.500</u>	
BOTTOM LOGGED INTERVAL	<u>NONE</u>	K FACTOR	<u>1.23 x 10^-5</u>		
TOP LOGGED INTERVAL	<u>NONE</u>	DEADTIME, SECONDS	<u>8.54</u>		
FLUID LEVEL	<u>397.0</u>	TIME CONSTANT (GR)	<u>1</u>	DENSITY <u>1</u>	
TYPE HOLE FLUID	<u>NATURAL GAS/WATER</u>	SCALE, CPS (GR)	<u>40/10</u>	DENSITY <u>125/10 + 250/10</u>	
BIT GAUGE	<u>5.0</u>	ZERO PLACEMENT (GR)	<u>LEFT</u>	DENSITY <u>RIGHT</u>	
CASING	<u>NONE</u>	WATER FACTOR	<u>1.157</u>		
TRUCK #	<u>1</u>	RESISTIVITY TYPE	<u>Single Point</u>		
LOGGING SPEED, FT/MIN	<u>15</u>	SPACING, INCHES	<u>NONE</u>		
RECORDER DEPTH SCALE, FT/IN.	<u>10</u>	SCALE, OHMS/INCH	<u>80</u>		
		ZERO	<u>LEFT</u>		
		S P SCALE, MV/INCH	<u>NONE</u>		
REMARKS:					



GEO-DYNAMICS GEOPHYSICAL SERVICES, CASPER, WYO. 82601

Project No. H50146

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE

EXHIBIT 6 LITHOLOGIC LOGDate 11-21-75Hole No. 46 Elev. 6956' Total Depth 829' Location NW 1/4, SW 1/4, SE 1/4, NE 1/4 SEC 26, T8N, R93W Property BLMCounty MOFFAT State COLO Sponsor USGS Drilling Co. IRON CLAD Geologist J.C. MULLER


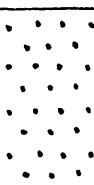
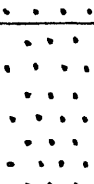
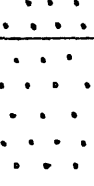
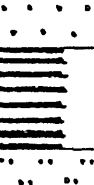
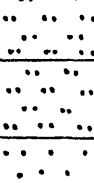
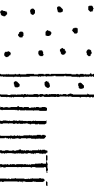
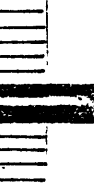

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)				ROUND-ING			SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL				
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0	Angular	Subangular		Subrounded	Rounded	Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed. Meta. Ign.	Most abund.	TOTAL %	Vitrinite	Clarinite	Durinite
OVERBURDEN ↑ 0 10 20 30 40 50 60 70 80		ALLUVIUM - SANDY LOAM, YELLOW BROWN	x	x					x		60		40												
		" "	x	x						x		60		40											
		SS, LT BROWN	x	x	x				x	x	MED-POOR	90	?	3		2	5	x	SS	0					
		SS, YELLOW-BUFF (OXIDIZED)	x	x	x				x	x	MED-POOR	89	?	1		5	5	x	Grt	0					
		" "	x	x	x				x	x	POOR	89	?	1		5	5	x	Grt	0					
		SS, LT GREY-BUFF	x	x	x				x	x	POOR	88		4		1	8	x	Grt	0					
		" "	x	x	x				x	x	POOR	88	?	4		1	8	x	Grt	0					
		SS, LT GREY-BUFF w/ CLYST, YELLOW INTBD	x	x	x				x	x	POOR	53	?	2	40		1	4	x	Grt	0				
		" "	x	x	x				x	x	POOR	53		2	40		1	4	x	Grt	0				
			SH, BLUE GREY w/ SH, DK GREY CARB INTBD												95			0			5				
	" "													95			0								
		COAL												6	1		0				93	x			
		" "												6	1		0				93	x			
		" "												6	1		0				93	x			
		SS, LT GREY-LT BROWN	x	x					x		MED	75	15	10		0									
		" "	x	x					x		MED	74	15	10		1	x	Grt	0						
		" "	x	x					x		MED	74	15	10		1	x	Grt	0						
		" "	x	x					x		MED	74	15	10		1	x	Grt	0						
		" "	x	x					x		MED	74	15	10		1	x	Grt	0						
		SH, DK GREY, CARB											90						10					x	

Project No. H50146 Date 11-21-75
 Hole No. Y-6 Elev. 6956' Total Depth 829' Location NW 1/4, SW 1/4, SE 1/4, NE 1/4, SEC 26, T8N, R93W Property BLM
 County MOFFAT State COLO Sponsor USGS Drilling Co. IRON CLAD Geologist S.C. MULLER

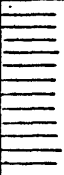



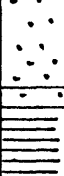
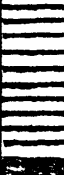




Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL							
			.00-.125	.125-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed.	Meta.	Ign.	Most abund.	TOTAL %	Vitrinite	Clarinite	Durinite	Fusinite		
80		SH, DK GREY, CARB													85		0					15					
90	SS, LT GREY - LT BROWN	x					x	well	75	20											5					
			x					x	well	75	20											5					
			x					x	well	75	20											5					
			x					x	well	75	20											5					
100		x					x	well	75	20											5					
			x					x	well	75	20											5					
			x					x	well	75	20											5					
			x					x	well	75	20											5					
110		x					x	well	75	20											5					
			x					x	well	75	20											5					
			x					x	well	75	20											5					
			x					x	well	75	20											5					
		COAL w/ SH, DK GREY, CARB INTBD										20										80	x				
		SH, DK GREY, CARB											85										15				
		COAL w/ SH, DK GREY, CARB INTBD																									
		SS, LT GREY	x					x	well	60	20	10										5					
120		x					x	well	74	20						1					5					
			x					x	well	75	20											5					
			x					x	well	75	20											5					
			x					x	well	75	20											5					
140		x					x	well	75	20											5					
			x					x	well	75	20											5					
			x					x	well	75	20											5					
			x					x	well	75	20											5					
150		x					x	well	75	20											5					
			x					x	well	75	20											5					
			x					x	well	75	20											5					
			x					x	well	75	20											5					
160		x				x	well	75	20											5						

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE

Project No. H50146 EXHIBIT 6 LITHOLOGIC LOG Date 11-21-75
 Hole No. Y-6 Elev. 6956' Total Depth 829' Location NW 1/4, SW 1/4, SE 1/4, NE 1/4, SEC 26, T8N, R93W Property BLM
 County MOFFAT State COLO Sponsor USGS Drilling Co. IRON CLAD Geologist S.C. MULLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING Angular Subangular Subrounded Rounded	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE							ROCK FRAGMENTS				COAL			
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed.	Meta.	Ign.	Most abund.	TOTAL %	Vitrain	Clarain	Durain
160		SS, LT GREY	x					x	WELL	75	20								5				x	
		"	x					x	WELL	75	20								5				x	
170		"	x					x	WELL	75	20								5				x	
		"	x					x	WELL	75	20								5				x	
180		"	x					x	WELL	60	20	15							5				x	
		"	x					x	WELL	75	20								5				x	
190		"	x					x	WELL	75	20								5				x	
		"	x					x	WELL	75	20								5				x	
200		SH, DK GREY, CARB										95							5				x	
		SLTST, GREY	x					x	WELL	30	15	50							5				x	
210		" "	x					x	WELL	30	15	50							5				x	
		SS, GREY	x					x	WELL	75	15								10				x	
220		"	x					x	WELL	75	15								10				x	
		SH, GREY-BLUE										95							5				x	
230											95							5				x		
		COAL w/ SH, DK GREY, CARB INTD										25							75	x			x	
		SS, BLUE-GREY																5				x		
240																		5				x		

Project No. H50146 COLORADO SCHOOL OF MINES RESEARCH INSTITUTE
 EXHIBIT 6 LITHOLOGIC LOG Date 11-21-75
 Hole No. Y-6 Elev. 6956' Total Depth 829' Location NW 1/4, SW 1/4, SE 1/4, NE 1/4, SEC 26, T8N, R93E Property BLM
 County MOFFAT State COLORADO Sponsor USGS Drilling Co. IRON CLAD Geologist S.C. MULLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL						
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafica	Clay	Pyrite	Others	TOTAL %	Sed.	Meta.	Ign.	Most abund.	TOTAL %	Vitrain	Clarain	Durain	Fusain	
240		SH, BLUE-GREY														95							5			X
250		SS, LT GREY	X					X	well	65	15	20														
260		SLTST, LT BROWN	X					X	well	25	15	60														
270		SS, LT. GREY	X					X	well	65	15	20														
280		" "	X					X	well	70	25	5														
290		SH, BLUE-GREY														95							5			X
		SH, DK GREY, CARB														85							15			X
300		COAL														5	1						94	X		
		SH, DK GREY-BLACK, CARB														5	1						94	X		
310		COAL														10							90	X		
		"														5							95	X		
320		SLTST, LT BROWN, SANDY	X					X	well	35	15	50											5			X

Project No. H50146

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE

EXHIBIT 6 LITHOLOGIC LOGDate 1-21-75Hole No. Y-6 Elev. 6956' Total Depth 829' Location NW 1/4, SW 1/4, SE 1/4, NE 1/4, SEC 26 T8N, R93W Property BLMCounty MOFFAT State COLORADO Sponsor USGS Drilling Co. IRON CLAD Geologist SC. MULLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING Angular Subangular Subrounded Rounded	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL					
			.0625-.125 .125-.25 .25-.5 .5-1.0 >1.0							Quartz	Feldspar	Mafica	Clay	Pyrite	Others	TOTAL %	Sed. Meta. Ign.	Most abund.	TOTAL %	Vitrain Clarain Durain Fusain					
320		SH, BLUE-GRAY												95							5				x
															95							5			
330		SS, LT GRAY	x					x	well	75	15	5									5				x
		" "	x					x	well	75	15	5									5				x
340		SH, BLUE-GRAY								25		70									5				x
		" "								5		90									5				x
350		SH, DK GRAY, CARB								5		90									5				x
		SH, BLUE-GRAY											85								15				x
360		SH, BLUE-GRAY											95								5				x
		SH, DK GRAY, CARB											85								15				x
370		SS, DK GRAY	x					x	well	70	20														x
		" "	x					x	well	70	20													x	
380		" "	x					x	well	70	20														x
		SILTST, GRAY-BROWN	x					x	well	35	15	45									5				x
390		SS, GRAY, SILTY	x					x	well	75		10									5				x
		" "	x					x	well	75	10	10									5				x
400		" "	x					x	well	75	10	10									5				x
		" "	x					x	well	75	10	10									5				x

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE

Project No. H50146

EXHIBIT 6 LITHOLOGIC LOG

Date 11-21-75

Hole No. Y-6 Elev. 6956' Total Depth 829'

Location NW 1/4, SW 1/4, SE 1/4, NE 1/4, SEC 26, T8N, R93W

Property BLM

County MOFFAT State COLO

Sponsor USGS

Drilling Co. IRON CLAD

Geologist J.C. MULLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING Angular Subangular Subrounded Rounded	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL				
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed. Meta. Ign.	Most abund.	TOTAL %	Vitrain	Clarain	Durain	Fusain	
400	SS, GREY, SILTY		x					x		60	10	25								5				x
			x					x		75	10	10								5				x
410	" "		x					x		75	10	10								5				x
			x					x		75	10	10								5				x
420	SH, GREY W/ SLTST INTBD		xx					x	med	10	10	75								5				x
			xx					x	med	10	10	75								5				x
430	" "		xx					x	med	15	10	70								5				x
			xx					x	med	20	10	65								5				x
440	COAL W/ SH, BLACK, CARB, INTBD										30	?								70	x			x
												30	?							70	x			x
450	SLTST, GREY		x					x	well	45	10	40								5				x
			x					x	well	40	10	45								5				x
460	" "		x					x	well	30	10	55								5				x
			x					x	well	45	10	40								5				x
470	" "		x					x	well	40	10	45								5				x
			x					x	well	65	15	15								5				x
480	SS, GREY, SILTY		x					x	well	65	15	15								5				x
			x					x	well	65	15	15								5				x

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL						
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed.	Meta.	Ign.	Most abund.	TOTAL %	Vitrain	Clarain	Durain	Fusain	
480		SH, GREY												95								5			x	
490	SS, GREY	x					x	Well	75	15	5										5			x	
			x					x	Well	75	15	5										5			x	
			x					x	Well	75	15	5										5			x	
500	" "	x					x	Well	75	15	5										5			x	
			x					x	Well	75	15	5										5			x	
			x					x	Well	75	15	5										5			x	
510	SLTST, GREY, SANDY	x					x	Well	40	10	40										10			x	
			x					x	Well	40	10	40										10			x	
			x					x	Well	40	10	40										10			x	
520	" "	x					x	Well	40	10	40										10			x	
			x					x	Well	40	10	40										10			x	
			x					x	Well	40	10	40										10			x	
530	SS, GREY	x					x	Well	75	15	5										5			x	
			x					x	Well	75	15	5										5			x	
			x					x	Well	75	15	5										5			x	
540		SH, GREY											95									5			x	
550													95										5			x
													85										15			x
		SH, GREY w/ SH, DK GREY CARB INTBD												80									20			x
560		" "											80									20			x	

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE
EXHIBIT 6 LITHOLOGIC LOG

Project No. H50146 Date 11-21-75
Hole No. Y-6 Elev. 6956' Total Depth 829' Location NW 1/4, SW 1/4, SE 1/4, NE 1/4 SEC 26 T8N, R93W Property BLM
County MOFFAT State COLORADO Sponsor USGS Drilling Co. IRON CLAD Geologist S.C. MULLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL				
			.06-.125	.125-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed. Meta. Ign.	Most abund.	TOTAL %	Vitrain	Clarain	Durain	Fusain	
560	=====	SH, DK GREY, CARB												80						20				x
	=====	COAL w/ SH, DK GREY, CARB												25	?					75	x			x
	=====	INT BD												25	?					75	x			x
570	=====	SH, GREY												95						5				x
	=====													95						5				x
	=====	" "								5				90						5				x
580	=====										5			90						5				x
	=====	" "												90						5				x
	=====	" "												95						5				x
590	=====													95						5				x
	=====	" "												95						5				x
	=====	" "												95						5				x
600	=====	SS, GREY	x					x	well	70	15	10								5				x
	=====	SH, GREY	x					x	well	15	5	75								5				x
	=====	" "												95						5				x
610	=====	" "												95						5				x
	=====	SS, GREY	x					x	well	70	15	10								5				x
	=====		x					x	well	70	15	10								5				x
620	=====	SH, GREY-BLUE												95						5				x
	=====													95						5				x
	=====	" "												95						5				x
630	=====	" "												95						5				x
	=====	SS, DK GREY	x x					x	med	65	15	10								10				x
	=====		x x					x	med	65	15	10								10				x
640	=====																							

Project No. H50146 EXHIBIT 6 LITHOLOGIC LOG Date 11-21-75
Hole No. Y-6 Elev. 6956' Total Depth 829' Location NW 1/4, SW 1/4, NE 1/4, SEC 26, TEN, R30D Property BLM
County MOFFAT State COLORADO Sponsor USGS Drilling Co. IRON CLAD Geologist J.C. MILLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL			
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed.	Meta.	Ign.	Most abund.	TOTAL %	Vitrain	Clarain
640		SS, DK GREY W/ COAL CLASTS	x	x				x	med	55	15	10								20			x
650		COAL											5	1						96	x		x
		"											5	1						96	x		x
		SH, DK GREY W/ COAL CLASTS											85							15			x
660		COAL W/ SH, DK GREY, CARB											30	?						70	x		x
		SH, GREY, SANDY	x	x				x	med	20	10	65								5			x
		"	x	x				x	med	20	5	70								5			x
670		"	x	x				x	med	20	5	70								5			x
		"	x	x				x	med	20	5	70								5			x
		"	x	x				x	med	10	2	83								5			x
680		SS, GREY	x					x	well	65	20	5								10			x
		"	x					x	well	65	20	5								10			x
		SH, DK GREY, CARB	x					x		5		75								20			x
690		SS, GREY	x					x	well	65	20	5								10			x
		"	x					x	well	65	20	5								10			x
		SH, DK GREY, CARB	x					x		10		70								20			x
700		SH, GREY W/ SH, DK GREY, CARB INTBD	x					x		5		80								15			x
		"	x					x		5		80								15			x
		"	x					x		5		80								15			x
710		"	x					x		5		80								15			x
720		"	x					x		5		80								15			x

Project No. H50196

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE

EXHIBIT 6 LITHOLOGIC LOGDate 11-21-75Hole No. Y-6 Elev. 6956' Total Depth 829' Location NW 1/4, SW 1/4, SE 1/4, NE 1/4, SEC 26 T8N, R93W Property BLMCounty MOFFAT State COLORADO Sponsor USGS Drilling Co. IRON CLAD Geologist S.C. MULLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL			
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed. Meta. Ign.	Most abund.	TOTAL %	Vitrinite	Clarinite	Durinite	Fusinite
720		SH, GREY W/ SH, DK GREY, CARB INTBD	x					x		5			75						20				x
		" "	x					x		5			80						15				x
730			x					x		10			80						15				x
		" "	x					x		10			80						15				x
740			x					x		10			80						15				x
		" "	x					x		10			80						15				x
750		COAL W/ SH, DK GREY, CARB INTBD											40						60	x			x
		SS, S&F - LT GREY W/ SH, DK GREY, CARB & MINOR COAL INTBD	x					x	well	54	10	20				1	CHT		15				x
		" "	x					x	well	54	10	20				1	CHT		15	x			x
760			x					x	well	44	10	20				1	CHT		25	x			x
		" "	x					x	well	54	5	15				1	CHT		25	x			x
770			x	x				x	med	68	10	5				2	CHT		15	x			x
		" "	x	x				x	med	68	10	10				2	CHT		10				x
780			x	x				x	med	68	10	10				2	CHT		10				x
		" "	x	x				x	med	68	10	10				2	CHT		10				x
790			x	x				x	med	68	10	10				2	CHT		10				x
		" "	x	x				x	med	68	10	10				2	CHT		10				x
800			x	x				x	med	68	10	10				2	CHT		10				x

Project No. H50146 COLORADO SCHOOL OF MINES RESEARCH INSTITUTE
 EXHIBIT 6 LITHOLOGIC LOG Date 11-21-75
 Hole No. Y-6 Elev. 6956' Total Depth 829' Location NW 1/4, SW 1/4, SE 1/4, NE 1/4, SEC 26 T8N, R93W Property BLM
 County MOFFAT State COLORADO Sponsor USGS Drilling Co. IRON CLAD Geologist S.C. MULLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL				
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed.	Meta.	Ign.	Most abund.	TOTAL %	Vitrain	Clarain	Durain
Bottom of Hole	800	SS, S&P - LT GRAY W/SH DK GRAY, CARB INTBD	X	X				X	X	Med	20	10	40			5	X			CHT 15				X
		SH, GRAY, CARB	X	X				X	X	Med	10	5	60			5	X			CHT 20	X			X
		SS, S&P - LT GRAY, CONG(?) 1/4 SH, GRAY INTBD	X	X				X	X	Med	10	5	60			5	X			CHT 20	X			X
	810	"	X	X	X			X	X	Med	45	10	25			5	10	X		CHT 5				X
		"	X	X	X			X	X	Med	45	10	25			5	10	X		CHT 5				X
	820	SS, S&P - LT GRAY W/SH, ORANGE (OXIDIZED)	X	X	X			X	X	Med	35	15	30			5	10	X		CHT 5				X
		"	X	X	X			X	X	Med	35	15	30			5	10	X		CHT 5				X
	830																							
	840																							
	850																							
	860																							
	870																							
	880																							



HOLE NO. Y-6

825

EXHIBIT 6

C 300-2 SP 117000

DATE 11-21-75

SEC TWP RANGE
AREA Yampa valley
COUNTY Moffat
STATE Colo
COMPANY CSMRI
DATE 11-21-75
TOTAL FOOTAGE LOGGED 820

LOG SILENT
BL. SIZE 4 1/2
PORT HOLE FLUID H₂O + Mud
DENSITY
VISCOSITY

RESISTIVITY
OPERATOR Hollander
UNIT NO. 7528
LOCATION Craig

COMPANY CSMRI

BORE HOLE Y-6

AREA Yampa valley
COUNTY Moffat

SECTION TOWNSHIP

STATE Colo

LOG MEASURED FROM Surface

10 LOGGED 820

GAMMA SCALE

TIME CONSTANT 2

CALIBRATION & PROBE DATA

SOURCE NO 8060-2

PROBE NO 8060-2

DETECTOR XTW1

DEAD TIME 0.0

WATER FACTOR 1.12

RES SCALE

SOURCE VALUE

4701

PROBE SIZE 1 7/16

DETECTOR 12X2

DEAD TIME 1.39 x 10⁻⁵

WATER FACTOR 1.0

Density

SCALE

TC 5

LOGGING SPEED 20

FROM

TO

TOTAL

GAMMA RAY

Initial run offset

SCALE

TC

LOGGING SPEED

FROM

TO

TOTAL

SCALE

TC

LOGGING SPEED

FROM

TO

TOTAL

DRIVE

STAND BY

LOGGING

2.0

TOTAL

6.5

ROUNDTRIP

46

CHARACTER

STANDBY

TIME IN

1448

TIME OUT

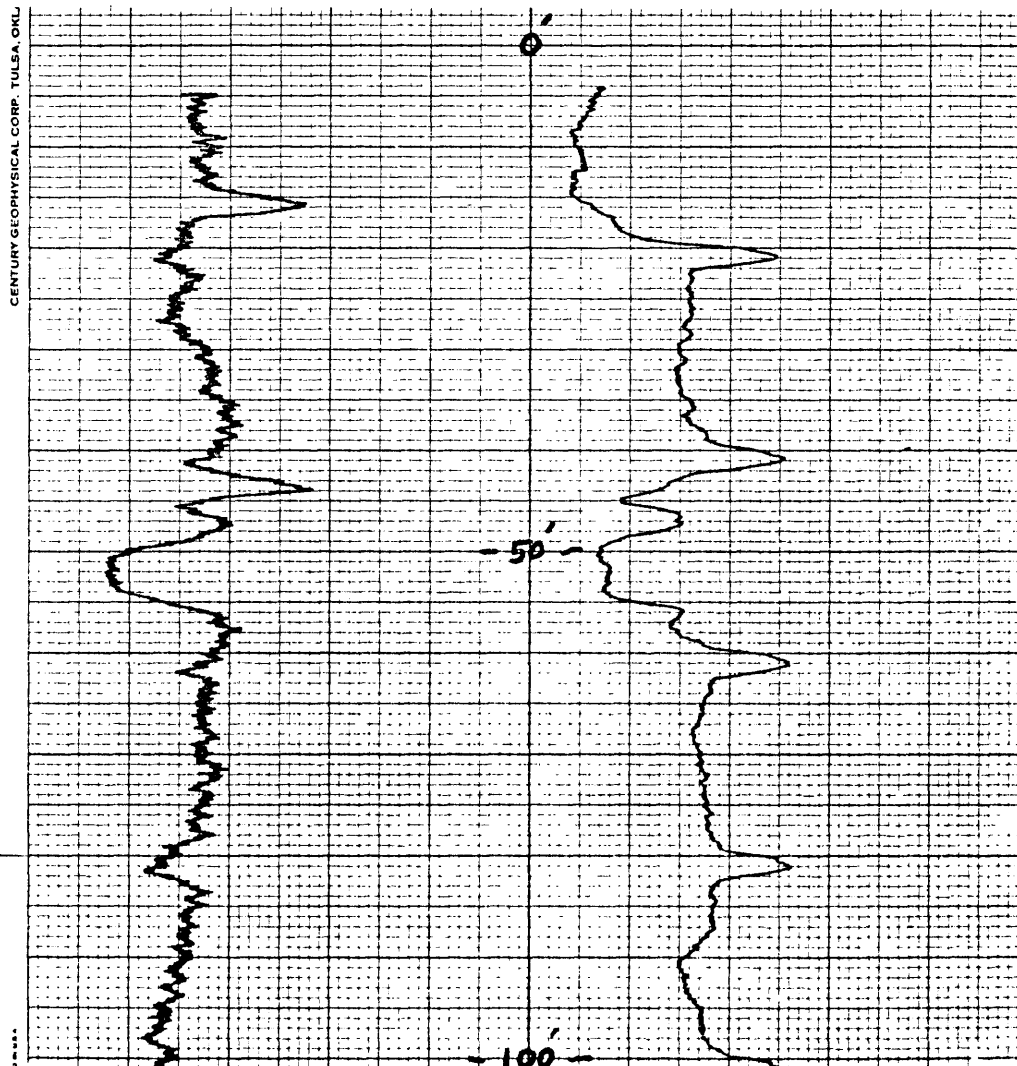
1648

SELF POTENTIAL

DENSITY

NATURAL GAMMA RAY
COUNTS PER SECOND

RESISTANCE
OHMS





Century Geophysical Corporation
Denver, Colo.

