UNITED STATES DEPARTMENT OF INTERIOR
GEOLOGICAL SURVEY

Lithologic Descriptions of Cutting Samples, Mariano Lake-Lake Valley Drilling Project, McKinley County, New Mexico, Hole Number 2

by

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Open File Report 81-1208
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This report is preliminary and has not been reviewed for conformity with US Geological Survey editorial standasrds and stratigraphic nomenclature.

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INTRODUCTION

In the fall of 1980, the U.S. Geological Survey contracted with Longman Drilling Company of Albuquerque, New Mexico to rotary drill and core twelve holes along a north-south line from Mariano Lake to the vicinity of Lake Valley, New Mexico. This report contains the lithologic descriptions of core and cutting samples from drill hole no. 2.

The drilling project was funded under a reimbursable interagency agreement between the U.S. Bureau of Indian Affairs (BIA) and the U.S. Geological Survey (USGS). The program was designed by representatives of the BIA, USGS, and the Minerals Department of the Navajo Tribe.

PURPOSE

The principal objective of this project was to provide core samples and geophysical logs for petrologic, sedimentologic, geophysical, and geochemical studies of the Upper Jurassic Morrison Formation. Other objectives included the following: stratigraphic and coal studies of Upper Cretaceous rocks; hydrologic and water monitoring of well no. 2; control for a proposed seismic study of the same geographic area; and development of water wells by the Navajo Tribal Water and Sanitation Department.

ACKNOWLEDGEMENTS

The USGS wishes to acknowledge the cooperation of Wyoming Fuel Company, and New Mexico and Arizona Land Corporation for permission to drill hole no. 2 on their mineral lease.

GENERAL DRILLING PLAN

The locations of all twelve drill holes are shown on figure 1, which is a portion of the Gallup $1^{\circ} \times 2^{\circ}$ Quadrangle. The general drilling plan called for most holes to be rotary drilled into the Upper Cretaceous Dakota Sandstone and then cored into or through the Recapture Member of the Morrison

Formation. The interval to be cored in each hole was about 600 ft.

Exceptions to the general drilling plan were as follows: Hole no. 2, rotary drilled, surface to Jurassic Entrada Sandstone; Hole no. 4A, cored 21-218 ft, to test an observed near surface I.P. anomaly; Hole no. 6, deepened after coring by rotary drilling into the Jurassic Entrada Sandstone; Hole no. 7A, cored only the Westwater Canyon Member of the Morrison Formation; Hole no. 8, abandoned in lower part of Westwater Canyon Member of the Morrison Formation; and Hole nos. 9 and 10, abandoned in Upper Cretaceous rocks.

Chip samples were collected at 10-ft or 20-ft intervals throughout each hole and sludge samples collected at 20-ft intervals throughout the cored interval.

The following suite of geophysical logs were included in the general drilling project: natural gamma, self potential, neutron-neutron porosity, resistance, resistivity, temperature, deviation, gamma-gamma density, caliper, magnetic susceptibility, gamma ray spectrometer (KUT), sonic, induced polarization, conductivity, and high-resolution 4-arm digital dipmeter.