C 360-1 SP 117-000

COMPANY

CSMRI

BORE HOLE

Y-6

AREA

Yampa valley

COUNTY

MoFFat

SECTION

TOWNSHIP

RANGE

LOG MEASURED FROM
Surface

DATE
11-21-75

WELL NO.

Y-6

SEC

TWP

RANGE

AREA

Yampa valley

COUNTY

MoFFat

STATE

Colo

COMPANY

CSMRI

DATE

11-21-75

TOTAL FOOTAGE LOGGED

820

TO BILLED

825

SEC

TWP

RANGE

AREA

Yampa valley

COUNTY

MoFFat

STATE

Colo

COMPANY

CSMRI

DATE

11-21-75

TOTAL FOOTAGE LOGGED

820

LOCATION

Craig

DRIVE

0.7

STAND BY

3.8

LOGGING

2.0

TOTAL

6.5

ROUNDTRIP

MILEAGE

46

CHARGEABLE

STANDBY

TIME IN

TIME OUT

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EXHIBIT 6

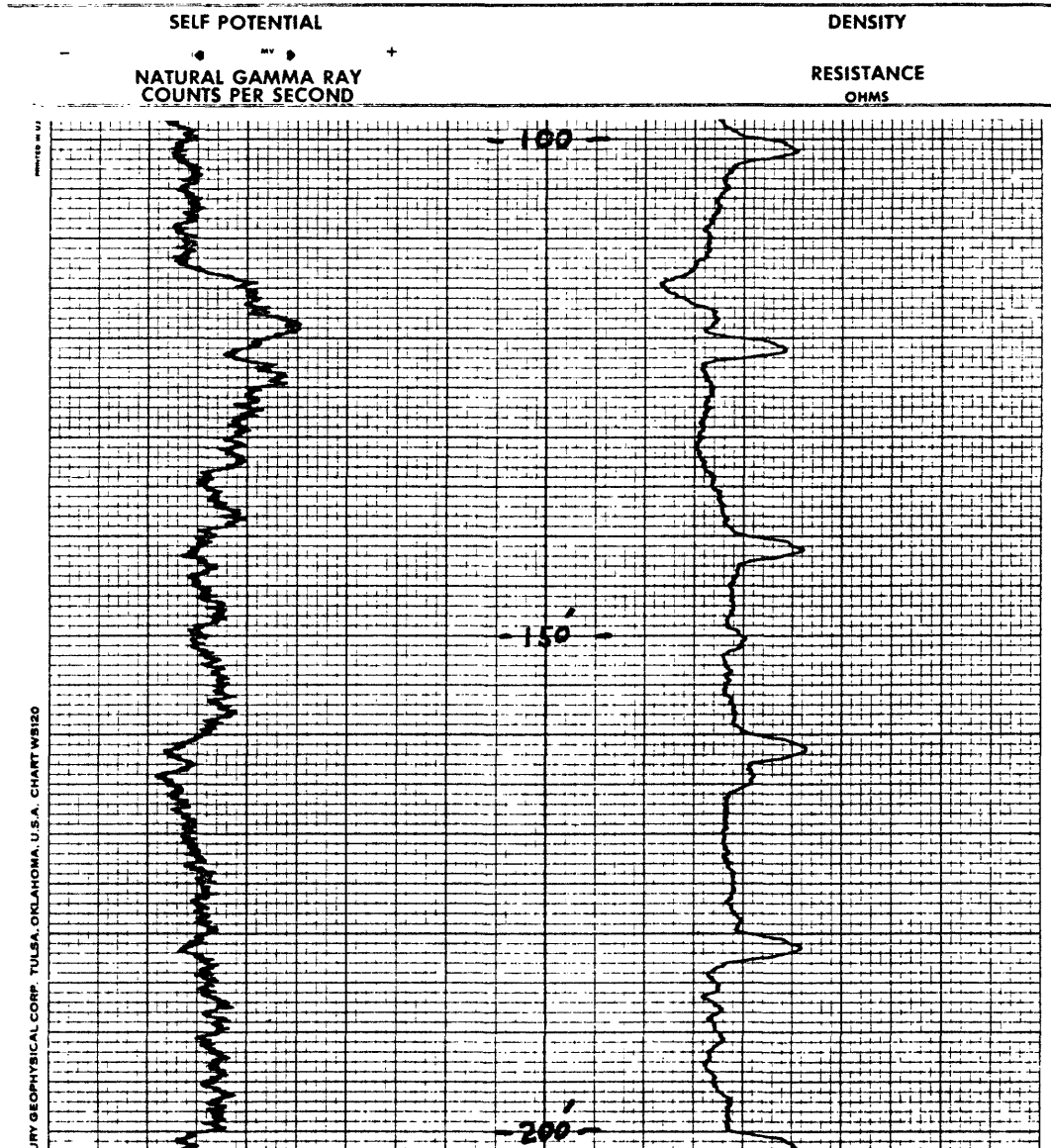
INITIAL RUN		Density		GAMMA BEGINS		GAMMA BEGINS		GAMMA BEGINS		GAMMA BEGINS	
SCALE		SCALE		SCALE		SCALE		SCALE		SCALE	
820		2.5		5		20		20		20	
LOGGING SPEED		LOGGING SPEED		LOGGING SPEED		LOGGING SPEED		LOGGING SPEED		LOGGING SPEED	
25		25		25		25		25		25	
TIME CONSTANT		TIME CONSTANT		TIME CONSTANT		TIME CONSTANT		TIME CONSTANT		TIME CONSTANT	
2		2		2		2		2		2	
CALIBRATION & PROBE DATA		CALIBRATION & PROBE DATA		CALIBRATION & PROBE DATA		CALIBRATION & PROBE DATA		CALIBRATION & PROBE DATA		CALIBRATION & PROBE DATA	
SOURCE NO		SOURCE NO		SOURCE NO		SOURCE NO		SOURCE NO		SOURCE NO	
8060-2		8060-2		8060-2		8060-2		8060-2		8060-2	
PROBE NO		PROBE NO		PROBE NO		PROBE NO		PROBE NO		PROBE NO	
8060-2		8060-2		8060-2		8060-2		8060-2		8060-2	
DETECTOR		DETECTOR		DETECTOR		DETECTOR		DETECTOR		DETECTOR	
XTM1		XTM1		XTM1		XTM1		XTM1		XTM1	
DEAD TIME		DEAD TIME		DEAD TIME		DEAD TIME		DEAD TIME		DEAD TIME	
0.0		0.0		0.0		0.0		0.0		0.0	
WATER FACTOR		WATER FACTOR		WATER FACTOR		WATER FACTOR		WATER FACTOR		WATER FACTOR	
1.12		1.12		1.12		1.12		1.12		1.12	
RES SCALE		RES SCALE		RES SCALE		RES SCALE		RES SCALE		RES SCALE	
1.0		1.0		1.0		1.0		1.0		1.0	

SELF POTENTIAL

DENSITY

RESISTANCE

OHMS





Century Geophysical Corporation
Denver, Colo.

C 366-1 SP 117488

COMPANY **CSMRI**

BORE HOLE **Y-6**

AREA **Yampa valley**

COUNTY **MoFFat**

SECTION

TOWNSHIP

RANGE

STATE **Colo**

LOG MEASURED FROM **SurFace**

HOLE NO **Y-6**

SEC

TWP

RANGE

TD DRILLED **825**

BIT SIZE **4 1/2**

CASING

AREA **Yampa valley**

COUNTY **MoFFat**

STATE **Colo**

COMPANY **CSMRI**

DATE **11-21-75**

TOTAL FOOTAGE LOGGED **820**

BORE HOLE FLUID **H₂O + Mud**

DENSITY

VISCOSITY

RESISTIVITY

OPERATOR **Hollander**

UNIT NO

7528

LOCATION **Craig**

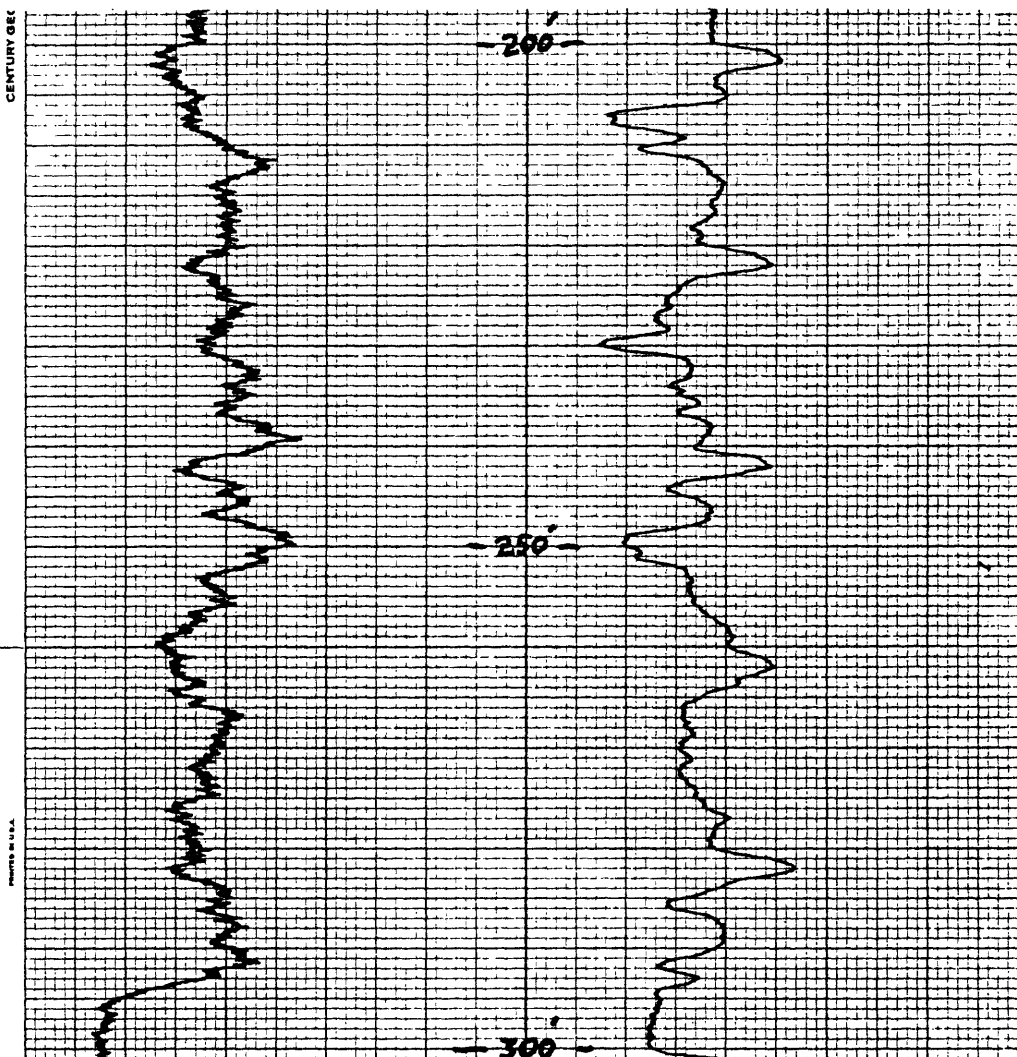
INITIAL RUN		DENSITY		GAMMA RAYS		GAMMA RAYS		GAMMA RAYS		GAMMA RAYS	
TD LOGGED	SCALE	SCALE	SCALE	SCALE	SCALE	SCALE	SCALE	SCALE	SCALE	SCALE	SCALE
820	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
GAMMA SCALE	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED
25	20	20	20	20	20	20	20	20	20	20	20
TIME CONSTANT	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED
2	20	20	20	20	20	20	20	20	20	20	20
CALIBRATION & PROBE DATA	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED	LOGGING SPEED
SOURCE NO	SOURCE VALUE	SOURCE VALUE	SOURCE VALUE	SOURCE VALUE	SOURCE VALUE	SOURCE VALUE	SOURCE VALUE	SOURCE VALUE	SOURCE VALUE	SOURCE VALUE	SOURCE VALUE
8060-2	4761	4761	4761	4761	4761	4761	4761	4761	4761	4761	4761
PROBE NO	PROBE SIZE	PROBE SIZE	PROBE SIZE	PROBE SIZE	PROBE SIZE	PROBE SIZE	PROBE SIZE	PROBE SIZE	PROBE SIZE	PROBE SIZE	PROBE SIZE
8060-2	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4
DIVISION	TYPE & SIZE	TYPE & SIZE	TYPE & SIZE	TYPE & SIZE	TYPE & SIZE	TYPE & SIZE	TYPE & SIZE	TYPE & SIZE	TYPE & SIZE	TYPE & SIZE	TYPE & SIZE
XTM	1/2 X 2	1/2 X 2	1/2 X 2	1/2 X 2	1/2 X 2	1/2 X 2	1/2 X 2	1/2 X 2	1/2 X 2	1/2 X 2	1/2 X 2
READ TIME	WATER FACTOR	WATER FACTOR	WATER FACTOR	WATER FACTOR	WATER FACTOR	WATER FACTOR	WATER FACTOR	WATER FACTOR	WATER FACTOR	WATER FACTOR	WATER FACTOR
0.0	1.39 x 10 ⁻⁵	1.39 x 10 ⁻⁵	1.39 x 10 ⁻⁵	1.39 x 10 ⁻⁵	1.39 x 10 ⁻⁵	1.39 x 10 ⁻⁵	1.39 x 10 ⁻⁵	1.39 x 10 ⁻⁵	1.39 x 10 ⁻⁵	1.39 x 10 ⁻⁵	1.39 x 10 ⁻⁵
WATER FACTOR	AIR FACTOR	AIR FACTOR	AIR FACTOR	AIR FACTOR	AIR FACTOR	AIR FACTOR	AIR FACTOR	AIR FACTOR	AIR FACTOR	AIR FACTOR	AIR FACTOR
1.12	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
RES SCALE											

SELF POTENTIAL

DENSITY

NATURAL GAMMA RAY
COUNTS PER SECOND

RESISTANCE
OHMS





Century Geophysical Corporation
Denver, Colo.

EXHIBIT 6

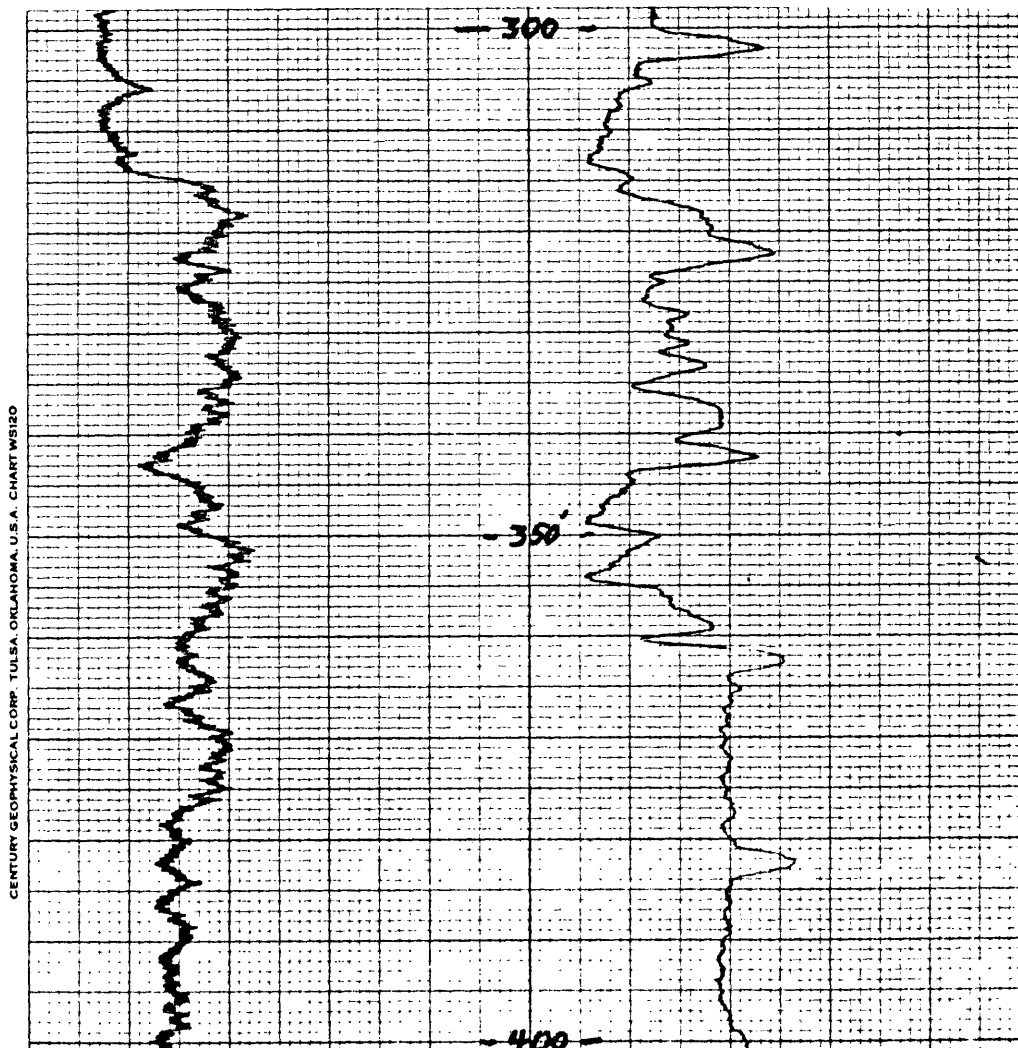
C 300-2 SP 117400		DATE 11-21-75		HOLE NO Y-6		TD 825	
COMPANY CSMRI		LOG MEASURED FROM Surface		SEC TWP RANGE		BIT SIZE 4 1/2	
BORE HOLE Y-6		LOG MEASURED FROM Surface		AREA Yampa valley		BORE HOLE FLUID H ₂ O + Mud	
AREA Yampa valley		LOG MEASURED FROM Surface		COUNTY Moffat		SINKING VIBRATOR	
COUNTY Moffat		LOG MEASURED FROM Surface		STATE Colo		SINKING VIBRATOR	
SECTION		LOG MEASURED FROM Surface		COMPANY CSMRI		SINKING VIBRATOR	
TOWNSHIP		LOG MEASURED FROM Surface		DATE 11-21-75		SINKING VIBRATOR	
RANGE		LOG MEASURED FROM Surface		TOTAL FOOTAGE LOGGED 820		SINKING VIBRATOR	
INITIAL RUN		LOG MEASURED FROM Surface		OPERATOR Hollander		SINKING VIBRATOR	
SCALE 820		LOG MEASURED FROM Surface		UNIT NO 7528		SINKING VIBRATOR	
GAMMA SCALE		LOG MEASURED FROM Surface		LOCATION Craig		SINKING VIBRATOR	
TIME CONSTANT 2		LOG MEASURED FROM Surface		DRIVE 0.7		SINKING VIBRATOR	
CALIBRATION & PROBE DATA		LOG MEASURED FROM Surface		STAND BY 3.8		SINKING VIBRATOR	
SOURCE NO 8060-2		LOG MEASURED FROM Surface		LOGGING 2.0		SINKING VIBRATOR	
PROBE NO 8060-2		LOG MEASURED FROM Surface		TOTAL 6.5		SINKING VIBRATOR	
DETECTOR XTW1		LOG MEASURED FROM Surface		SOUNDING 46		SINKING VIBRATOR	
DEAD TIME 0.0		LOG MEASURED FROM Surface		CHARGEABLE		SINKING VIBRATOR	
WATER FACTOR 1.12		LOG MEASURED FROM Surface		STANDBY		SINKING VIBRATOR	
RES SCALE		LOG MEASURED FROM Surface				SINKING VIBRATOR	

SELF POTENTIAL

DENSITY

NATURAL GAMMA RAY
COUNTS PER SECOND

RESISTANCE
OHMS





Century Geophysical Corporation
Denver, Colo.

EXHIBIT 6

C 206 1 SP 117000

COMPANY

CSMRI

BORE HOLE

AREA
Yampa valley
COUNTY
MoFFat

SECTION

TOWNSHIP

RANGE

STATE
Colo

LOG MEASURED FROM
Surface

DATE
11-21-75

WELL NO
Y-6

SEC

TWP

RANGE

AREA
Yampa valley

COUNTY
MoFFat

STATE
Colo

COMPANY
CSMRI

DATE
11-21-75

LOGICAL TO LOGICAL (1000 FT)
820

LOGICAL TO LOGICAL (1000 FT)
825

LOGICAL TO LOGICAL (1000 FT)
442

LOGICAL TO LOGICAL (1000 FT)
1120 + Mud

LOGICAL TO LOGICAL (1000 FT)
DENSITY

LOGICAL TO LOGICAL (1000 FT)
VISCOSITY

LOGICAL TO LOGICAL (1000 FT)
RESISTIVITY

LOGICAL TO LOGICAL (1000 FT)
LOCATION

LOGICAL TO LOGICAL (1000 FT)
CRASH

LOGICAL TO LOGICAL (1000 FT)
0.7

LOGICAL TO LOGICAL (1000 FT)
3.8

LOGICAL TO LOGICAL (1000 FT)
2.0

LOGICAL TO LOGICAL (1000 FT)
6.5

LOGICAL TO LOGICAL (1000 FT)
46

LOGICAL TO LOGICAL (1000 FT)
CHARGEABLE

LOGICAL TO LOGICAL (1000 FT)
STANDBY

LOGICAL TO LOGICAL (1000 FT)
TIME IN

LOGICAL TO LOGICAL (1000 FT)
TIME OUT

LOGICAL TO LOGICAL (1000 FT)
1448

LOGICAL TO LOGICAL (1000 FT)
1648

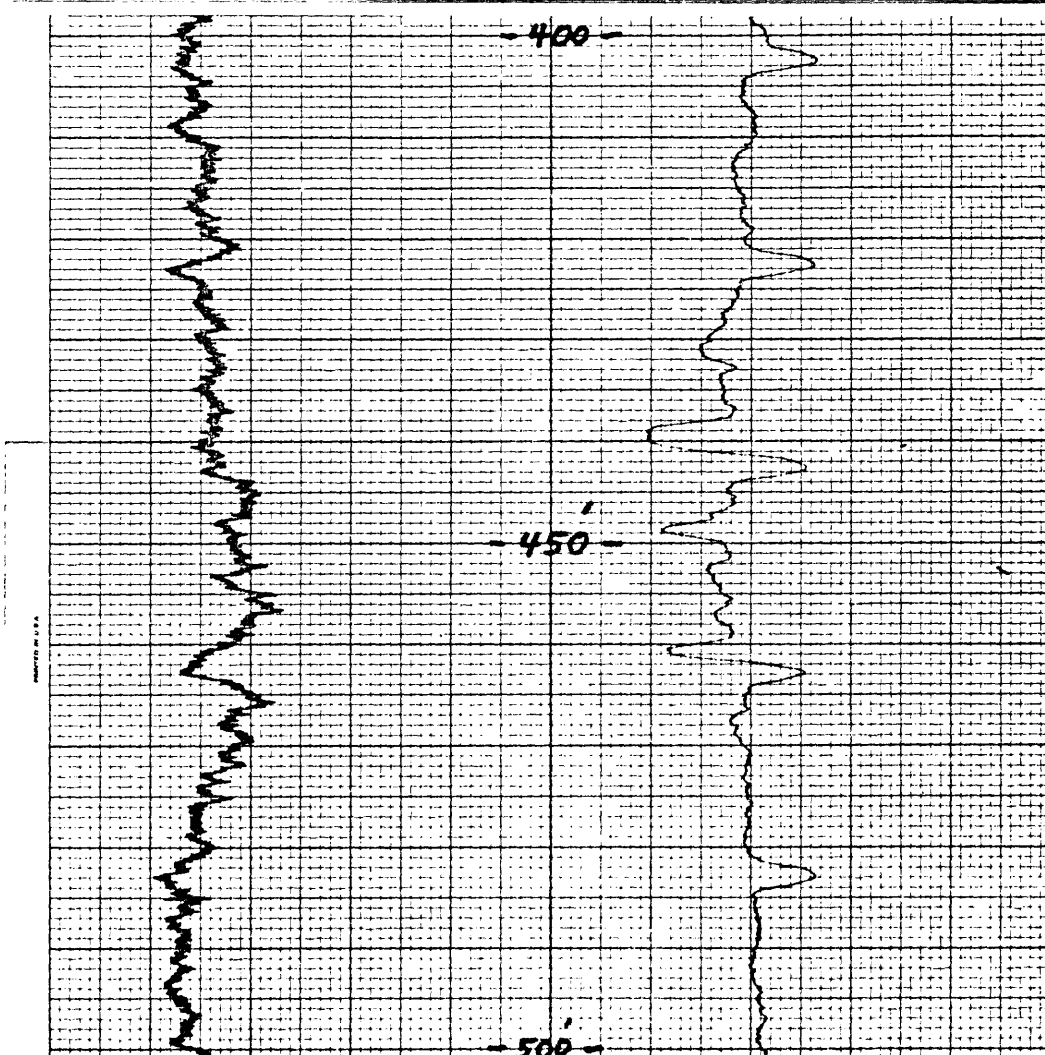
INITIAL RUN		Density		GAMMA RESULTS	
SCALE		SCALE		SCALE	
TD LOGGED	820	SCALE	2.5%	SCALE	2.5%
GAMMA SCALE	25 Cps Per In	LOGGING SPEED	20	LOGGING SPEED	20
TIME CONSTANT	2	FROM		FROM	
CALIBRATION & PROBE DATA		TO		TO	
SOURCE NO	8060-2	TOTAL		TOTAL	
PROBE NO	8060-2				
DETECTOR	X721				
DEAD TIME	0.0				
WATER FACTOR	1.12				
RES SCALE					

SELF POTENTIAL

DENSITY

NATURAL GAMMA RAY
COUNTS PER SECOND

RESISTANCE
OHMS





Century Geophysical Corporation
Denver, Colo.

C 360-1 50 117408

COMPANY CSMRI

BORE HOLE Y-6

AREA Yampa valley

COUNTY MoFFat

SECTION TOWNSHIP

RANGE

STATE Colo

LOG MEASURED FROM Surface

DATE 11-21-75

WELL NO. Y-6

SEC TWP RANGE

AREA Yampa valley

COUNTY MoFFat

STATE Colo

COMPANY CSMRI

DATE 11-21-75

TOTAL FOOTAGE LOGGED 820

TO DEPTH 825

R 1 SIZE 4 1/2

BORE HOLE FLUID H₂O + Mud

DENSITY

VISCOSITY

RESISTIVITY

OPERATOR Hollander

UNIT NO. 7528

LOCAL CH. Crater

DRIVE 0.7

STAND BY 3.8

LOGGING 2.0

TOTAL 6.5

ROUNDTRIP 46

MILEAGE

CHARGEABLE

STANDBY

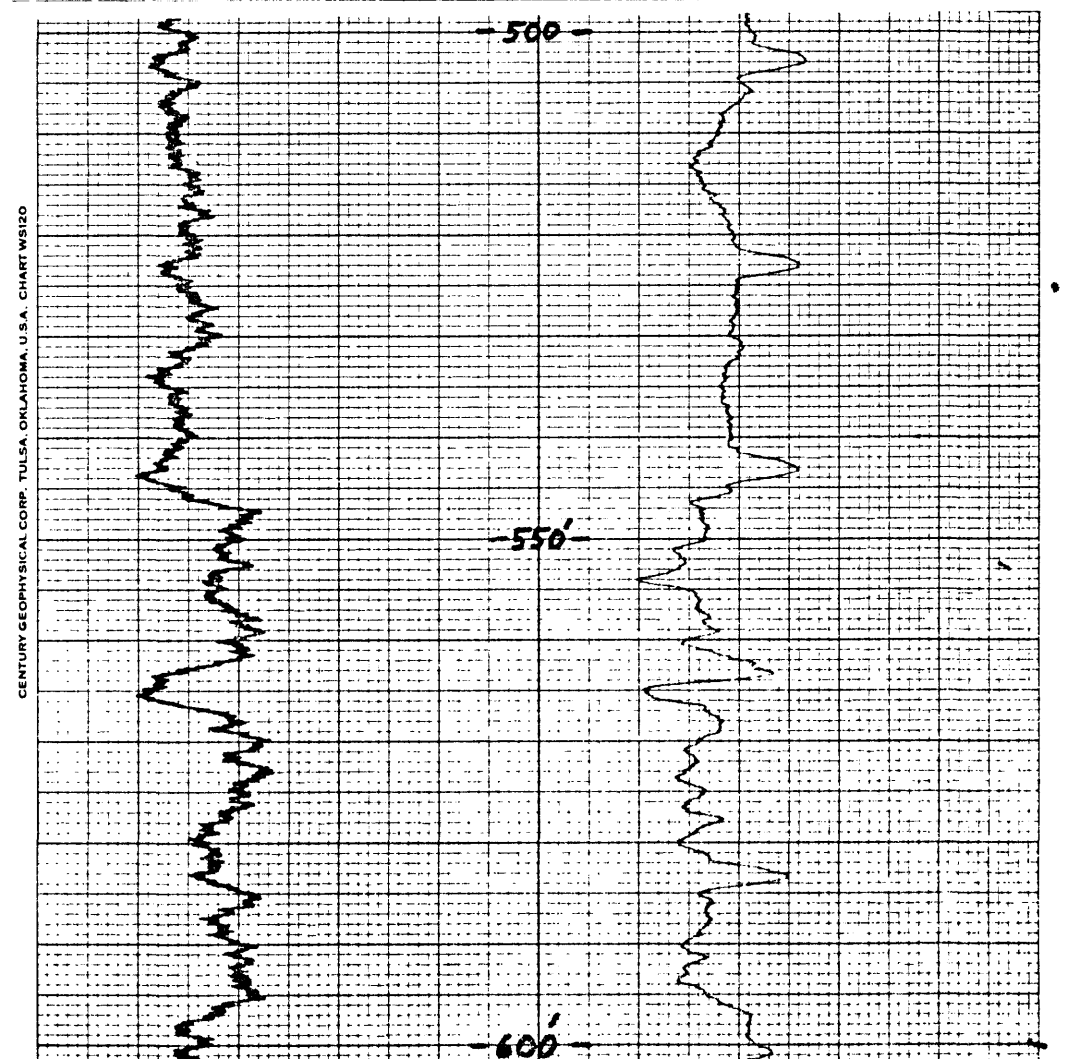
TIME IN 1448

TIME OUT 1648

INITIAL RUN		DENSITY		GAMMA BEAMS		GAMMA BEAMS		GAMMA BEAMS	
TD LOGGED	820	SCALE	2.5	SCALE	2.5	SCALE	2.5	SCALE	2.5
GAMMA SCALE	25	LOGGING SPEED	20	LOGGING SPEED	20	LOGGING SPEED	20	LOGGING SPEED	20
TIME CONSTANT	2	FROM		FROM		FROM		FROM	
CALIBRATION & PROBE DATA		TO		TO		TO		TO	
SOURCE NO	8060-2	SOURCE VALUE	4761	SOURCE NO	8060-2	SOURCE VALUE	4761	SOURCE NO	8060-2
PROBE NO	8060-2	PROBE SIZE	1 7/16	PROBE NO	8060-2	PROBE SIZE	1 7/16	PROBE NO	8060-2
DETECTOR	XTM1	TYPE & SIZE	1/2 x 2	DETECTOR	XTM1	TYPE & SIZE	1/2 x 2	DETECTOR	XTM1
DEAD TIME	0.0	K FACTOR	1.39 x 10 ⁻⁵	DEAD TIME	0.0	K FACTOR	1.39 x 10 ⁻⁵	DEAD TIME	0.0
WATER FACTOR	1.12	AIR FACTOR	1.0	WATER FACTOR	1.12	AIR FACTOR	1.0	WATER FACTOR	1.12
RES SCALE				RES SCALE				RES SCALE	

SELF POTENTIAL
NATURAL GAMMA RAY
COUNTS PER SECOND

DENSITY
RESISTANCE
OHMS



CENTURY GEOPHYSICAL CORP. TULSA, OKLAHOMA, U.S.A. CHART WS120



Century Geophysical Corporation
Denver, Colo.

C 366-1 SP 117400

COMPANY
CSMRI

BORE HOLE
Y-6

AREA
Yampa valley

COUNTY
MoFFat

SECTION

TOWNSHIP

RANGE

STATE
Colo

LOG MEASURED FROM
SatFate

HOLE NO
Y-6

SAC

TWP

RANGE

AREA
Yampa valley

COUNTY
MoFFat

STATE
Colo

COMPANY
CSMRI

DATE
11-21-75

TOTAL FOOTAGE LOGGED
820

LOGGED
825

BIT SIZE
4 1/2

BORE HOLE FLUID
H₂O + Mud

DENSITY

VISCOSITY

RESISTIVITY

OPERATOR
Hollander

UNIT NO
7528

LOCATION
Craig

INITIAL RUN		Density		GAMMA BEAMS		GAMMA BEAMS		GAMMA BEAMS		GAMMA BEAMS	
		Scale		Scale		Scale		Scale		Scale	
LOGGED	820	SCALE	2.54	LOGGING SPEED	2.54	LOGGING SPEED	2.54	LOGGING SPEED	2.54	LOGGING SPEED	2.54
GAMMA SCALE	25	LOGGING SPEED	2.54	LOGGING SPEED	2.54	LOGGING SPEED	2.54	LOGGING SPEED	2.54	LOGGING SPEED	2.54
TIME CONSTANT	2	LOGGING SPEED	2.54	LOGGING SPEED	2.54	LOGGING SPEED	2.54	LOGGING SPEED	2.54	LOGGING SPEED	2.54
CALIBRATION & PROBE DATA		LOGGING SPEED	2.54	LOGGING SPEED	2.54	LOGGING SPEED	2.54	LOGGING SPEED	2.54	LOGGING SPEED	2.54
SOURCE NO	8060-2	SOURCE VALUE	4.061	SOURCE NO	8060-2	SOURCE VALUE	4.061	SOURCE NO	8060-2	SOURCE VALUE	4.061
PROBE NO	8060-2	PROBE SIZE	1 7/16	PROBE NO	8060-2	PROBE SIZE	1 7/16	PROBE NO	8060-2	PROBE SIZE	1 7/16
DETECTOR	XTM1	DETECTOR	XTM1	DETECTOR	XTM1	DETECTOR	XTM1	DETECTOR	XTM1	DETECTOR	XTM1
READ TIME	0.0	READ TIME	0.0	READ TIME	0.0	READ TIME	0.0	READ TIME	0.0	READ TIME	0.0
WATER FACTOR	1.12	WATER FACTOR	1.12	WATER FACTOR	1.12	WATER FACTOR	1.12	WATER FACTOR	1.12	WATER FACTOR	1.12
REF. SCALE		REF. SCALE		REF. SCALE		REF. SCALE		REF. SCALE		REF. SCALE	

SELF POTENTIAL

DENSITY

NATURAL GAMMA RAY
COUNTS PER SECOND

RESISTANCE
OHMS

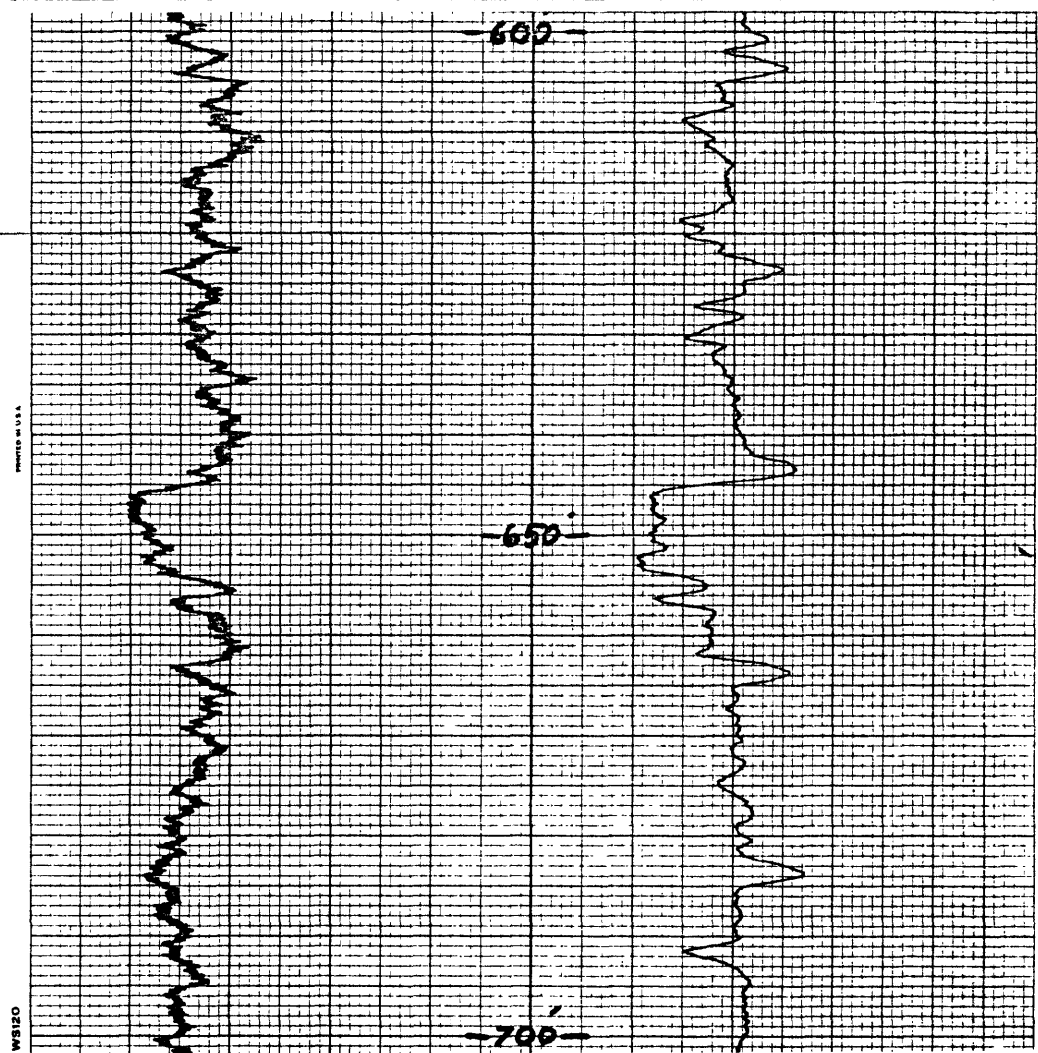


EXHIBIT 6



Century Geophysical Corporation
Denver, Colo.

C 344-E SP 117488

COMPANY

CSMRI

BORE HOLE

Y-6

AREA

Yampa valley

COUNTY

MoFFat

SECTION

TOWNSHIP

RANGE

STATE

Colo

LOG MEASURED FROM

Surface

DATE

11-21-75

NO. 1

Y-6

SEC

TMP

RANGE

AREA

COUNTY

MoFFat

STATE

Colo

COMPANY

CSMRI

DATE

11-21-75

TOTAL FOOTAGE LOGGED

820

T.D. DRILLED

825

BIT SIZE

4 1/2

BORE HOLE FLUID

H₂O + Mud

DENSITY

VELOCITY

RESISTIVITY

OPERATOR

Hollander

UNIT NO.

7528

LOCATION

Camp

DRIVE

0.7

STAND BY

3.8

LOGGING

2.0

TOTAL

6.5

FOUNDTOP

46

CHANGABLE

STANDBY

INITIAL RUN		Density		GAMMA BEAMS		Initial run offset	
TD LOGGED	820	SCALE	2.5K	SCALE		SCALE	
GAMMA SCALE	25	LOGGING SPEED	5	LOGGING SPEED	20	LOGGING SPEED	20
TIME CONSTANT	2	FROM		FROM		FROM	
CALIBRATION & PROBE DATA		TO		TO		TO	
SOURCE NO	8060-2	SOURCE VALUE	4761	SOURCE NO	8060-2	SOURCE VALUE	1716
PROBE NO	8060-2	PROBE SIZE	1 1/16	PROBE NO	8060-2	PROBE SIZE	1 1/16
DETECTOR	XTM1	TYPE & SIZE	1/2 X 2	DETECTOR	XTM1	TYPE & SIZE	1/2 X 2
DEAD TIME	0.0	K FACTOR	1.39 X 10 ⁻⁵	DEAD TIME	0.0	K FACTOR	1.39 X 10 ⁻⁵
WATER FACTOR	1.12	AIR FACTOR	1.0	WATER FACTOR	1.12	AIR FACTOR	1.0
RES SCALE				RES SCALE			

SELF POTENTIAL

DENSITY

NATURAL GAMMA RAY
COUNTS PER SECOND

RESISTANCE
OHMS

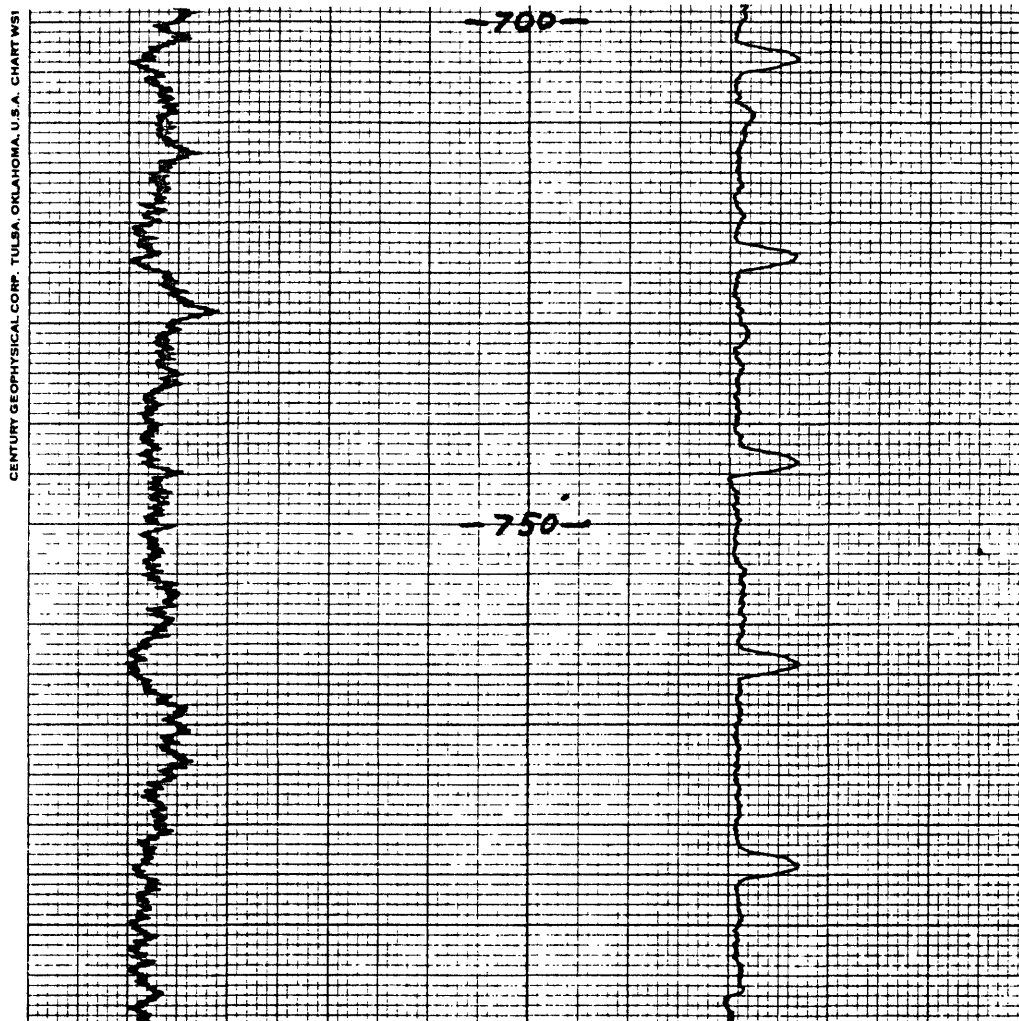


EXHIBIT 6



Century Geophysical Corporation
Denver, Colo.

C 366-1 3P 117400

COMPANY **CSMRI**

BORE HOLE **Y-6**

AREA **Yampa valley**

COUNTY **MoFFat**

SECTION

TOWNSHIP

RANGE

STATE **Colo**

LOG MEASURED FROM **Surface**

DATE **11-21-75**

HOLES NO **Y-6**

SEC TWP RANGE
AREA **Yampa valley**
COUNTY **MoFFat**
STATE **Colo**

COMPANY **CSMRI**
DATE **11-21-75**
TOTAL FOOTAGE LOGGED **820**

TD DRILLED **825**

BIT SIZE **4 1/2**
Casing
Mud
H₂O + Mud
DENSITY
VISCOSITY
RESISTIVITY
OPERATOR **Hollander**
UNIT NO **7528**
LOCATION **Craig**

EXHIBIT 6

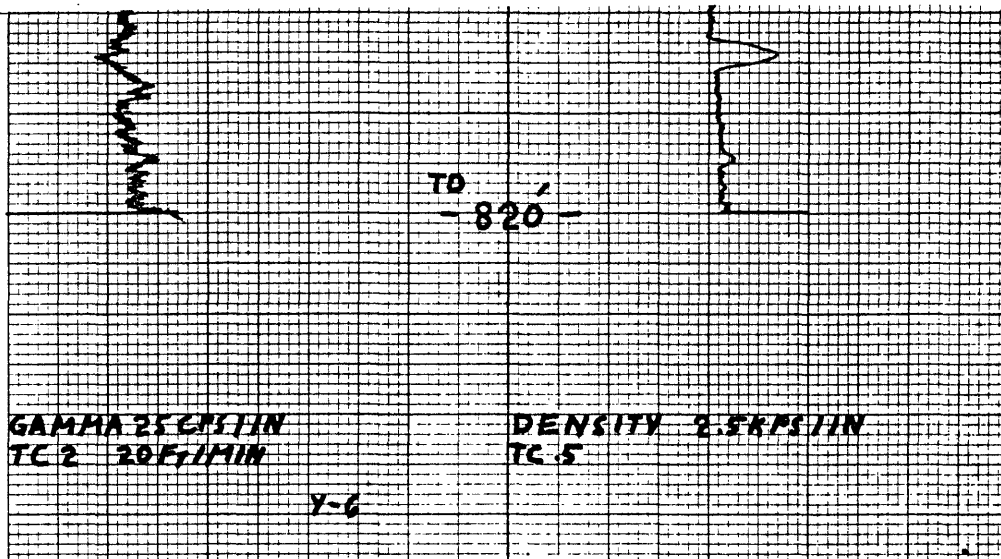
INITIAL RUN		Density		GAMMA BEAMS	
T.C. LOGGED		SCALE		SCALE	
820		2.5kps/in		3.8	
GAMMA SCALE		LOGGING SPEED		LOGGING SPEED	
25 Cps Per In		20 P/Min		2.0	
TIME CONSTANT		FROM		TOTAL	
2		20		6.5	
CALIBRATION & PROBE DATA		TO		ROUNDTRIP	
SOURCE NO		SOURCE VALUE		MILEAGE	
8060-2		4Mci		46	
PROBE NO		PROBE SIZE		CHARGEABLE	
8060-2		1 7/16		STANDBY	
DETECTION		TYPE & SIZE			
XTM1		1/2 X 2			
DEAD TIME		FACTOR			
0.0		1.39 x 10 ⁻⁵			
WATER FACTOR		AIR FACTOR			
1.12		1.0			
RES SCALE					

SELF POTENTIAL

DENSITY

NATURAL GAMMA RAY
COUNTS PER SECOND

RESISTANCE
OHMS





Century Geophysical Corporation
Denver, Colo.

C-360-S SP 117400

COMPANY **CSMRI**

BORE HOLE **Y-6**

AREA **YAMPA Valley**

COUNTY **MOFFAT**

SECTION

TOWNSHIP

RANGE

STATE **Colo**

LOG MEASURED FROM **Sea/Face**

DATE **10-28-75**

HOLE NO **Y-6**

MC

TWT

SANDS

YAMPA Valley

COUNTY **MOFFAT**

STATE **Colo**

COMPANY **CSMRI**

DATE **10-28-75**

TOTAL FOOTAGE LOGGED **412**

TO 20000

840

DI SIZE

4 1/2

DRILL HOLES PLUG

H₂O + CHEM

DENSITY

VISCOSITY

RESISTIVITY

OPERATOR

W. J. Anderson

WELL NO

7528

LOCATION

Comp.

DEPTH

0.7

STAGE BY

4.2

LOGGING

0.6

TOTAL

FOUNDROP

2.3

CHARGEABLE

STANDBY

TIME IN

1456

TIME OUT

1530

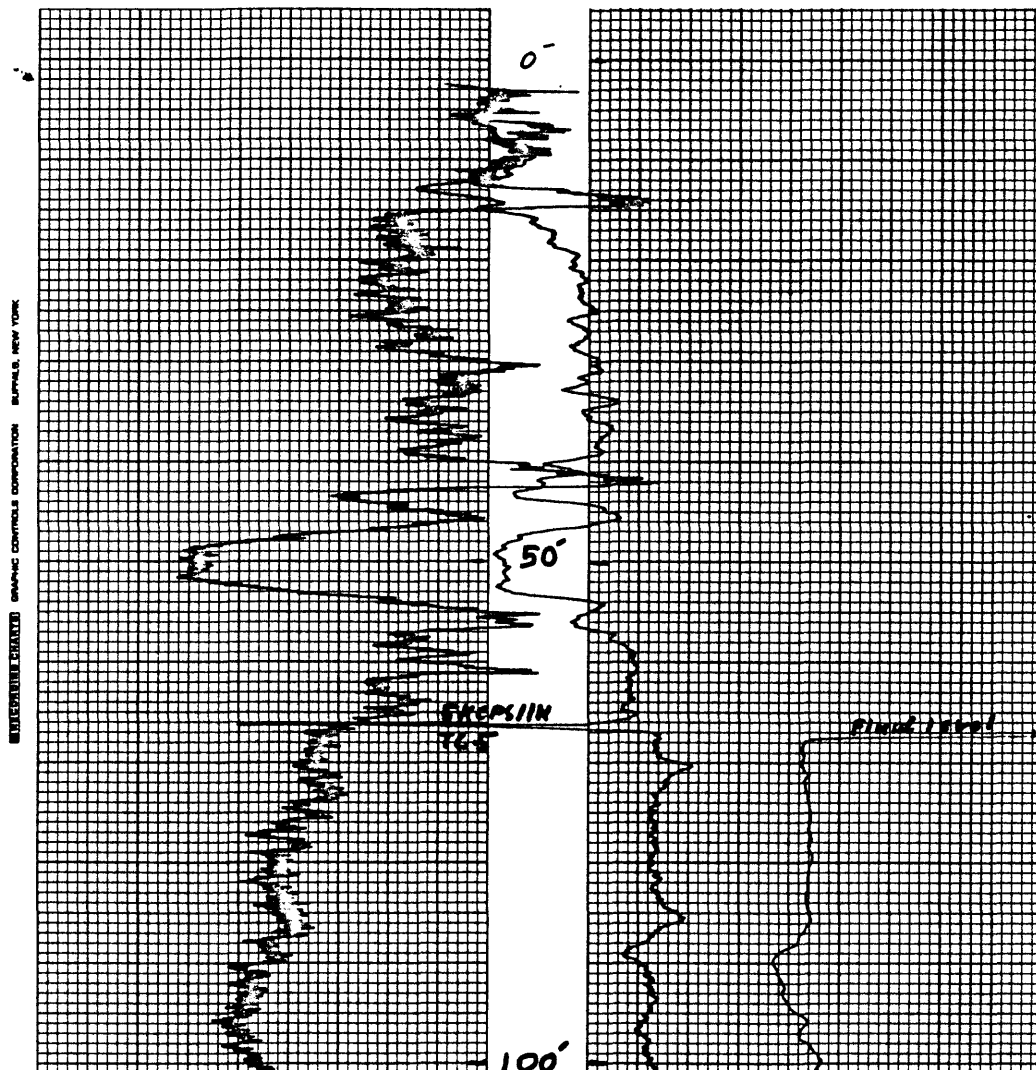
INITIAL RUN		SCALE Density 2.5x		SCALE		SCALE		SCALE	
TD LOGGED 412		TC 5	LOGGING SPEED 20	TC	LOGGING SPEED	TC	LOGGING SPEED	TC	LOGGING SPEED
GAMMA SCALE		FROM	TO	FROM	TO	FROM	TO	FROM	TO
TIME CONSTANT 2	LOGGING SPEED 20	FROM	TO	FROM	TO	FROM	TO	FROM	TO
CALIBRATION & PROBE DATA		FROM	TO	FROM	TO	FROM	TO	FROM	TO
SOURCE NO A-453	SOURCE VALUE 4 Mc.	TOTAL		TOTAL		TOTAL		TOTAL	
PROB NO 8818-101	PROB VALUE 15%								
PROB NO 8820-49	PROB VALUE 15%								
DETECTOR Ytal	TYPE Ytal								
DEAD TIME 0.0	K FACTOR 1.59x10⁵								
WATER FACTOR 1.12	AIR FACTOR 1.0								
RES SCALE 10									

SELF POTENTIAL

DENSITY

NATURAL GAMMA RAY
COUNTS PER SECOND

RESISTANCE
OHMS





Century Geophysical Corporation
Denver, Colo.

C 366-E 1P 117488

COMPANY **CSHRI**

BORE HOLE **Y-6**

AREA **YAMPA Valley**

COUNTY **MOFFAT**

STATE **Colo**

SECTION **Sec. 1**

TOWNSHIP

RANGE

LOG MEASURED FROM **Sec. 1 Face**

ROLL NO. **Y-6**

INC.

POS.

RANGE

T.D. BILLED **840**

BIT SIZE **4 1/2**

CASING

SOFT HOLE FLUID **H₂O + Chem**

DENSITY

VISCOSITY

RESISTIVITY

GEOMETER **YHoller**

UNIT NO. **7528**

LOCATION **Crng**

DRIVE **0.7**

STAMP BY **4.2**

LOGGING SPEED **0.6**

TOTAL

FOUNDERS

MILWAUKEE **23**

CHARLES

STANLEY

STAMP

STAMP

STAMP

STAMP

STAMP

STAMP

STAMP

STAMP

STAMP

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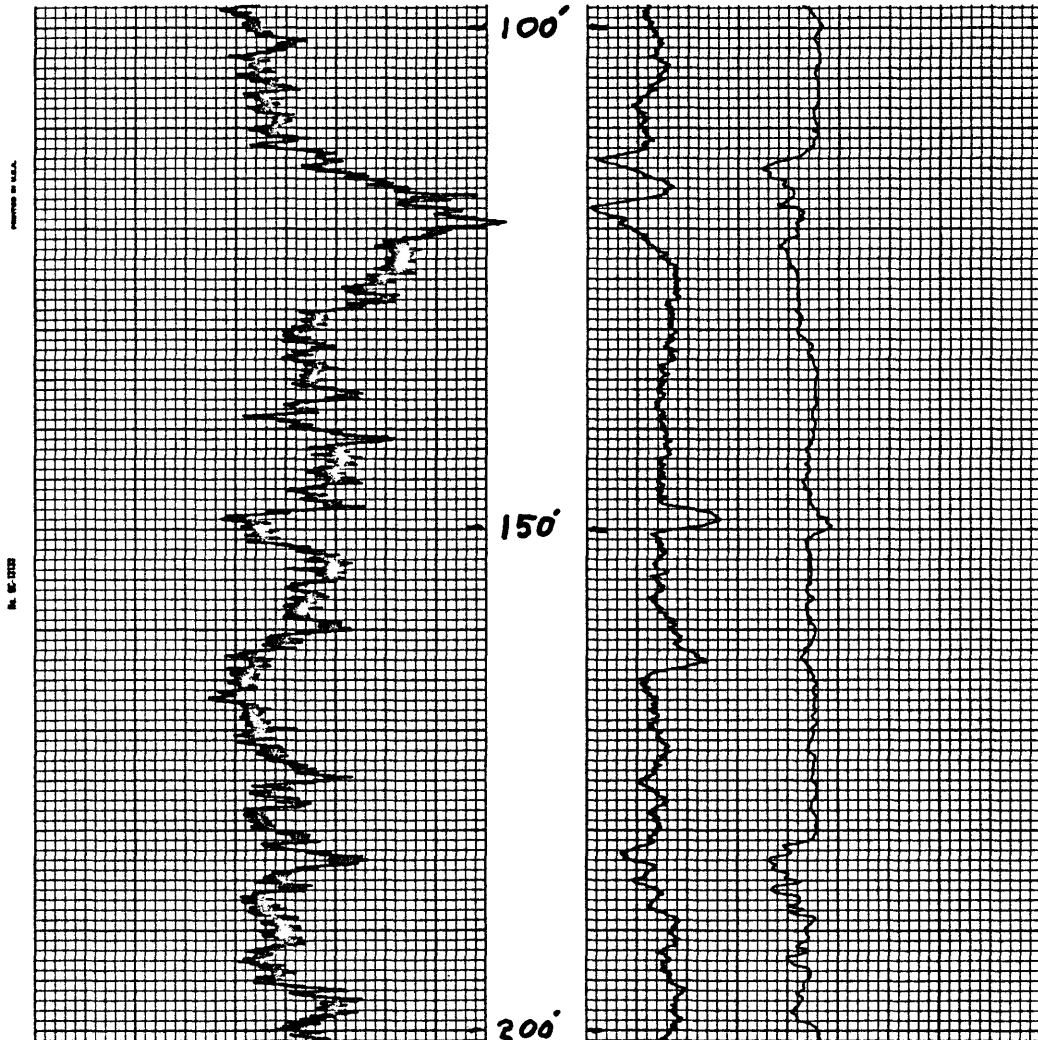
STAMP

SELF POTENTIAL

DENSITY

NATURAL GAMMA RAY
COUNTS PER SECOND

RESISTANCE
OHMS





Century Geophysical Corporation
Denver, Colo.

EXHIBIT 6

1. 500 2. 10-28-75

COMPANY

CSMRE

DATE

Y-6

DATA

YAMPA Valley

LOCATION

MOFFAT

STATE

Colo

FORMATION

LOG MEASURED FROM
Surface

WELL NO.

Y-6

DATE

10-28-75

WELL

YAMPA Valley

MOFFAT

STATE

Colo

COMPANY

CSMRE

DATE

10-28-75

TOTAL FEET LOGGED

912

LOG NO.

840

DATE

4/2

WELL

YAMPA Valley

MOFFAT

STATE

Colo

COMPANY

CSMRE

DATE

10-28-75

TOTAL FEET LOGGED

912

LOG

YAMPA Valley

MOFFAT

STATE

Colo

COMPANY

CSMRE

DATE

10-28-75

TOTAL FEET LOGGED

912

LOG

YAMPA Valley

MOFFAT

STATE

Colo

COMPANY

CSMRE

DATE

10-28-75

TOTAL FEET LOGGED

912

LOG

YAMPA Valley

MOFFAT

STATE

Colo

COMPANY

CSMRE

DATE

10-28-75

TOTAL FEET LOGGED

912

LOG

YAMPA Valley

MOFFAT

STATE

Colo

COMPANY

CSMRE

DATE

10-28-75

TOTAL FEET LOGGED

912

LOG

YAMPA Valley

MOFFAT

STATE

Colo

COMPANY

CSMRE

DATE

10-28-75

TOTAL FEET LOGGED

912

LOG

YAMPA Valley

MOFFAT

STATE

Colo

COMPANY

CSMRE

DATE

10-28-75

TOTAL FEET LOGGED

912

LOG

YAMPA Valley

MOFFAT

STATE

Colo

COMPANY

CSMRE

DATE

10-28-75

TOTAL FEET LOGGED

912

LOG

YAMPA Valley

MOFFAT

STATE

Colo

COMPANY

CSMRE

DATE

10-28-75

TOTAL FEET LOGGED

912

LOG

YAMPA Valley

MOFFAT

STATE

Colo

COMPANY

CSMRE

DATE

10-28-75

TOTAL FEET LOGGED

912

LOG

YAMPA Valley

MOFFAT

STATE

Colo

COMPANY

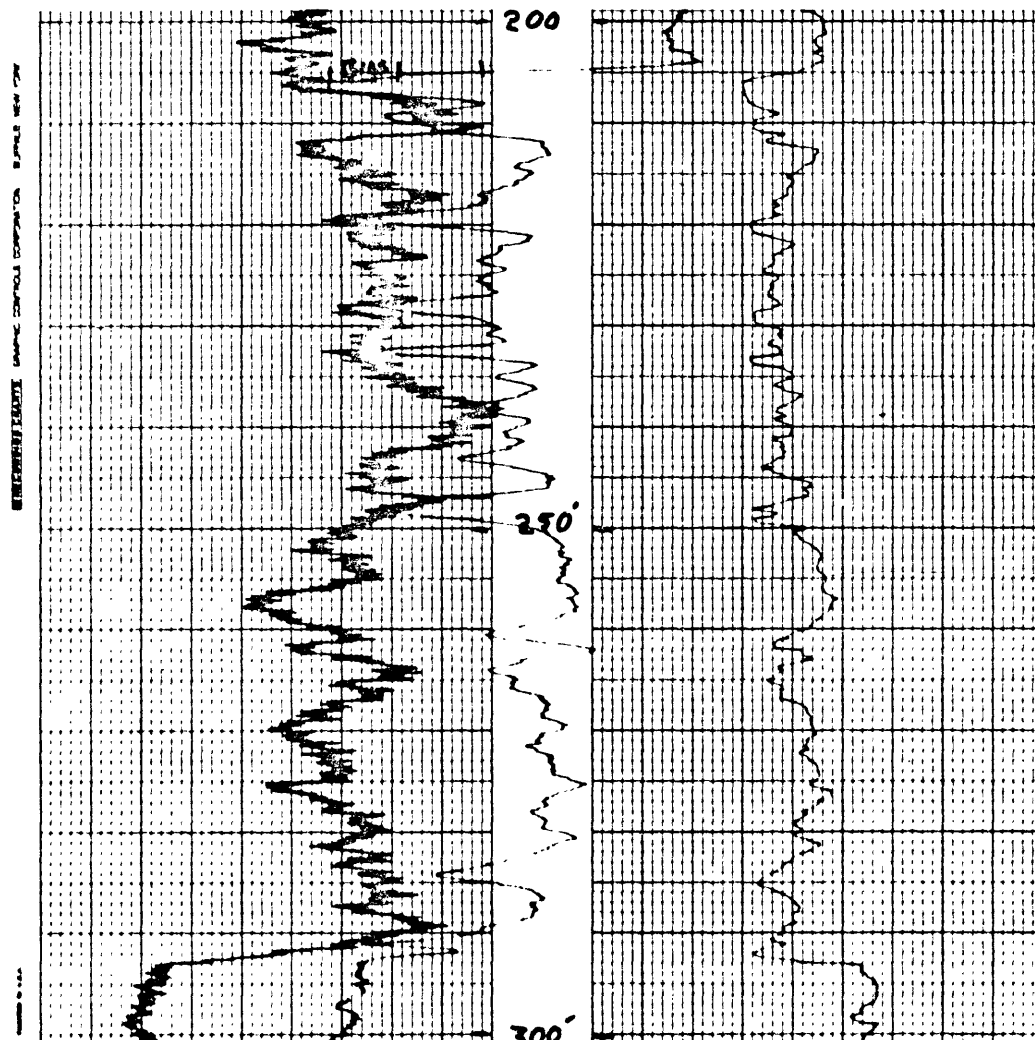
CSMRE

SELF POTENTIAL

NATURAL GAMMA RAY
COUNTS PER SECOND

DENSITY

RESISTANCE
OHMS





Century Geophysical Corporation
Denver, Colo.

C 344-E SP 11748B

COMPANY **CSMRI**

HOLE NO **Y-6**

AREA **YAMPA Valley**

COUNTY **MOFFAT**

SECTION

TOWNSHIP

RANGE

STATE **Colo**

LOG MEASURED FROM **Sur Face**

HOLE NO **Y-6**

SEC

TWP

RANGE

TD DRILLED **840**

BIT SIZE **4 1/2**

CASING

AREA **YAMPA Valley**

COUNTY **MOFFAT**

STATE **Colo**

COMPANY **CSMRI**

DATE **10-28-75**

TOTAL FOOTAGE LOGGED **412**

ROCK HOLE FLUID **H₂O / Chem**

DENSITY

VISCOSITY

OPERATOR **H. Hollander**

UNIT NO **7528**

LOCATION **Craig**

INITIAL RUN		SCALE		GAMMA ROUNDS		SCALE		GAMMA ROUNDS		SCALE		GAMMA ROUNDS	
TD LOGGED	412	SCALE	2.5K	SCALE	2.5K	SCALE	2.5K	SCALE	2.5K	SCALE	2.5K	SCALE	2.5K
GAMMA SCALE	10	Cps Per In	20	LOGGING SPEED	20	LOGGING SPEED	20	LOGGING SPEED	20	LOGGING SPEED	20	LOGGING SPEED	20
TIME CONSTANT	2	LOGGING SPEED	20	LOGGING SPEED	20	LOGGING SPEED	20	LOGGING SPEED	20	LOGGING SPEED	20	LOGGING SPEED	20
CALIBRATION & PROBE DATA		LOGGING SPEED	20	LOGGING SPEED	20	LOGGING SPEED	20	LOGGING SPEED	20	LOGGING SPEED	20	LOGGING SPEED	20
SOURCE NO	A453	SOURCE VALUE	4Mc.	SOURCE NO	A453	SOURCE VALUE	4Mc.	SOURCE NO	A453	SOURCE VALUE	4Mc.	SOURCE NO	A453
PROBE NO	801820-49	PROBE SIZE	15/8	PROBE NO	801820-49	PROBE SIZE	15/8	PROBE NO	801820-49	PROBE SIZE	15/8	PROBE NO	801820-49
DETECTOR	Ytal	TYPE & SIZE	7/8 x 11/4	DETECTOR	Ytal	TYPE & SIZE	7/8 x 11/4	DETECTOR	Ytal	TYPE & SIZE	7/8 x 11/4	DETECTOR	Ytal
DEAD TIME	8.8	K FACTOR	1.59 x 10 ⁵	DEAD TIME	8.8	K FACTOR	1.59 x 10 ⁵	DEAD TIME	8.8	K FACTOR	1.59 x 10 ⁵	DEAD TIME	8.8
WATER FACTOR	1.12	AIR FACTOR	1.0	WATER FACTOR	1.12	AIR FACTOR	1.0	WATER FACTOR	1.12	AIR FACTOR	1.0	WATER FACTOR	1.12
RES SCALE	10	RES SCALE	10	RES SCALE	10	RES SCALE	10	RES SCALE	10	RES SCALE	10	RES SCALE	10

SELF POTENTIAL

DENSITY

NATURAL GAMMA RAY
COUNTS PER SECOND

RESISTANCE
OHMS

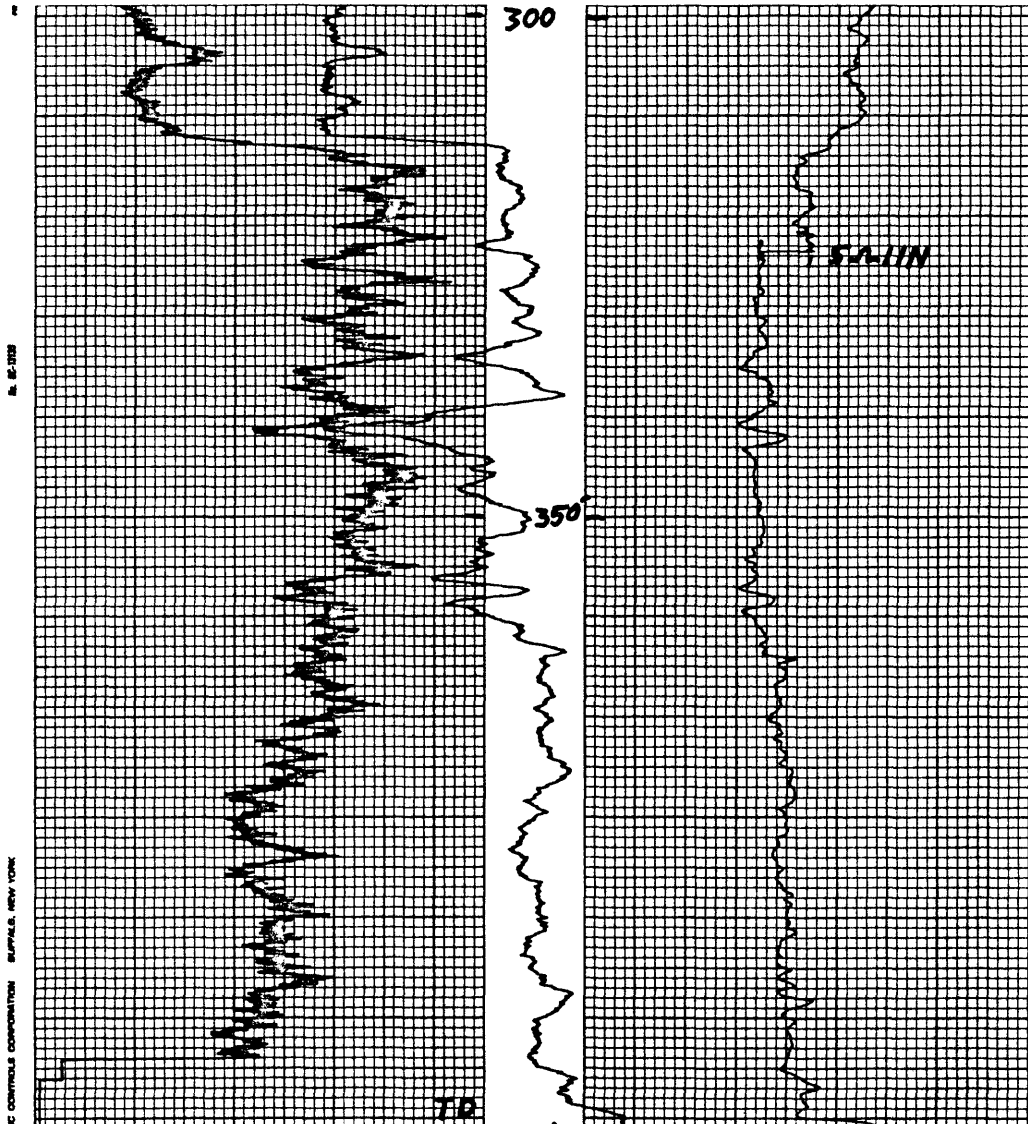


EXHIBIT 6



Century Geophysical Corporation
Denver, Colo.

EXHIBIT 6

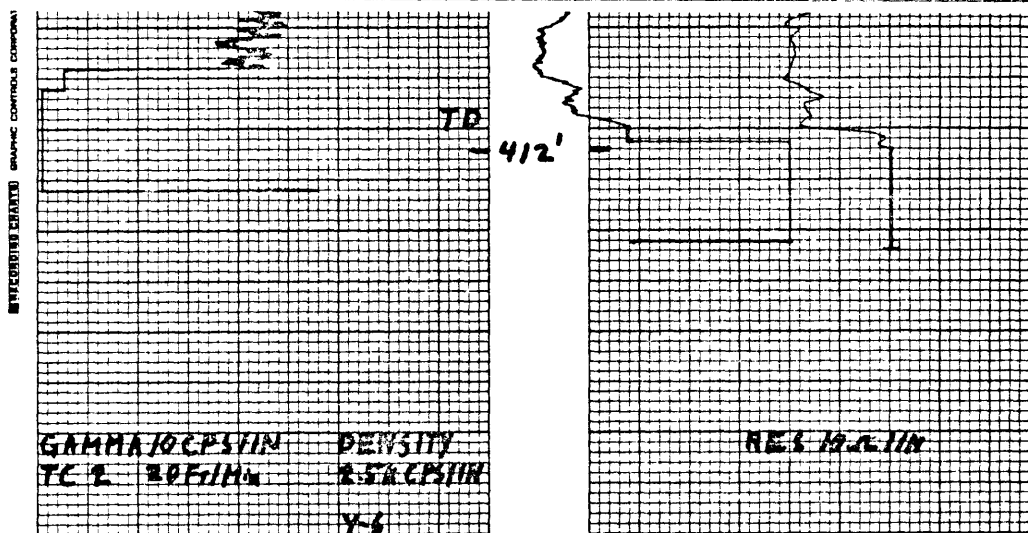
C 964 E 89 117400		DATE 10-28-75		HOLE NO. Y-6		T.D. 840	
COMPANY CSMRI		YAMPA Valley		Moffat		B.I. 4 1/2	
BORE HOLE Y-6		COUNTY Moffat		STATE Colo		Casing	
AREA YAMPA Valley		TOWNSHIP		RANGE		LOG MEASURED FROM Surface	
COUNTY Moffat		STATE Colo		COMPANY CSMRI		HOLLANDER	
SECTION		TOWNSHIP		RANGE		DATE 10-28-75	
INITIAL RUN		DENSITY		GAMMA BEURNE		TIME IN 14:56	
T.D. 412		SCALE 2.5K		SCALE		TIME OUT 15:30	
GAMMA SCALE		TC 5		TC		LOGGING SPEED	
TIME CONSTANT 2		LOGGING SPEED 20		LOGGING SPEED		LOGGING	
CALIBRATION & PROBE DATA		FROM		FROM		TOTAL	
SOURCE NO. A453		SOURCE VALUE 4 Mc.		SOURCE		SOUNDING MILES 2.3	
DETECTOR 8018-101		PROBE SIZE 15/8		DETECTOR		CHARACTERISTICS	
DEAD TIME 0.0		R FACTOR 1.59X105		DEAD TIME		STANDBY	
WATER FACTOR 1.12		AIR FACTOR 1.0		WATER FACTOR			
RES SCALE 10		RES. 1		RES SCALE			

SELF POTENTIAL

DENSITY

NATURAL GAMMA RAY
COUNTS PER SECOND

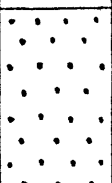
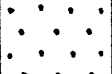

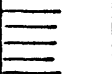
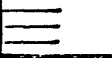


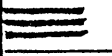


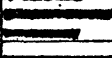
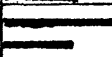


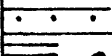
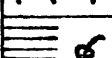

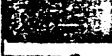

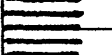
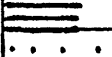
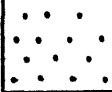

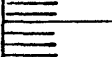

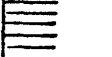
RESISTANCE
OHMS



Project No. H50146 COLORADO SCHOOL OF MINES RESEARCH INSTITUTE
 EXHIBIT 7 LITHOLOGIC LOG Date 12-19-75
 Hole No. D-1 Elev. 7222' Total Depth 1102' Location NE 1/4, SW 1/4, SW 1/4 SEC 7, T3N, R92W Property BLM
 County MOFFAT State COLORADO Sponsor USGS Drilling Co. BOYLES BROS Geologist S.C. MULLER

FORMATION CONTACTS, FOOTNOTES, SHOWS, INTERVALS (IN FEET)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUNDING		SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL						
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0	Angular	Subangular		Subrounded	Rounded	Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed.	Meta.	Ign.	Most abund.	TOTAL %	Vitrain	Clarain	Durain
ROCK BIT OVERBURDEN TO 200'	0	ALLUVIUM - SILTY CLAY LOAM, YELLOW-BROWN	x	x					x	Well	10			90													
			x	x						x	Well	10			90												
	10	"	x	x					x	Well	10			90													
			x	x						x	Well	10			90												
	20	"	x	x					x	Well	10			90													
			x	x						x	Well	10			90												
	30	SS, LT BROWN	x						x	Well	75	25					0					0					
			x							x	Well	75	25					0					0				
	40	"	x						x	Well	75	25					0					0					
		SH, GREY												97			0					3				x	
		SS, S&P	x						x	Well	60	20	10				0					10				x	
		COAL												10			0					90	x			x	
	50	SS, S&P - LT BROWN	x						x	Well	60	25	10				0					5					x
		SH, GREY W/ COALIFIED TWIGS												95				0					5				x
			"												95				0					5			
		60	SILTST, LT. BROWN - LT GREY, SANDY	x						x	Well	25	15	60				0					0				
	"		x						x	Well	25	15	60				0					0					
	70	SS, LT BROWN - S&P	x						x	Well	60	20	10				0					10					x
		"	x						x	Well	75	15					0						10				x
	80		"	x						x	Well	75	15					0					10				
		x								x	Well	75	15					0					10				x

Project No. H50146 COLORADO SCHOOL OF MINES RESEARCH INSTITUTE
 EXHIBIT 7 LITHOLOGIC LOG Date 12-19-75
 Hole No. D-1 Elev. 7222' Total Depth 1102' Location NE 1/4, SW 1/4, SW 1/4, SEC 7, T3N, R92W Property BLM
 County MOFFAT State COLORADO Sponsor USGS Drilling Co. BOYLES BROS Geologist S.C. MULLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING		SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL				
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0	Angular	Subangular		Subrounded	Rounded	Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed. Meta.	Ign.	Most abund.	TOTAL %	Vitrinite	Clarinite
80		SS, LT. BROWN - S & P	X					X		WELL	75	15				0					10				X
		" "	X					X		WELL	75	15				0					10				X
90		SH, GREY, CLAY-RICH											100			0					0				
		" "											100			0					0				
100		" "											100			0					0				
		COAL											5	1		0					94	X			X
		"											5	1		0					94	X			X
110		SH, DK GREY, CARB											80			0					20			X	
		SS, S & P	X					X		WELL	75	15				0					10			X	
		"	X					X		WELL	75	15				0					10			X	
120		SH, CARB W/ MINOR COAL INTBD											65			0					35	X			X
		"											65			0					35	X			X
		SS, S & P	X					X		WELL	70	20				0					10			X	
		"	X					X		WELL	70	20				0					10			X	
130		SH, GREY											95			0					5			X	
		SS, S & P	X					X		WELL	75	15				0					10			X	
		SH, GREY W/ COALIFIED TWIGS											90			0					10			X	
		COAL											5			0					95	X			X
		"											5			0					95	X			X
140		SH, DK GREY, CARB											90			0					10			X	
		" "											90			0					10			X	
		SS, S & P	X					X		WELL	70	20				0					10			X	
		"	X					X		WELL	70	20				0					10			X	
150		SH, GREY											95			0					5			X	
		"											95			0					5			X	
160		"											95			0					5			X	

Project No. H50146

 EXHIBIT 7 LITHOLOGIC LOG

 Date 12-19-75

 Hole No. D-1 Elev. 7222' Total Depth 1102' Location NE 1/4, SW 1/4, SW 1/4, SEC 7, T3N, R92W Property BLM

 County MOFFAT State COLORADO Sponsor USGS Drilling Co. BOYLES BROS Geologist S.C. MULLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)				ROUND-ING Angular Subangular Subrounded Rounded	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL			
			.06-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed. Meta. Ign.	Most abund.	TOTAL %	Vitrinite	Clarinite	Durinite	Fusinite
160		SH, GREY											95			0			5			X
		SH, DK GREY, CARB											75			0			25			X
170		SS, S & P	X				X	WELL	65	25			0			0			10			X
		SH, DK GREY, CARB											80			0			20			X
180		SS, S & P	X				X	WELL	70	20			0			0			10			X
		SH, DK GREY, CARB w/ MINOR COAL INTBD											75			0			25			X
190		COAL										5	1		0			94	X			
		"										5	1		0			94	X			
200		SH, DK GREY, CARB										75			0			25	X			X
		COAL										10			0			90	X			X
210		SH, DK GREY, CARB										75			0			25	X			X
		SH, GREY w/ MINOR COAL CLASTS	X				X	WELL	2				0			0			1			X
220		SS, LT GREY, FINE GR w/ MINOR COAL LENSES (.5mm)	X				X	WELL	83		10		0			0			7	X		X
		SH, DK GREY, CARB	X				X	WELL	90	3			0			0			7	X		X
230		SH, DK GREY, CARB										100			0			0				
		SH, GREY											100			0			0			
240		"	X				X	WELL	5	3			0			0			3	X		X
		"	X				X	WELL	5	3	91		0			0			1	X		X
250		SH, DK GREY, CARB w/ COAL CLASTS										90			0			10				X
		SH, LT GREY w/ MINOR COALIFIED TWIGS											97			0			3			X
260		SH, DK GREY, CARB w/ MINOR COAL INTBD										97			0			3				X
		"											92			0			8			X
270		COAL w/ SH, DK GREY CARB INTBD										50			0			50	X			X
		SH, GREY, CARB w/ MINOR COALIFIED TWIGS											97			0			3			X

Project No. H50146

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE

EXHIBIT 7 LITHOLOGIC LOGDate 12-19-75Hole No. D-1 Elev. 7222' Total Depth 1102' Location N 1/4, SW 1/4, SW 1/4, SEC 7, T3N, R92W Property BLMCounty MOFFAT State COLO Sponsor USGS Drilling Co. Boyles Bros. Geologist J.C. Mueller

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUNDING	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL			
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed. Meta. Ign.	Most abund.	TOTAL %	Vitrinite	Clarinite	Durinite	Fusinite
240		SH, GREY, CARB W/ MINOR COALIFIED TWIGS												97		0			3				X
														97		0			3				X
250		SH, DK GREY, CARB												90		0			10				X
		COAL W/ SH, DK GR, CARB INTBD												20		0			80	X			X
		SH, GREY, CARB W/ MINOR COAL INTBD (.25 mm)												95		0			5				X
260		" "												95		0			5				X
		SH, DK GREY, CARB W/ MINOR COALIFIED TWIGS												97		0			3				X
270		COAL												10		0			90	X			X
		SS, S&P, FINE GR	X					X	WELL 65	35					0			0					
		SH, DK GREY, CARB	X					X	WELL 65	35					0			3					X
		SS, GREY, SILTY, FINE GR	X					X	WELL 75	25					0			0					X
280		SH, GREY W/ MINOR COALIFIED TWIGS												95		0			5				X
		" "												95		0			5				X
		SS, S&P, FINE GR.	X					X	WELL 65	35					0			0					
			X					X	WELL 65	35					0			0					
290		COAL W/ SH, DK GREY INTBD												25		0			75	X			X
		SH, GREY W/ MINOR COALIFIED TWIGS												95		0			5				X
		SS, S&P	X					X	WELL 75	20					0			5					X
300			X					X	WELL 75	20					0			5					X
		"	X					X	WELL 75	20					0			5					X
310			X					X	WELL 75	20					0			5					X
		"	X					X	WELL 75	20					0			5					X
320			X					X	WELL 75	20					0			5					X

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE

EXHIBIT 7 LITHOLOGIC LOG

Project No. H50146

Date 12-19-75

Hole No. D-1 Elev. 7222' Total Depth 1102'

Location NE 1/4, SW 1/4, SW 1/4, Sec 7, T3N, R92W Property BLM

County MOFFAT State COLO.

Sponsor USGS

Drilling Co. BOYLES BROS

Geologist S.C. MULLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL			
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed. Meta. Ign.	Most abund.	TOTAL %	Vitrinite	Clarinite	Durinite	Fusinite
320		SS, S&P	X					X	WELL	75	15					0			10				X
		"	X					X	WELL	75	15					0			10				X
330		"	X					X	WELL	70	20					0			10				X
340		SH, DK GREY, CARB.											98			0			2				X
		SH, BLACK, CARB w/ MINOR COALIFIED TWIGS											95			0			5				X
		SS, S&P w/ SLTST, BROWN INTBD	X					X	WELL	70	15	5				0			10				X
		SH, DK GREY-BLACK, CARB	X					X	WELL	70	15	5				0			10				X
350		SH, DK GREY-BLACK, CARB											85			0			15				X
		COAL w/ MINOR SH, DK GREY-BLACK, CARB										5	1			0			94	X			
		SH, DK GREY-BLACK, CARB											85			0			15				X
360		SH, GREY w/ MINOR COALIFIED TWIGS											95			0			5				X
		SS, S&P, SILTY	X					X	WELL	75	15	5				0			5				X
		SH, GREY											100			0			0				
370		SH, LT-DK GREY, CARB w/ COAL INTBD											60			0			40	X			X
		SS, S&P	X					X	WELL	70	20					0			10				X
		"	X					X	WELL	70	20					0			10				X
380		COAL, CLAY-RICH											40	2		0			58	X			X
		SH, GREY w/ MINOR COALIFIED TWIGS (VERY POOR RECOVERY)											95			0			5				X
		"											95			0			5				X
390		SH, GREY w/ COALIFIED TWIGS											90			0			10				X
		SH, DK GREY, CARB											85			0			15				X
		SH, GREY											87			0			13				X
		SS, S&P, SILTY								50	25	20				0			5				X
		SH, DK GREY-BLACK, CARB											95			0			5				X
		"											95			0			5				X
400		SH, GREY											99			0			1				X

SAMPLE NO. 201.

POOR RECOVERY

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE

EXHIBIT 7 LITHOLOGIC LOG

Project No. H50146

Hole No. D-1 Elev. 7222' Total Depth 1102' Location NE 1/4, SW 1/4, SW 1/4, SEC 2, T3N, R92W

Date 12-19-75

County MOFFAT

State COLO

Sponsor USGS

Drilling Co. BOYLES BROS

Property BLM
Geologist S.C. MULLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL				
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed.	Meta.	Ign.	Most abund.	TOTAL %	Vitrain	Clarain	Durain
400		SS, S&P	X					X	WELL	75	15				0				10				X	
		"	X					X	WELL	75	15				0				10				X	
410		SLTST, GREY, SANDY	X					X	WELL	45	20	25			0				10				X	
		"	X					X	WELL	45	20	25			0				10				X	
		SS, S&P	X					X	WELL	75	15				0				10				X	
		"	X					X	WELL	75	15				0				10				X	
420		"	X					X	WELL	75	15				0				10				X	
		"	X					X	WELL	75	15				0				10				X	
430		SH, GREY										99			0				1				X	
		↑										90			0				10				X	
		SH, DK GREY, CARB											90			0				10				X
		"											90			0				10				X
440		"										90			0				10				X	
SS, LT GREY W/SH, LT GREY INTBD		X					X	WELL	50	25	20			0				5				X		
SH, GREY W/MINOR COALIFIED TWIGS												90			0				10				X	
"												90			0				10				X	
450		"										90			0				10				X	
SAMPLES		SH, DK GREY, CARB										85			0				15				X	
↓		SH, BLACK, CARB										80			0				20				X	
No. 202		COAL											0	1		0				99	X	X		
No. 203	160											0	1		0				99	X	X			
												0	1		0				99	X	X			
No. 204												10	0		0				90	X				
No. 205												1	1		0				98	X	X			
No. 206	470											10	0		0				90	X	X		X	
												10	0		0				90	X	X		X	
↑			SH, DK GREY, CARB W/COALIFIED LEAVES									80			0				20				X	
SAMPLES			SLTST, LT BROWN W/SS, S&P INTBD	X					X	WELL	35	25	40			0				0				
480		SS, S&P	X					X	WELL	75	15				0				10				X	

Project No. H50146

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE

EXHIBIT 7 LITHOLOGIC LOGDate 12-19-75Hole No. D-1 Elev. 7222' Total Depth 1102' Location NE 1/4, SW 1/4, SW 1/4, SEC 7, T3N, R92WProperty BLMCounty MOFFAT State COLOSponsor USGSDrilling Co. BOYLES BROS.Geologist S.C. MULLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL			
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafice	Clay	Pyrite	Others	TOTAL %	Sed. Meta. Ign.	Most abund.	TOTAL %	Vitrain	Clarain	Durain	Fusain
480		SS, S&P	x					x	WELL	75	15					0			10				x
		"	x					x	WELL	75	15					0			10				x
490		"	x					x	WELL	75	15					0			10				x
		"	x					x	WELL	75	15					0			10				x
500		"	x					x	WELL	75	15					0			10				x
		"	x					x	WELL	75	15					0			10				x
510		SH, GREY W/ COAL CLASTS											95			0			5				x
		"											95			0			5				x
520		"											90			0			10				x
		SH, DK-GREY, CARB W/ COAL CLASTS														0			15				
		SH, BLACK, CARB											75			0			25				
530		"											75			0			25				
		COAL, CLAY-RICH											25			0			75	x			x
		SH, LT GREY, CARB W/ COALIFIED TWIGS											85			0			15				x
		SH, DK GREY, CARB W/ COALIFIED TWIGS											70			0			30				x
540		"											75			0			25				x
		SH, GREY W/ MINOR SS, GREY-SS&P INTBD	x					x	WELL	10	5	85				0			0				
		"	x					x	WELL	25	10	65				0			0				
550		"	x					x	WELL	30	10	60				0			0				
		"	x					x	WELL	30	10	60				0			0				
560		SS, S&P	x					x	WELL	75	15					0			10				x

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE

Project No. H50146

EXHIBIT 7 LITHOLOGIC LOG

Date 12-19-75

Hole No. 0-1 Elev. 7222' Total Depth 1102' Location N61/4, SW1/4, SW1/4, SEC 7, T3N, R92W Property BLM
County MOFFAT State COLORADO Sponsor USGS Drilling Co. BOYLES BROS Geologist S.C. MULLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL			
			.06-.125	.125-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed. Meta. Ign.	Most abund.	TOTAL %	Vitrinite	Clarinite	Durain	Fusain
560		SS, SSP	x					x	WELL	75	15					0			10				x
		SH, DK GREY, CARB											90			0			10				x
		SS, SSP	x					x	WELL	75	15					0			10				x
		"	x					x	WELL	70	20					0			10				x
570		"	x					x	WELL	80	15					0			5				x
		COAL, CLAY-RICH											25			0			75	x			x
		SH, DK GREY, CARB w/ COAL CLASTS											80			0			20				x
													80			0			20				x
580		SS, GREY, CARB & SILTY w/ COAL CLASTS	x					x	WELL	60		20				0			20				x
		SH, BLACK, CARB w/ MINOR COAL INTACT											75			0			25				x
		"											70			0			30	x			x
590		"											50			0			50	x			x
		"											70			0			20				x
600		SH, GREY w/ MINOR COAL CLASTS											95			0			5				x
		SS, SSP	x					x	WELL	80	10					0			10				x
		"	x					x	WELL	70	20					0			10				x
610		"	x					x	WELL	75	15					0			10				x
		"	x					x	WELL	75	15					0			10				x
620		SS, GREY, SILTY	x					x	WELL	55	15	20				0			10				x
		"	x					x	WELL	55	15	20				0			10				x
		SS, SSP	x					x	WELL	80	10					0			10				x
		"	x					x	WELL	80	10					0			10				x
630		"	x					x	WELL	80	10					0			10				x
		"	x					x	WELL	80	10					0			10				x
SAMPLE NO. 207 + 640		COAL w/ SH, DK GREY-BLACK, CARB	x					x	WELL	80	10					0			10				x
													20		1	0			79	x			x

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE

Project No. H50146 EXHIBIT 7 LITHOLOGIC LOG Date 12-19-75
 Hole No. 0-1 Elev. 7222' Total Depth 1102 Location NE 1/4, SW 1/4, SW 1/4, SEC 7, T3N, R9E Property BUM
 County MOFFAT State COLORADO Sponsor USGS Drilling Co. BOYLES BROS Geologist J.C. MULLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING			SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL			
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0	Angular	Subangular	Subrounded		Rounded	Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed. Meta. Ign.	Most abund.	TOTAL %	Vitrinite	Clasrain	Durain
NO. 207 ↑ SAMPLE	640	COAL w/SH, DK-GREY-BLACK, CARB													20	1		0			79	X		X	
		SH, DK GREY, CARB w/COALIFIED TWIGS													85			0			15			X	
		" "													85			0			15			X	
650		" "													85			0			15			X	
		" "													85			0			15			X	
660		" "													85			0			15			X	
		" "													85			0			15			X	
670		SH, GREY, SANDY w/SS, GREY-SS, INTBD										25	20	50				0			5			X	
		" "										25	20	50				0			5			X	
		SH, DK GREY, CARB w/COALIFIED TWIGS													85			0			15			X	
680		" "													85			0			15			X	
		COAL w/SH, BLACK, CARB													20			0			80	X		X	
		SH, DK GREY, CARB w/COALIFIED TWIGS													85			0			15			X	
		" "													85			0			15			X	
690		SH, GREY													95			0			5			X	
		SH, DK GREY, CARB													85			0			15			X	
		SS, GREY, SILTY	X					X	WELL	55	15	20						0			10			X	
		SH, DK GREY, CARB													85			0			15			X	
700		" "													85			0			15			X	
		SS, GREY, SILTY	X					X	WELL	55	15	20						0			10			X	
		" "	X					X	WELL	55	15	20						0			10			X	
710		COAL w/SH, BLACK, CARB, INTBD													45			0			55			X	
		SH, DK GREY, CARB													85			0			15			X	
		SLTST, GREY, SANDY	X					X	WELL	25	10	60						0			5			X	
		" "	X					X	WELL	25	10	60						0			5			X	
720		SH, GREY, CARB w/COAL CLASTS													80			0			20			X	

Project No. 1150146

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE

EXHIBIT 7 LITHOLOGIC LOGDate 12-19-75Hole No. D-1 Elev. 7222' Total Depth 1102' Location NE 1/4, SW 1/4, SW 1/4, SEC 7, T3N, R92W Property, BLMCounty MOFFAT State COLO Sponsor USGS Drilling Co. BOYLES BROS Geologist J.C. MULLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)				ROUNDING			SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL						
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0	Angular	Subangular		Subrounded	Rounded	Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed.	Meta.	Ign.	Most abund.	TOTAL %	Vitrinite	Clarinite	Durinite
720		SH, DK GRAY CARB W/ COAL CLASTS												80			0					20				X	
		SS, GRAY, SILTY	X						X		well	60	10	20				0					10				X
730		SH, GRAY, CARB W/ COALIFIED TWIGS												85			0					15				X	
		SS, S&P	X						X		well	60	30					0					10				X
740		"	X						X		well	60	30				0					10				X	
		SLTST, GRAY-LT BROWN	X						X		well	90	20	40				0					0				
750		COAL												20			0					80	X			X	
		SH, DK GRAY, CARB													85			0					15	X			X
760		SS, GRAY	X						X		well	60	20	10				0					10				X
		SH, GRAY, CARB W/ COALIFIED TWIGS													85			0					15				X
770		SH, DK GRAY CARB												75			0					25				X	
		SH, GRAY													90			0					10				X
780		SS, S&P-LT GRAY	X						X		well	55	25	10				0					10				X
		SLTST, GRAY	X						X		well	25		65				0					10				X
790		COAL												5			0					95	X			X	
		SH, BLACK, CARB													55			0					45				X
800		SS, GRAY	X						X		well	65	20	10				0					5				X
		SH, GRAY W/ COALIFIED TWIGS													80			0					20				X
810		SH, DK GRAY-BLACK, CARB												80			0					20				X	
		SS, GRAY-DK GRAY, CARB	XX						X	X	med	35	45					0					20				X
820		SH, DK GRAY W/ COALIFIED TWIGS												80			0					20				X	
		"													80			0					20				X
830		SH, LT GRAY-GRAY W/ COALIFIED TWIGS												90			0					10				X	
		SH, BLACK, CARB W/ MINOR COAL INTAD													70			0					30				X
840		"												70			0					30				X	
		"													65			0					35				X
850		"												55			0					45	X			X	
		"													70			0					30	X			X
860		SH, GRAY W/ MINOR COALIFIED TWIGS												92			0					8				X	
		SS, S&P	X						X		well	70	15	5				0					10				X
870		"	X						X		well	70	15	5				0					10				X
		SH, DK GRAY W/ COALIFIED TWIGS													80			0					20				X

Project No. H50146 COLORADO SCHOOL OF MINES RESEARCH INSTITUTE
 EXHIBIT 7 LITHOLOGIC LOG Date 12-19-75
 Hole No. D-1 Elev. 7222' Total Depth 1102' Location NE 1/4, SW 1/4, SW 1/4, SW 1/4, SEC 7 T3N, R92W Property BLM
 County MOFFAT State COLO. Sponsor USGS Drilling Co. Boyle's Bores Geologist S.C. MULLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL			
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed. Meta. Ign.	Most abund.	TOTAL %	Vitrinite	Clarinite	Fusinite	
7mm GAST.	800	SH, DK GREY, CARB W/ COALIFIED TWIGS												75			0			25			X
														75			0			25			X
	810	SS, S&P W/ COALIFIED TWIGS	X					X	WELL	65	15						0			20			X
		SLTST, GRAY-LT BROWN, SANDY	X					X	WELL								0			20			X
		SH, DK GRAY, CARB												75			0			25			X
		SH, BLACK, CARB W/ MINOR COAL INTBD												30			0			75	X		X
														65			0			35	X		X
	820	SS, LT GRAY	X					X	WELL	70	15	5					0			5			X
		SH, DK GRAY, CARB												75			0			25			X
		SLTST, LT GRAY-LT BROWN, SANDY	X					X	WELL	35	10	40					0			15			X
		SH, DK GRAY, CARB												75			0			25			X
	830	SH, GRAY W/ MINOR COAL CLASTS												95			0			5			X
		"												95			0			5			X
		SH, BLACK, CARB W/ COAL, LIGNITIC, INTBD												75			0			25			X
														60			0			40	X		X
	840	"												70			0			30			X
		"												75			0			25			X
	850	SS, S&P	X					X	WELL	70	15	10					0			0			X
		SLTST, LT BROWN W/ SS, S&P, LT GRAY, INTBD	X					X	WELL	30	15	55					0			0			X
		SS, LT GRAY-WHITE	X					X	WELL	80	15						0			5			X
860	"	X					X	WELL	80	15						0			5			X	
	SLTST, LT BROWN-GRAY W/ MINOR COAL CLASTS	X	X				X	X	MSD	30	10	55				0			5			X	
	"	X	X				X	X	MSD	30	10	55				0			5			X	
870	SH, GRAY W/ SS, S&P INTBD	X					X	WELL	30	15	50					0			5			X	
	"	X					X	WELL	30	15	50					0			5			X	
880	SS, S&P	X					X	WELL	75	20						0			5			X	

Project No. H50196

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE

EXHIBIT 7 LITHOLOGIC LOGDate 12-19-75Hole No. D-1 Elev. 7222' Total Depth 1102' Location NE 1/4, SW 1/4, SW 1/4, Sec 7, T3N, R22W Property BLMCounty MOFFAT State COLO Sponsor USGS Drilling Co. BORLES BROS Geologist S. C. MULLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL			
			.06-.25	.25-.125	.125-.25	.25-.5	.5-1.0			Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed. Mela. Ign.	Most abund.	TOTAL %	Vitrain	Clarain	Durain	Fusain
880		SS, S&P	x					x	well	75	20					0			5				x
		SH, GRAY W/ COALIFIED TWIGS											85			0			15				x
		SS, SS, P, SILTY W/ COAL INTBD								55		15				0			30	x			x
		COAL										3				0			97	x			x
		SH, DK GRAY, CARB										80				0			20				x
890		SLTST, LT BROWN-LT GREY, SANDY W/ SS, S&P, INTBD	x	x				x	med	25		65				0			10				x
		"	x	x				x	med	25		65				0			10				x
		COAL W/ SH, DK BROWN, CARB										10				0			90	x			x
		SH, DK BROWN-BLACK, CARB										55				0			45				x
900		SS, S&P	x					x	well	60	20					0			20				x
		SH, GRAY W/ COALIFIED TWIGS						x	well	60	20	85				0			15				x
		SS, S&P	x	x				x	med	20	10	65				0			20				x
		SLTST, LT BROWN-LT GREY	x	x				x	med	20	10	65				0			5				x
910		SS, S&P	x					x	well	60	20					0			20				x
		"	x					x	well	60	20					0			20				x
		COAL	x					x	well	60	20	10				0			20	x			x
920		SH, GRAY W/ COALIFIED TWIGS										80				0			20				x
		"										80				0			20				x
		SLTST, LT BROWN-LT GREY, SANDY	x	x				x	med	30	10	55				0			5				x
		COAL	x	x				x	med	30	10	55				0			5				x
		COAL										5				0			95	x			x
930		SS, LT GRAY	x					x	well	75	15					0			10				x
		"	x					x	well	75	15					0			10				x
		LIMESTONE, LT GRAY-LT BROWN	x						well		20					0							
		COAL?																					
		LIMESTONE?														0							
940		LIMESTONE, LT GRAY-LT BROWN	x						well		15					0							
		SH, DK GRAY, CARB W/ COAL CLASTS										80				0			20				
		"										80				0			20	x			
950		SH, GRAY										98				0			2				
		SS, S&P, SILTY	x					x	well	65	10	15				0			10				
960																							

NO RECOVERY

Project No. H5046

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE

EXHIBIT 7 LITHOLOGIC LOGDate 12-19-75Hole No. D-1 Elev. 7222' Total Depth 1102' Location NE 1/4, SW 1/4, SW 1/4, SEC 7, T3N, R92W Property BLMCounty MOFFAT State COLO Sponsor USGS Drilling Co. Boyles Bros Geologist S.C. MULLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL			
			.0625-.125	.125-.25	.25-.5	.5-1.0	>1.0			Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed. Meta. Ign.	Most abund.	TOTAL %	Vitrain	Clarain	Durain	Fusain
960		SS, S&P, SILTY	X					X	well	65	10	15				0			10				X
		SS, S&P w/ SLTST, LT BROWN INTBD	X	X				X	med	35	10	45				0			10				X
			X	X				X	med	35	10	45				0			10				X
970		SLTST, BROWN, CARB	X					X	well	15		65				0			20				X
		" "	X					X	well	15		65				0			20				X
980		SS, S&P - GREY, SILTY	X					X	well	60	20	15				0			10				X
		" "	X					X	well	60	20	15				0			10				X
990		" "	X					X	well	50	20	25				0			5				X
			X					X	well	50	20	25				0			5				X
1000		SH, DK BROWN, CARB										80				0			20				X
		SS, LT GREY - S&P	X					X	well	75	15					0			10				X
		" "	X					X	well	75	15					0			10				X
1010		" "	X					X	well	75	15					0			10				X
			X					X	well	75	15					0			10				X
1020		" "	X					X	well	75	15					0			10				X
			X					X	well	75	15					0			10				X
1030		" "	X					X	well	75	15					0			10				X
			X					X	well	75	15					0			10				X
1040		" "	X					X	well	75	15					0			10				X
			X					X	well	75	15					0			10				X

Project No. H5096

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE

EXHIBIT 7 LITHOLOGIC LOGDate 12-19-75Hole No. D-1 Elev. 7222' Total Depth 1102' Location NE 1/4, SW 1/4, SW 1/4, SEC 7, T3N, R92W Property BLMCounty MOFFAT State COLORADO Sponsor USGS Drilling Co. Boyles Bros Geologist S.C. MULLER

Formation contacts, footnotes, shows, intervals (in feet)	LITHOLOGY	DESCRIPTION	CRYSTAL, GRAIN, OR FRAGMENT SIZE (mm)					ROUND-ING	SORTING (poor, med., well)	TOTAL PERCENT MEGASCOPIC MINERALS IN SAMPLE						ROCK FRAGMENTS				COAL			
			.00-.25	.25-.125	.125-.25	.25-.5	.5-1.0			Quartz	Feldspar	Mafics	Clay	Pyrite	Others	TOTAL %	Sed. Meta. Ign.	Most abund.	TOTAL %	Vitrain	Clarain	Durain	Fusain
POCK RECOVERY	1040	SS, LT GREY - SS/P	x					x	well	75	15					0			10				x
		" "	x					x	well	75	15					0			10				x
	1050	" "	x					x	well	75	15					0			10				x
		SS, LT GREY w/ COAL (REWORKED) INTSD	x					x	well	60	15					0			25				x
		LIGNITE, DK BROWN-BLACK										10				0			45				x
	1060	COAL										5				0			95	x			x
		"										?							?				
		"										?							?				
	1070	SH, DK GREY, CARB										55							95	x			x
		" "										55							15	x			x
BOTTOM OF HOLE	1080	SS, LT GREY	x					x	well	60	15	10							15				x
		" "	x					x	well	60	15	10							15				x
		SH, GREY w/ COALIFIED TWIGS										85							15				x
		"										85							15				x
	1090	SS, GREY, SILTY	x					x	well	50	15	25							10				x
		" "	x					x	well	50	15	25							10				x
		SH, GREY w/ COALIFIED TWIGS										85							15				x
		" "										85							15				x
	1100	SH, DK GREY, CARB										80							20				x
	1110																						
	1120																						



Century Geophysical Corporation
Denver, Colo.

C 344-1 SP 117488

COMPANY
CSMRI
BORE HOLE
D-3

AREA
DanForth Hills
COUNTY
MoFFat

SECTION

STATE
Colo

DATE
11-8-75

LOG MEASURED FROM
3ft above surface

WELL NO.
D-1

SEC TOP RANGE

AREA
DanForth H. 115
COUNTY
MoFFat

STATE
Colo

COMPANY
CSMRI

DATE
11-8-75

TOTAL FOOTAGE LOGGED
1070

1.0 DRILLED
1102

BIT SIZE
2 1/4

BORE HOLE FLUID
H₂O

DENSITY

VISCOSITY

RESISTIVITY

OPERATOR
Hollander

UNITS
7528

LOCATION
Craig

DRIVE
1.0

TIME IN
1830

TIME OUT
2030

INITIAL RUN
1070

GAMMA SCALE

TIME CONSTANT
2

CALIBRATION & PROBE DATA

SOURCE NO.
A453

PROBE NO.
8020-47

DIRECTOR
Xtal

DEAD TIME
0.0

WATER FACTOR
1.1

RES SCALE

Density

SCALE
2.5K

TC
.5

FROM

TO

TOTAL

LOGGING SPEED
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TOTAL



Century Geophysical Corporation
Denver, Colo.

C 344 E SP 117488

COMPANY

CSMRI

BORE HOLE

D-1

AREA

DanForth Hills

COUNTY

MoFFat

SECTION

TOWNSHIP

RANGE

STATE

Colo

LOG MEASURED FROM

3ft above surface

WELL NO

D-1

SEC

TWP

RANGE

TD DRILLED

1102

BIT SIZE

2 1/4

BORE HOLE FLUID

H₂O

DENSITY

RESISTIVITY

VISCOSITY

OPERATOR

Hollander

UNIT

75-28

LOCATION

Craig

DRIVE

1.0

STAND BY

5

LOGGING

2.0

TOTAL

3.5

ROUNDTRIP

MILEAGE

50

CHARGEABLE

STANDBY

TIME IN

1830

TIME OUT

2030

TD LOGGED

1070'

GAMMA SCALE

10

TIME CONSTANT

2

CALIBRATION & PROBE DATA

SOURCE NO

A453

PROBE NO

101

DEAD TIME

0.0

WATER FACTOR

1.1

RES SCALE

SP

abms per

inches

Muffin

34

35

36

37

38

39

40

41

42

43

44

45

46

47

48

49

50

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75

SELF POTENTIAL

NATURAL GAMMA RAY
COUNTS PER SECOND

DENSITY

RESISTANCE
OHMS

D-1

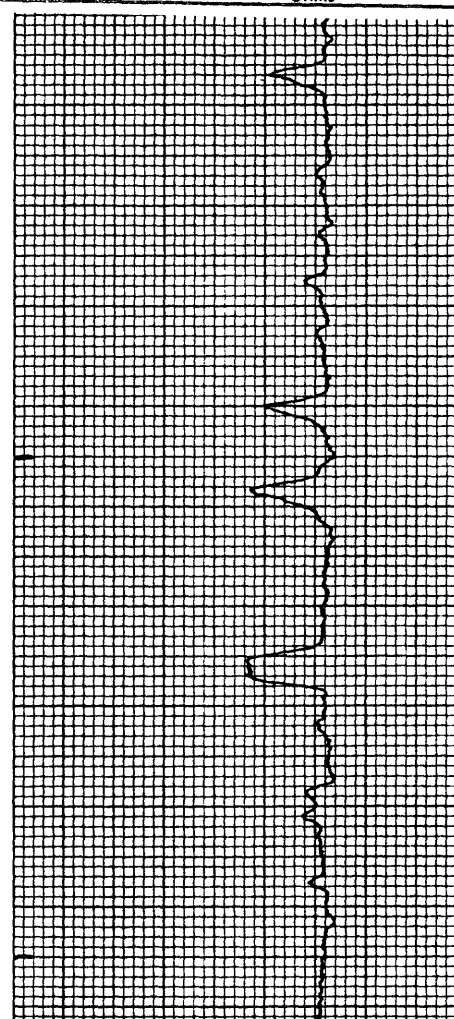
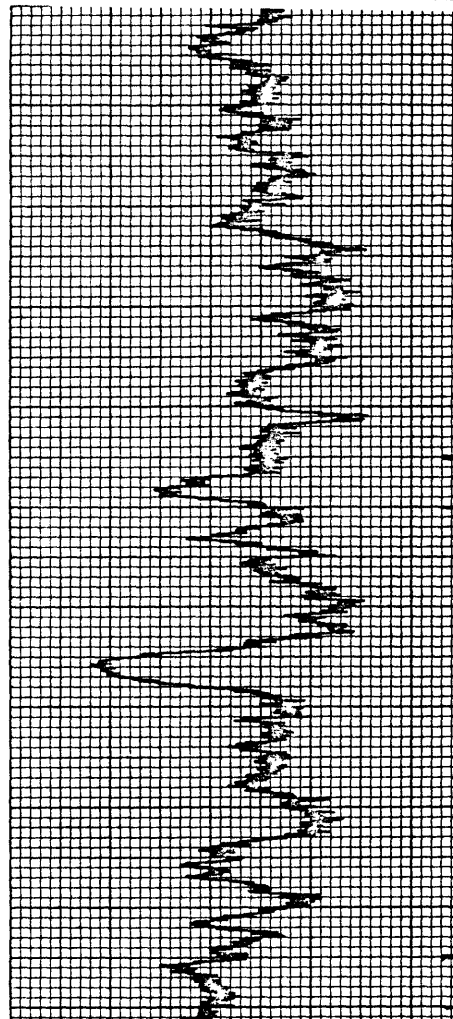


EXHIBIT 7



Century Geophysical Corporation
Denver, Colo.

HOLE NO	D-1	
SEC	TWP	RANGE
DATE	11-8-75	
AREA	DanForth H. 11s	
COUNTY	MoFFat	
STATE	Colo	
COMPANY	CSMRI	
DATE	11-8-75	
TOTAL FOOTAGE LOGGED	1070	

EXHIBIT 7

COMPANY	CSMRI
WELL NO	D-1
AREA	DanForth Hills
COUNTY	MoFFat
SECTION	
TOWNSHIP	
RANGE	C-10

INITIAL RUN	Density
LOGGED	1070'
GAMMA SCALE	SCALE 2.5K
TIME CONSTANT	2
CALIBRATION & PROBE DATA	
SOURCE NO	4453
PROBE NO	101
DETECTOR	X741
DEAD TIME	0.0
WATER FACTOR	1.1
RES SCALE	

Casing 20'-4" 200'-NX Casing 870'-NX ROD
Logged thru casing as described above
Hole bottomed at 1102'

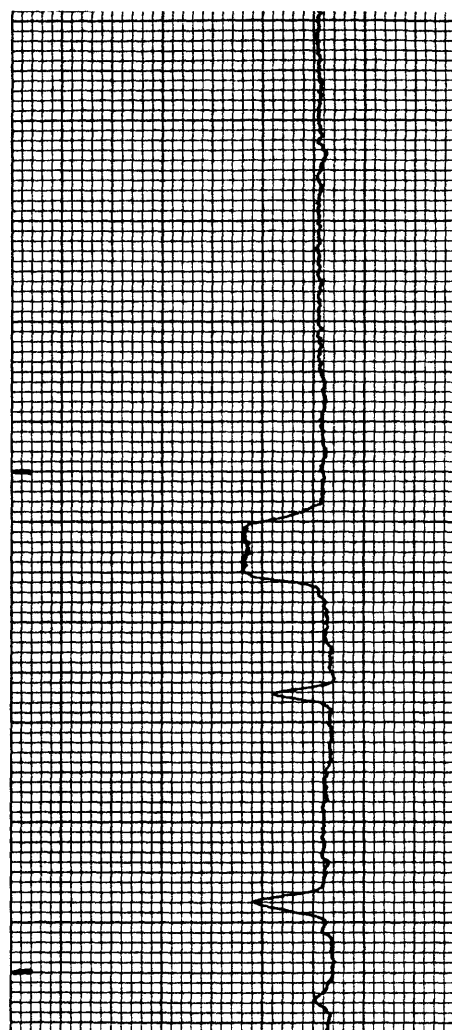
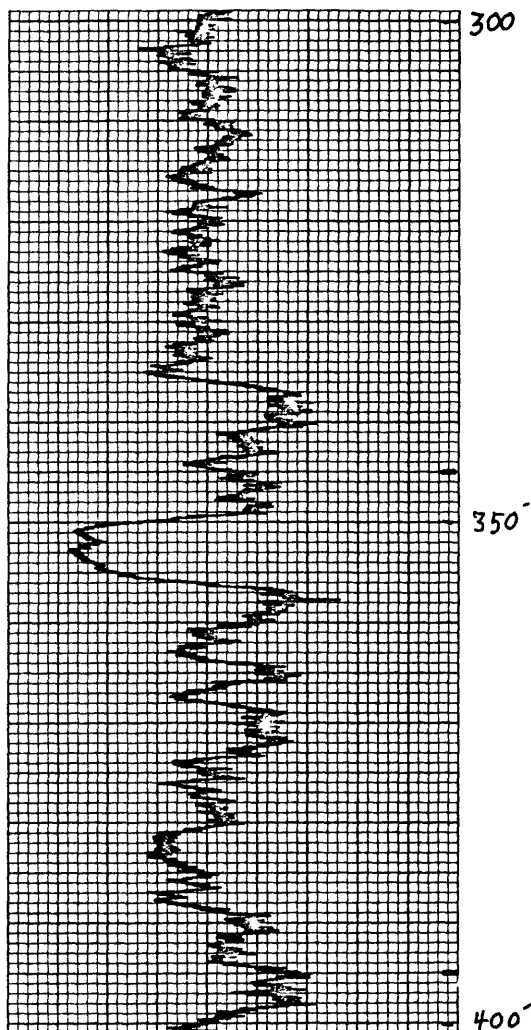
SELF POTENTIAL

DENSITY

NATURAL GAMMA RAY
COUNTS PER SECOND

D-1

RESISTANCE
OHMS



RECEIVED 11/11/75
GRAPHIC CONTROLS CORPORATION
BUFFALO, NEW YORK



Century Geophysical Corporation
Denver, Colo.

C 344-B SP 117480

COMPANY

CSMRI

BORE HOLE

D-1

AREA

DanForth Hills

COUNTY

MoFFat

SECTION

TOWNSHIP

RANGE

STATE

CoLo

DATE

11-8-75

LOG MEASURED FROM

3ft above surface

HOLE NO

D-1

SEC

TWP

RANGE

LOG DRILLED

1102

BIT SIZE

2 1/4

CASING

200'

AREA

DanForth Hills

COUNTY

MoFFat

STATE

CoLo

COMPANY

CSMRI

DATE

11-8-75

TOTAL FOOTAGE LOGGED

1070

BORE HOLE FLUID

H₂O

DENSITY

VISCOSITY

RESISTIVITY

OPERATOR

Hollander

UNITS

75-28

LOCATION

Craig

DRIVE

1.0

TIME IN

1830

STAND BY

5

TIME OUT

2030

LOGGING

2.0

TOTAL

3.5

ROUNDTRIP

50

MILEAGE

CHARGEABLE

STANDBY

SOURCE NO

A453

PROBE NO

8016-101

PROBE SIZE

8020-47

DEFECTOR

X701

DEAD TIME

0.0

WATER FACTOR

1.1

RES SCALE

SOURCE VALUE

4461

PROBE SIZE

1578

TYPE & SIZE

7/8 X 1/4

K FACTOR

1.57 X 10⁻⁵

AIR FACTOR

1.0

Casing 20'-4" 200'-NX Casing 870'-NX ROD

Logged thru casing as described above

Hole bottomed at 1102'

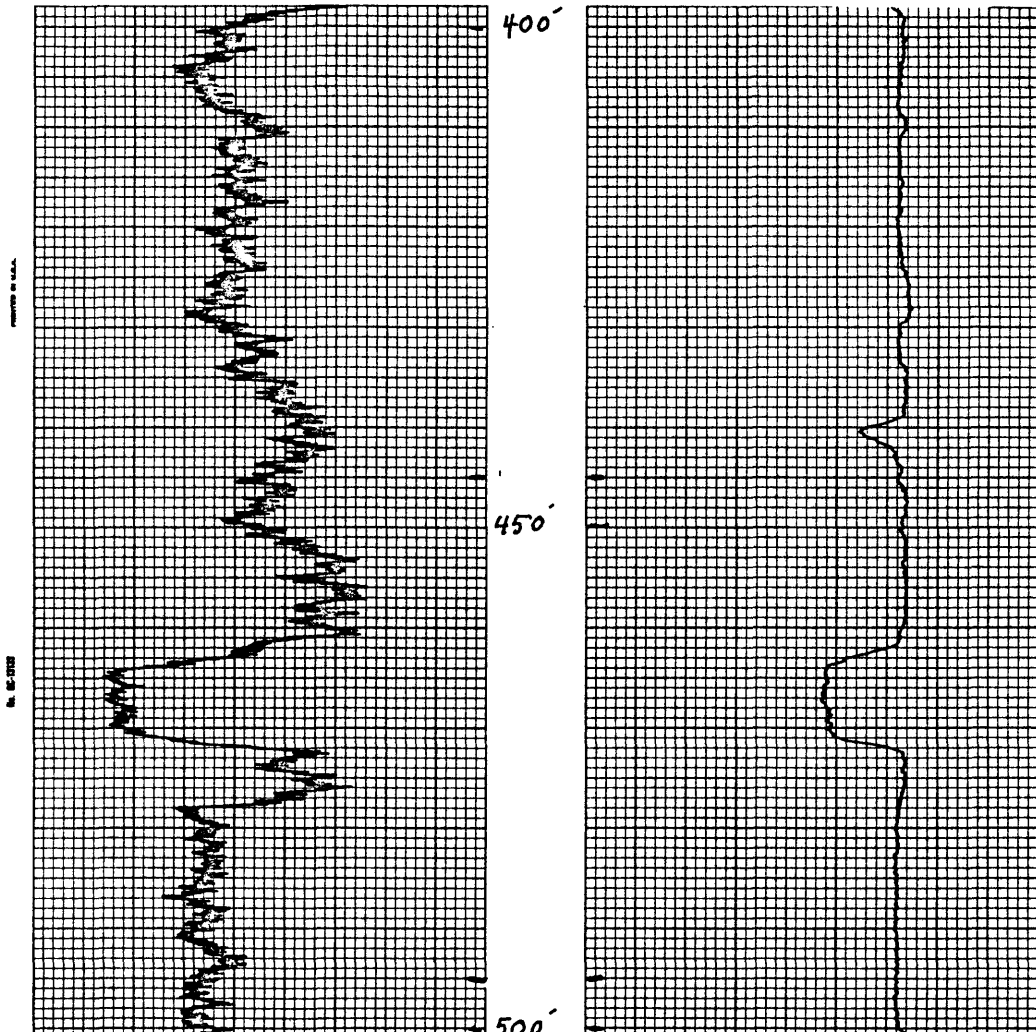
SELF POTENTIAL

NATURAL GAMMA RAY
COUNTS PER SECOND

DENSITY

RESISTANCE
OHMS

D-1



Century Geophysical Corporation
Denver, Colo.

C 366-S SP 317408

COMPANY
CSMRIBORE HOLE
D-3AREA
DanForth HillsCOUNTY
MoFFat

SECTION

TOWNSHIP

RANGE

STATE
ColoLOG MEASURED FROM
3ft above surfaceHOLE NO.
D-1

SEC

TWP

RANGE

TD DRILLED
1102BIT SIZE
2 1/4CASING
200'AREA
DanForth H. HsCOUNTY
MoFFatSTATE
ColoCOMPANY
CSMRIDATE
11-8-75TOTAL FOOTAGE LOGGED
1070BORE HOLE FLUID
H₂O

DENSITY

VISCOSITY

RESISTIVITY

OPERATOR
HollanderUNILNG
7528LOCATION
CraigDRIVE
1.0TIME IN
1830STAND BY
5TIME OUT
2030INITIAL RUN
1070Density
SCALE
2.5KGAMMA BEGINS
Initial run offsetGAMMA SCALE
10Cps Per In
20LOGGING SPEED
2.0Cps Per In
20LOGGING SPEED
2.0Cps Per In
20LOGGING SPEED
2.0TIME CONSTANT
2LOGGING SPEED
20Cps Per In
20LOGGING SPEED
2.0Cps Per In
20LOGGING SPEED
2.0Cps Per In
20

CALIBRATION & PROBE DATA

Cps Per In
20LOGGING SPEED
2.0Cps Per In
20LOGGING SPEED
2.0Cps Per In
20LOGGING SPEED
2.0SOURCE NO
A453SOURCE VALUE
4MciPROBE NO
820-49PROBE SIZE
1 3/8DITCHES
XtalTYPE & SIZE
7/8 X 1 1/4DEAD TIME
0.0K FACTOR
1.59 X 10⁻⁵WATER FACTOR
1.1AIR FACTOR
1.0

RES SCALE

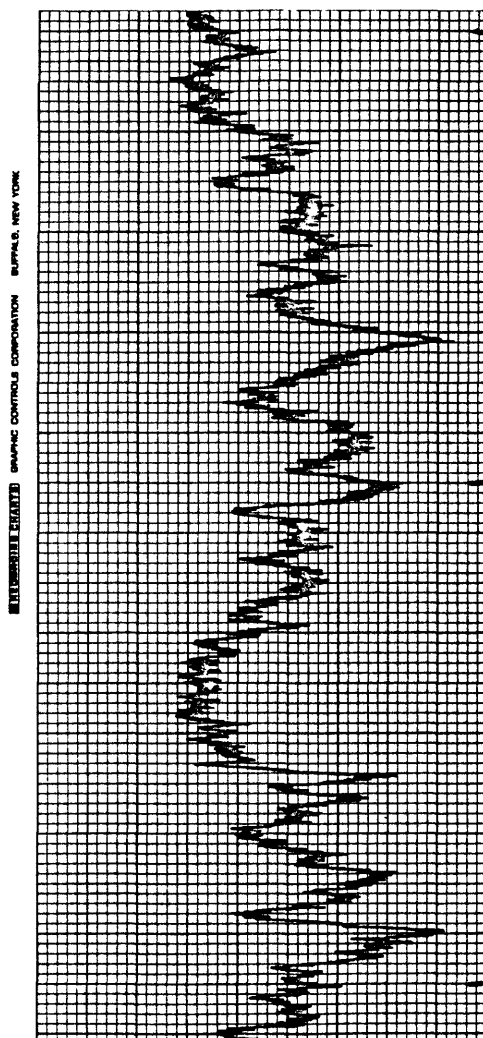
Cps Per In
20LOGGING SPEED
2.0Cps Per In
20LOGGING SPEED
2.0Cps Per In
20LOGGING SPEED
2.0

S.P.

Cps Per In
20LOGGING SPEED
2.0Cps Per In
20LOGGING SPEED
2.0Cps Per In
20LOGGING SPEED
2.0

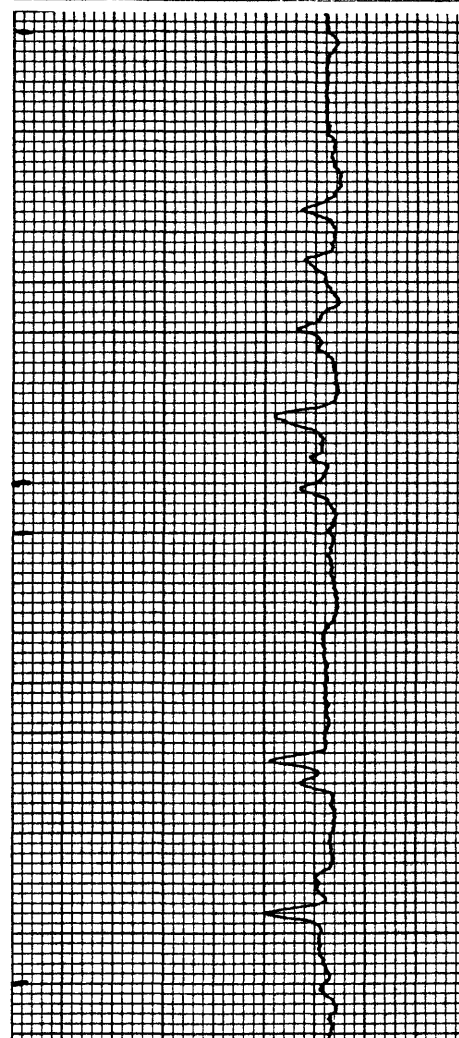
SELF POTENTIAL


DENSITY

NATURAL GAMMA RAY
COUNTS PER SECOND**D-1**RESISTANCE
OHMS

500'

550'



		Century Geophysical Corporation Denver, Colo.		HOLE NO. D-1		T.O. DEPTH 1102	
C-364-B SP 117468 COMPANY CSMRI		DATE 11-8-75		AREA DanForth H. 11s		BIT SIZE 2 1/4	
BORE HOLE D-3		STATE Colo		COUNTRY MoFFat		CASING 200'	
AREA DanForth Hills		LOG MEASURED FROM 3ft above surface		COMPANY CSMRI		DENSITY H₂O	
COUNTY MoFFat		TOWNSHIP Colo		DATE 11-8-75		VISCOSITY 1070	
SECTION 1070		RANGE 1070		TOTAL FOOTAGE LOGGED 1070		LOCATION Craig	
INITIAL RUN Density		SCALE 2.5K		DRIVE 1.0		TIME IN 1830	
TO LOGGED 1070		LOGGING SPEED 5		STAND BY 5		TIME OUT 2030	
GAMMA SCALE 10		LOGGING SPEED 20		LOGGING 2.0		TOTAL 3.5	
TIME CONSTANT 2		LOGGING SPEED 20		LOGGING 2.0		TOTAL 3.5	
CALIBRATION & PROBE DATA 20		LOGGING SPEED 20		LOGGING 2.0		TOTAL 3.5	
SOURCE NO A453		SOURCE VALUE 4Mci		LOGGING 2.0		TOTAL 3.5	
PROBE NO 8016-101		PROBE SIZE 1 3/8		LOGGING 2.0		TOTAL 3.5	
DETECTOR KTal		TYPE & SIZE 7/8 X 1 1/4		LOGGING 2.0		TOTAL 3.5	
DEAD TIME 0.0		R FACTOR 1.59 X 10⁻⁵		LOGGING 2.0		TOTAL 3.5	
WATER FACTOR 1.1		AIR FACTOR 1.0		LOGGING 2.0		TOTAL 3.5	
RES SCALE 1.1		AIR FACTOR 1.0		LOGGING 2.0		TOTAL 3.5	

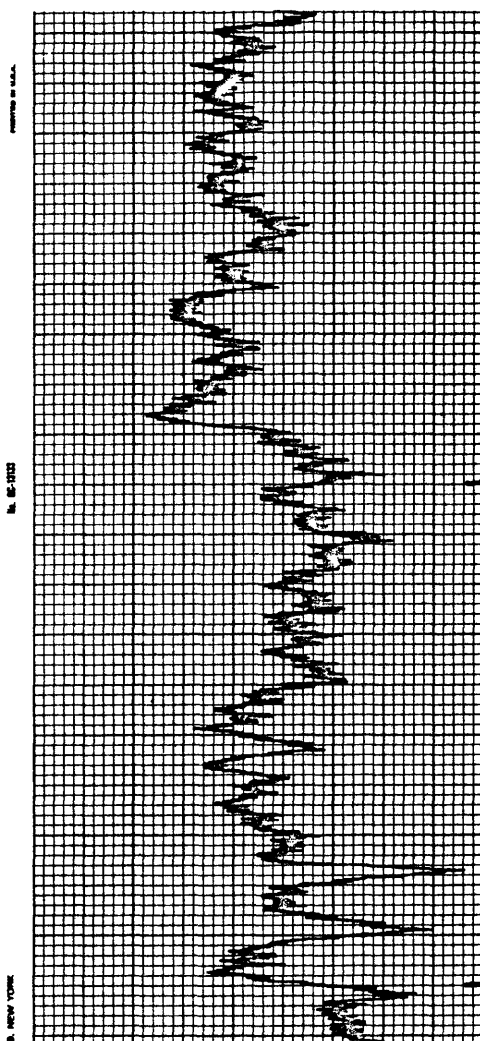
Casing 20'-4" 200'-NX casing 870'-NX ROD
 Logged thru casing as described above
 Hole bottomed at 1102'

SELF POTENTIAL

DENSITY

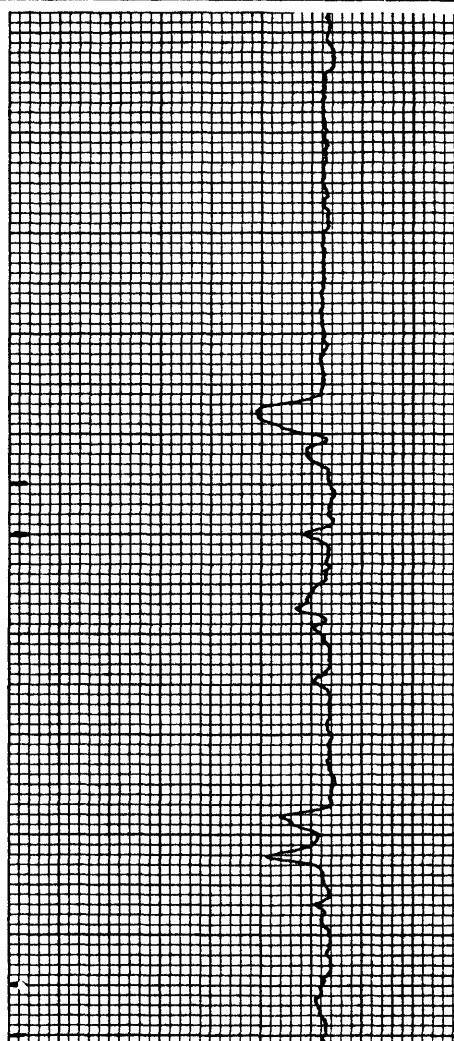
 NATURAL GAMMA RAY
 COUNTS PER SECOND

D-1

 RESISTANCE
 OHMS


650'

700'



366-1 SP 17-1000		11-8-75		DanForth 14.14		H ₂ O	
COMPANY CSMRI		COUNTY MoFFat		DENSITY		VISCOSITY	
BORE HOLE D-3		STATE Colo		RESISTIVITY			
AREA DanForth Hills		COMPANY CSMRI		OPERATOR Hollander			
COUNTY MoFFat		STATE Colo		DATE 11-8-75		UNIT 75-28	
SECTION		TOWNSHIP		RANGE		LOG MEASURED FROM 3ft above surface	
INITIAL RUN		DENSITY		GAMMA RAY Control run offscale		DRIVE 1.0	
TD LOGGED 1070'		SCALE 2.5K		SCALE		TIME IN 13.30	
GAMMA SCALE		Cps Per In LOGGING SPEED		Cps Per In LOGGING SPEED		TIME OUT 20.00	
TIME CONSTANT 2		LOGGING SPEED 20		LOGGING SPEED 2.0		TOTAL 3.5	
CALIBRATION & PROBE DATA		TO		TO		BOUNDARY MILEAGE 50	
SOURCE NO A453		SOURCE VALUE 4mci		TOTAL		CHARGEABLE STANDBY	
PROBE SIZE 178		TYPE & SIZE 7/8 X 1/4		TOTAL		MILEAGE	
DISTANCE 0.0		E FACTOR 1.57 X 10 ⁻⁵		TOTAL		MILEAGE	
WATER FACTOR 1.1		AIR FACTOR 1.0		TOTAL		MILEAGE	
RES SCALE				TOTAL		MILEAGE	

Casing. 20'-4" 200'-NX Casing 870'-NX ROD
 Logged thru casing as described above
 Hole bottomed at 1102'

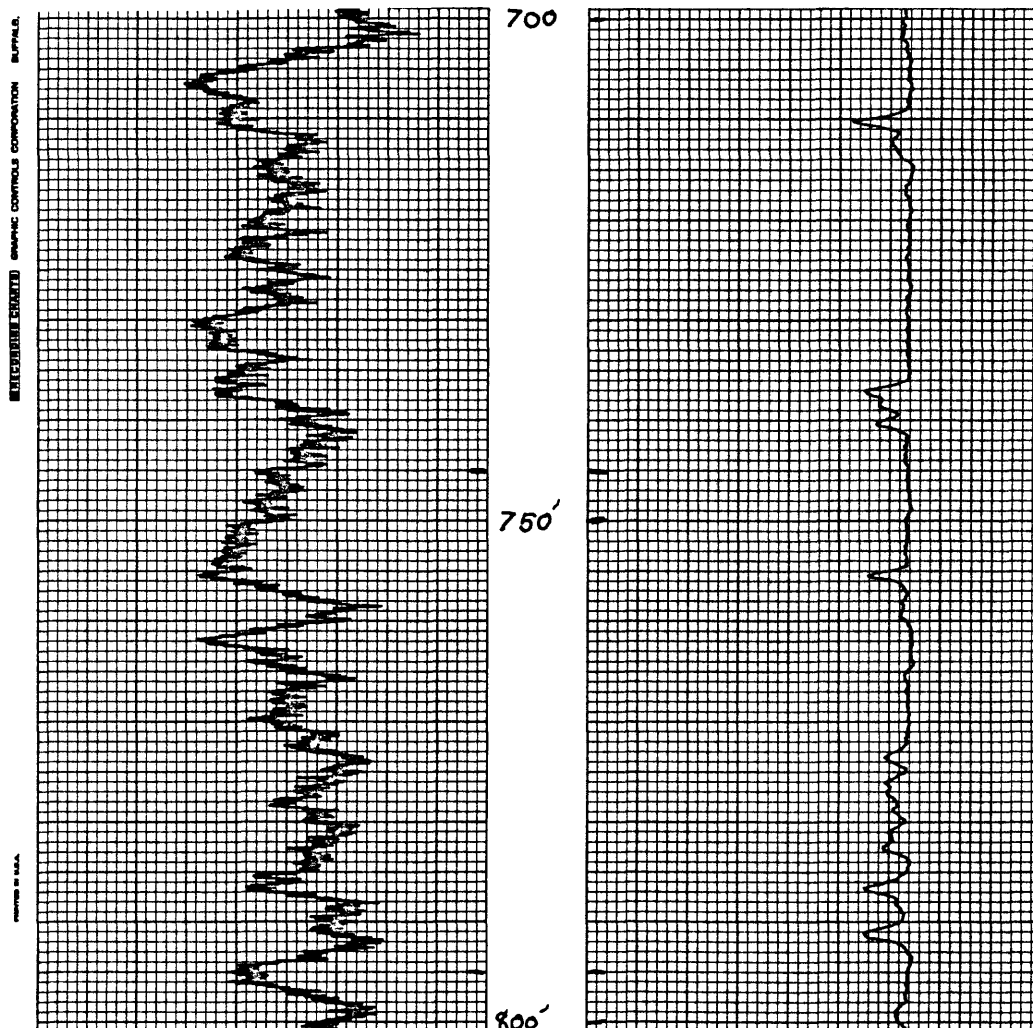
SELF POTENTIAL

DENSITY

**NATURAL GAMMA RAY
COUNTS PER SECOND**

RESISTANCE
OHMS

D-1





Century Geophysical Corporation
Denver, Colo.

C-364-E SP 117488

COMPANY

CSMRI

BORE HOLE

D-3

AREA

DanForth Hills

COUNTY

MoFFat

STATE C-10

SECTION

TOWNSHIP

RANGE

LOG MEASURED FROM

3ft above surface

HOLE NO

D-1

SEC

TWP

RANGE

T.D. DEPTH

1102

BIT SIZE

CASING

2 1/4 200'

AREA

DanForth Hills

COUNTY

MoFFat

STATE

Colo

COMPANY

CSMRI

DATE

11-8-75

TOTAL FOOTAGE LOGGED

1070

RESISTIVITY

VISCOSITY

OPERATOR

Hollander

WIRELINE

7628

LOCATION

Craig

INITIAL RUN

Density

GAMMA BEAMS

(initial run off-scale)

T.D. LOGGED

1070'

SCALE

2.5K

Cap Per In

LOGGING SPEED

20

FT./Min.

SCALE

Cap Per In

LOGGING SPEED

20

FT./Min.

STAND BY

5

TIME IN

1830

GAMMA SCALE

10

Cap Per In

TC

5

Sec

LOGGING SPEED

20

FT./Min.

TC

5

Sec

LOGGING SPEED

20

FT./Min.

LOGGING

2.0

TIME OUT

2030

TIME CONSTANT

2

LOGGING SPEED

20

FT./Min.

FROM

TO

FT.

FROM

TO

FT.

FROM

TO

FT.

LOGGING

2.0

TIME

3.5

TIME

50

Miles

CALIBRATION & PROBE DATA

SOURCE NO

A453

PROBE NO

8020-47

DETECTION

Xtal

DEAD TIME

0.0

WATER FACTOR

1.1

RES SCALE

SOURCE VALUE

441ci

PROBE SIZE

1 3/8

TYPE & SIZE

7/8 X 1 1/4

K FACTOR

1.57 X 10⁻⁵

AIR FACTOR

1.0

TOTAL

FT.

TOTAL

FT.

TOTAL

FT.

LOGGING

2.0

TIME

3.5

TIME

50

Miles

IN

20'-4"

200'-NX

Casing

870'-NX

ROD

Logged thru casing as described above

Hole bottomed at 1102'

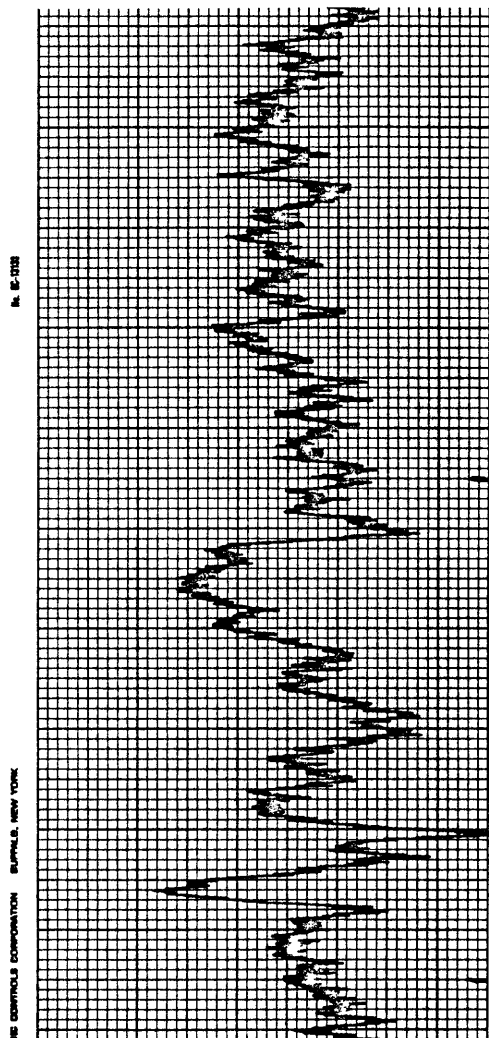
SELF POTENTIAL

DENSITY

NATURAL GAMMA RAY
COUNTS PER SECOND

RESISTANCE
OHMS

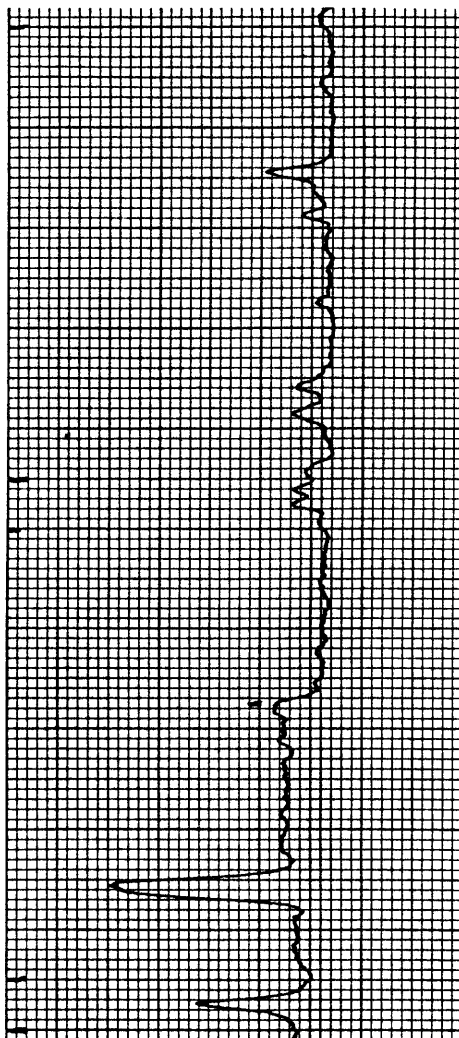
D-1



800'

850'

900'



IN. 10-11-75

RE. CENTRALS CORPORATION, BUFFALO, NEW YORK

EXHIBIT 7



Century Geophysical Corporation
Denver, Colo.

C-366-E SP 117488

COMPANY
CSMRI
D-3

AREA
Dan Earth Hills

COUNTY
MoFFat

SECTION

TOWNSHIP

RANGE

STATE
Colo

DATE
11-8-75

LOG MEASURED FROM
3ft above surface

HOLE NO.
D-1

SEC

TWP

RANGE

AREA
DanForth H. Hs

COUNTY
MoFFat

STATE
Colo

COMPANY
CSMRI

DATE
11-8-75

TOTAL FOOTAGE LOGGED
1070

T.O. DRILLED
1102

BIT SIZE
2 1/4

BORE HOLE FLUID
H₂O

DENSITY

VISCOSITY

RESISTIVITY

OPERATOR
Hollander

WITNESS
75-28

LOCATION
Craig

DRIVE
1.0

TIME IN
1830

STAND BY
5

TIME OUT
2030

INITIAL RUN
Density
T.O. LOGGED
1070

SCALE
2.5K

GAMMA BEAMS
(Initial run offset)

GAMMA SCALE
10

LOGGING SPEED
20

TIME CONSTANT
2

CALIBRATION & PROBE DATA

SOURCE NO.
A453

PROBE NO.
101

DETECTORS
KTA1

READ TIME
0.0

WATER FACTOR
1.1

RES SCALE

SOURCE VALUE
4Mc

PROBE SIZE
1 3/8

TYPE & SIZE
7/8 X 1/4

K FACTOR
1.57 X 10⁻⁵

AIR FACTOR
1.0

Casing. 20'-4" 200'-NX Casing 870'-NX ROD
Logged thru casing as described above
Hole bottomed at 1102'

SELF POTENTIAL

DENSITY

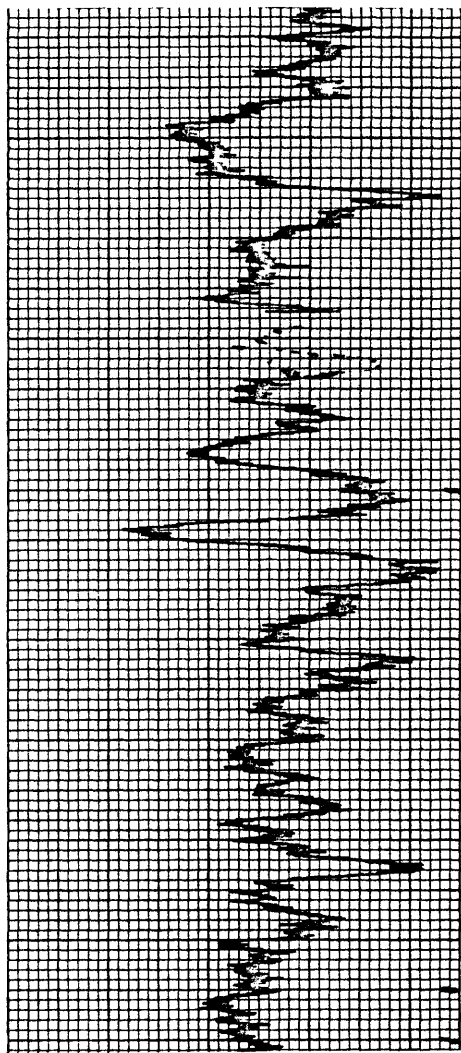
NATURAL GAMMA RAY
COUNTS PER SECOND

RESISTANCE
OHMS

D-1

TELEPHONE CHARTER

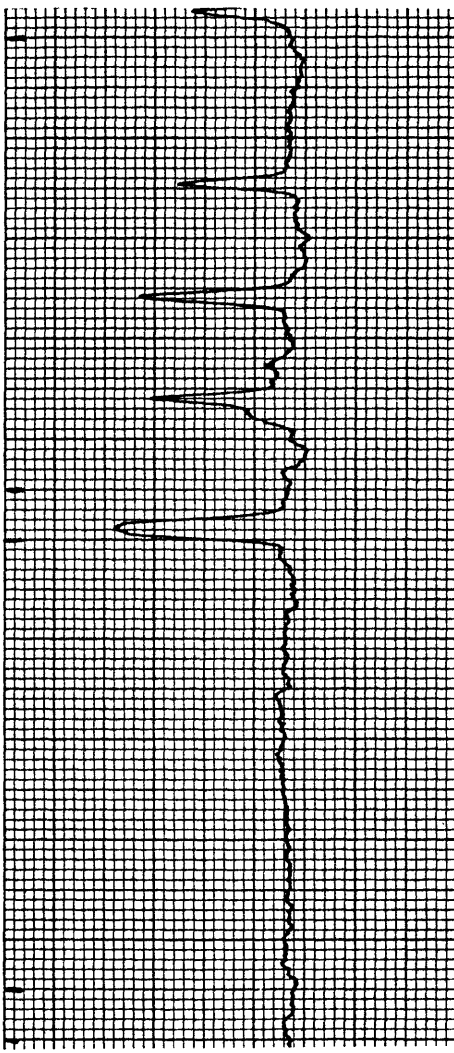
PRINTED IN U.S.A.



900'

950'

1000'





Century Geophysical Corporation
Denver, Colo.

C-366-E SP 117468

COMPANY

CSMRI

BORE HOLE

D-1

AREA

DanForth Hills

COUNTY

Moffat

SECTION

TOWNSHIP

RANGE

LOG MEASURED FROM

3FT above surface

DATE

11-8-75

STATE

Colo

LOG MEASURED FROM

3FT above surface

DATE

11-8-75

STATE

Colo

LOG MEASURED FROM

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Colo

LOG MEASURED FROM

3FT above surface

DATE

11-8-75

STATE

Colo

LOG MEASURED FROM

3FT above surface

DATE

11-8-75

279-2271
C-366-E

11-8-75

HOLE NO	D-1	T.D. DRILLED	1102
SAC		BIT SIZE	2 1/4
RANGE		CASING	200'
AREA	DanForth H. 11s	BORE HOLE FLUID	H2O
COUNTY	Moffat	DENSITY	
STATE	Colo	VISCOSITY	
COMPANY	CSMRI	DRILLER	Hollander
DATE	11-8-75	UNIT	75-28
TOTAL FOOTAGE LOGGED	1070	LOCATION	Craig

EXHIBIT 7

INITIAL RUN	Density	GAMMA RAY	Initial run offset
TO LOGGED	1070	SCALE	2.5K
GAMMA SCALE		TC	5
LOGGING SPEED	10	LOGGING SPEED	20
TIME CONSTANT	2	LOGGING SPEED	20
CALIBRATION & PROBE DATA		LOGGING SPEED	20
SOURCE NO	A453	SOURCE VALUE	4161
PROBE NO	8016-101	PROBE SIZE	1 7/8
BORE HOLE	8020-47	TYPE & SIZE	7/8 X 1 1/4
DEAD TIME	0.0	K FACTOR	1.57 X 10 ⁻⁵
WATER FACTOR	1.1	AIR FACTOR	1.0
RES SCALE			

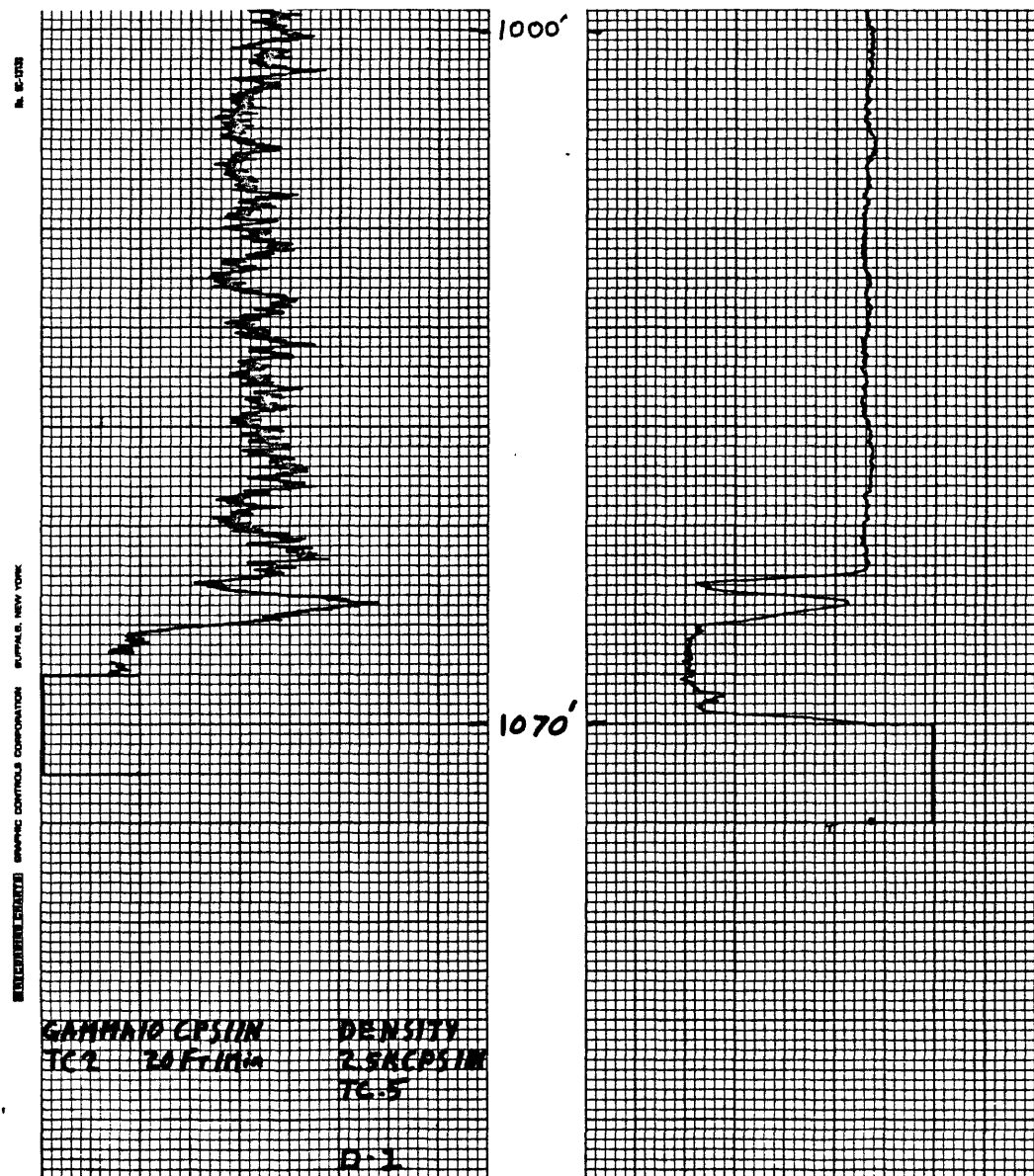
SELF POTENTIAL

DENSITY

NATURAL GAMMA RAY
COUNTS PER SECOND

D-1

RESISTANCE
OHMS



GAMMA 10 CPS/IN
TC 2 20 FT/IN
DENSITY
2.5K CPS/IN
TC 5

D-1

Sponsor U. S. G. S. Sample No. 201 Description Hole D-1 345-349' 10-17-75
Lab No. 1356 Project No. H50146 Analyst Wayand Date 11-5-75

Moisture: Air Dry	8.08	%	Oven Dry	13.8	%	Total	20.8	%
	As-received		Dry basis			Moisture and ash free basis		
Volatile Matter	27.6	%	34.7	%				
Ash	4.77	%	6.02	%				
Fixed Carbon	46.8	%	59.1	%				
	9959		12574			13379		
Heating Value (ASTM D271)	9931	Btu/lb	12539	Btu/lb		13342	Btu/lb	

Carbon	<u>57.8</u> %	<u>73.0</u> %
Hydrogen	<u>3.51</u> %	<u>4.43</u> %
Sulfur	<u>0.62</u> %	<u>0.78</u> %
Nitrogen	<u>1.26</u> %	<u>1.59</u> %
Oxygen (by difference)	<u>32.0</u> %	<u>14.2</u> %

Sulfate sulfur	<u>0.01</u> %
Pyritic sulfur	<u>0.50</u> %
Organic sulfur	<u>0.27</u> %

Fusibility of Ash (ASTM D1857)

<u>Reducing Atmosphere</u>	<u>Oxidizing Atmosphere</u>
_____°F	_____°F
_____°F	_____°F
_____°F	_____°F
_____°F	_____°F

Fluid Temperature (FT)

Approved _____ 173

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE
COAL ANALYSIS REPORT

Sponsor U. S. G. S. Sample No. 203 Description Hole D-1 459-462 10-21-75
Lab No. 1356 Project No. H50146 Analyst Wayand Date 11-5-75

Proximate Analysis (ASTM D271)

Moisture: Air Dry 0.51 % Oven Dry 14.4 % Total 14.8 %

As-received

Dry basis

Moisture and
ash free basis

Volatile Matter 30.7 % 36.0 %

Ash 4.55 % 5.34 %

Fixed Carbon 49.9 % 58.7 %

Heating Value (ASTM D271) 10685 Btu/lb 12541 Btu/lb 13248 Btu/lb

Ultimate Analysis (ASTM D271)

Carbon 62.2 % 73.0 %

Hydrogen 3.54 % 4.15 %

Sulfur 0.28 % 0.33 %

Nitrogen 1.40 % 1.64 %

Oxygen (by difference) 28.0 % 15.5 %

Forms of Sulfur (ASTM D2492)

Sulfate sulfur < 0.01 %

Pyritic sulfur 0.09 %

Organic sulfur 0.24 %

Hardgrove Grindability Index (ASTM D409)

Free-swelling Index (ASTM D720)

Fusibility of Ash (ASTM D1857)

Initial Deformation Temperature (IT) _____°F _____°F

Softening Temperature (ST) _____°F _____°F

Hemispherical Temperature (HT) _____°F _____°F

Fluid Temperature (FT) _____°F _____°F

Approved _____ 175

Sponsor U.S. G.S. Sample No. 204 Description Hole D-1 462'-465' 10-21-75
Lab No. 1356 Project No. H50146 Analyst Wayand Date 11-5-75

Moisture: Air Dry	<u>7.92</u>	%	Oven Dry	<u>9.87</u>	%	Total	<u>17.0</u>	%
			As-received	Dry basis			Moisture and ash free basis	

Approved _____ 176

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE

COAL ANALYSIS REPORT

Sponsor U. S. G. S. Sample No. 204 Description Parting sample from 204

Lab No. 1356 Project No. H50146 Analyst Wayand Date 11-5-75

Moisture 2.85

Ash as Rec' 74.1

Ash Dry 76.3

% of Sample 9.51

Sponsor U. S. G. S. Sample No. 205 Description Hole D-1 465-468' 10-21-75
Lab No. 1356 Project No. H50146 Analyst Wayand Date 11-5-75

Moisture: Air Dry 1.66 % Oven Dry 13.7 % Total 15.1 %

	<u>As-received</u>	<u>Dry basis</u>	<u>Moisture and ash free basis</u>
	30.9	36.4	
Volatile Matter	<u>30.9</u> %	<u>36.4</u> %	
	4.27		
Ash	<u>4.27</u> %	<u>5.03</u> %	
	49.7	58.6	
Fixed Carbon	<u>49.7</u> %	<u>58.6</u> %	

10734 Btu/lb 12643 Btu/lb 13312 Btu/lb

Carbon	<u>61.8</u> %	<u>72.8</u> %
Hydrogen	<u>3.96</u> %	<u>4.67</u> %
Sulfur	<u>0.27</u> %	<u>0.32</u> %
Nitrogen	<u>1.43</u> %	<u>1.68</u> %
Oxygen (by difference)	<u>28.3</u> %	<u>15.5</u> %

<u>Forms of Sulfur (ASTM D2492)</u>	0.01	
Sulfate sulfur	<u>0.01</u>	%
	0.12	
Pyritic sulfur	<u>0.12</u>	%
	0.19	
Organic sulfur	<u>0.19</u>	%

Fusibility of Ash (ASTM D1857)

	<u>Reducing Atmosphere</u>	<u>Oxidizing Atmosphere</u>
<u>Initial Deformation Temperature (IT)</u>	_____°F	_____°F
<u>Softening Temperature (ST)</u>	_____°F	_____°F
<u>Hemispherical Temperature (HT)</u>	_____°F	_____°F
<u>Fluid Temperature (FT)</u>	_____°F	_____°F

Sponsor U.S.G.S. Sample No. 206 Description Hole D-1 468'-472' 10-21-75
Lab No. 1356 Project No. H50146 Analyst Wayand Date 11-5-75

Moisture: Air Dry 0.67 % Oven Dry 12.2 % Total 12.8 %

	<u>As-received</u>	<u>Dry basis</u>	<u>Moisture and ash free basis</u>
Volatile Matter	<u>27.2</u> % <u>18.3</u>	<u>31.2</u> % <u>21.0</u>	
Ash	<u>18.4</u> %	<u>21.1</u> %	
Fixed Carbon	<u>41.6</u> %	<u>47.7</u> %	
Heating Value (ASTM D271)	<u>9171</u> Btu/lb	<u>10517</u> Btu/lb	<u>13313</u> Btu/lb

Carbon	<u>53.0</u> %	<u>60.8</u> %
Hydrogen	<u>3.14</u> % 0.28	<u>3.60</u> % 0.32
Sulfur	<u>0.29</u> % 1.14	<u>0.33</u> % 1.31
Nitrogen	<u>1.16</u> %	<u>1.33</u> %
Oxygen (by difference)	<u>24.1</u> %	<u>13.0</u> %

Sulfate sulfur	<u>0.01</u> %
Pyritic sulfur	<u>0.11</u> %
Organic sulfur	<u>0.21</u> %

Fusibility of Ash (ASTM D1857)

Initial Deformation Temperature (IT)	_____°F	_____°F
Softening Temperature (ST)	_____°F	_____°F
Hemispherical Temperature (HT)	_____°F	_____°F
Fluid Temperature (FT)	_____°F	_____°F