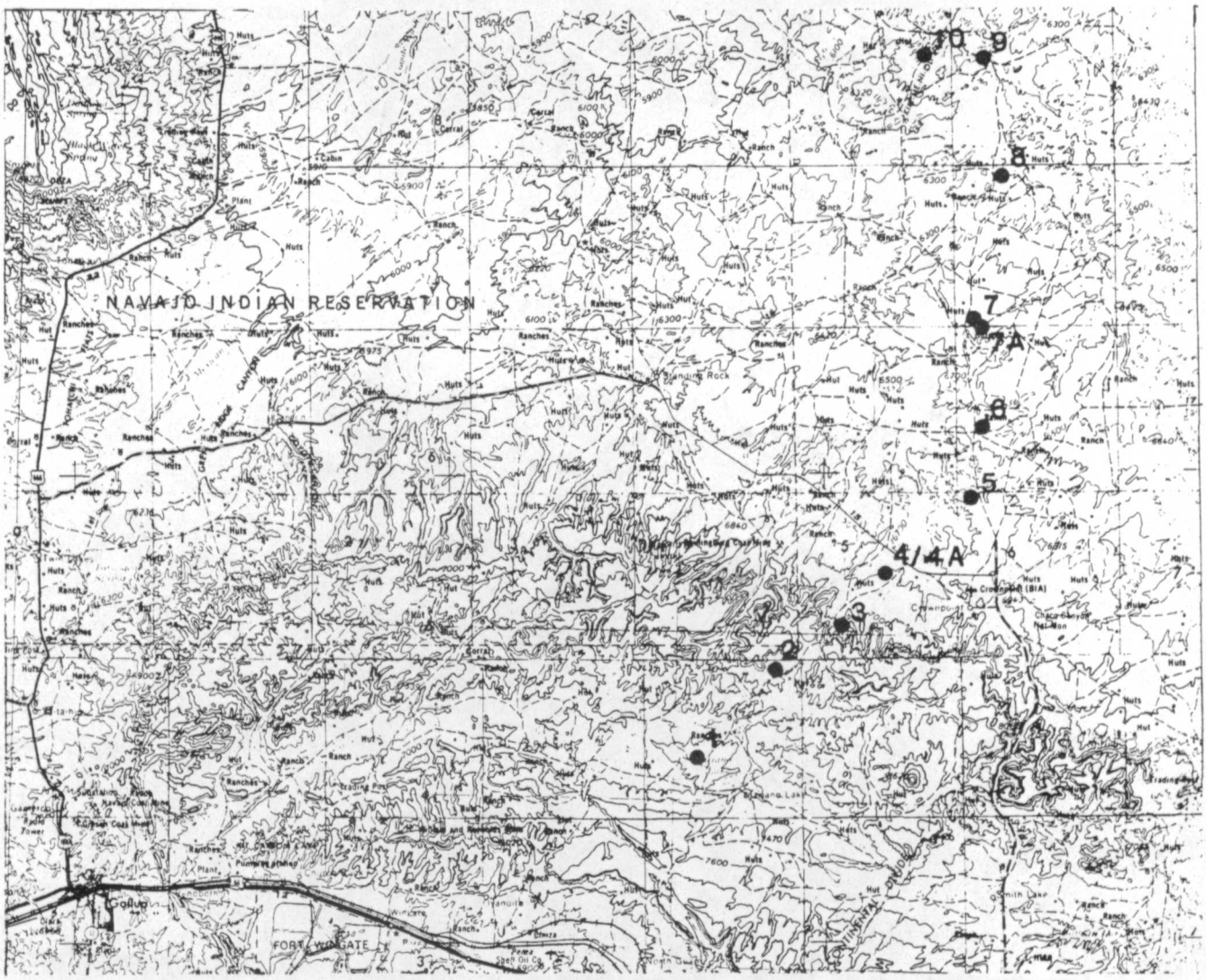

Figure 1. - Location of USGS Drill Holes, Gallup 1° x 2° Quadrangle.

DRILL HOLE NO. 2

The location of this well is shown on figure 2.

The vital statistics of the well include:

Spud date: October 29, 1980

Location: T. 16 N., R. 14 W., SW/4 sec. 1.

Lat. 35°38′34" Long. 108°16′45"

Collar Elevation: 7355 ft (topo) Mulatto Tongue of Mancos Shale (Cretaceous)

Total Depth: 2460 ft (depth) Entrada Sandstone (Jurassic)

Drilling Completed: November 2, 1980.

Status of well: Abandoned, cement plug 500-700 ft, and surface

The following suite of geophysical logs were run on this hole and have been published by the U.S. Geological Survey (1981): natural gamma, self potential, neutron-neutron porosity, resistance, deviation, resistivity, gamma-gamma density and caliper.

Cutting samples from rotary drilling were collected and described on ten (10) foot intervals (table 1).

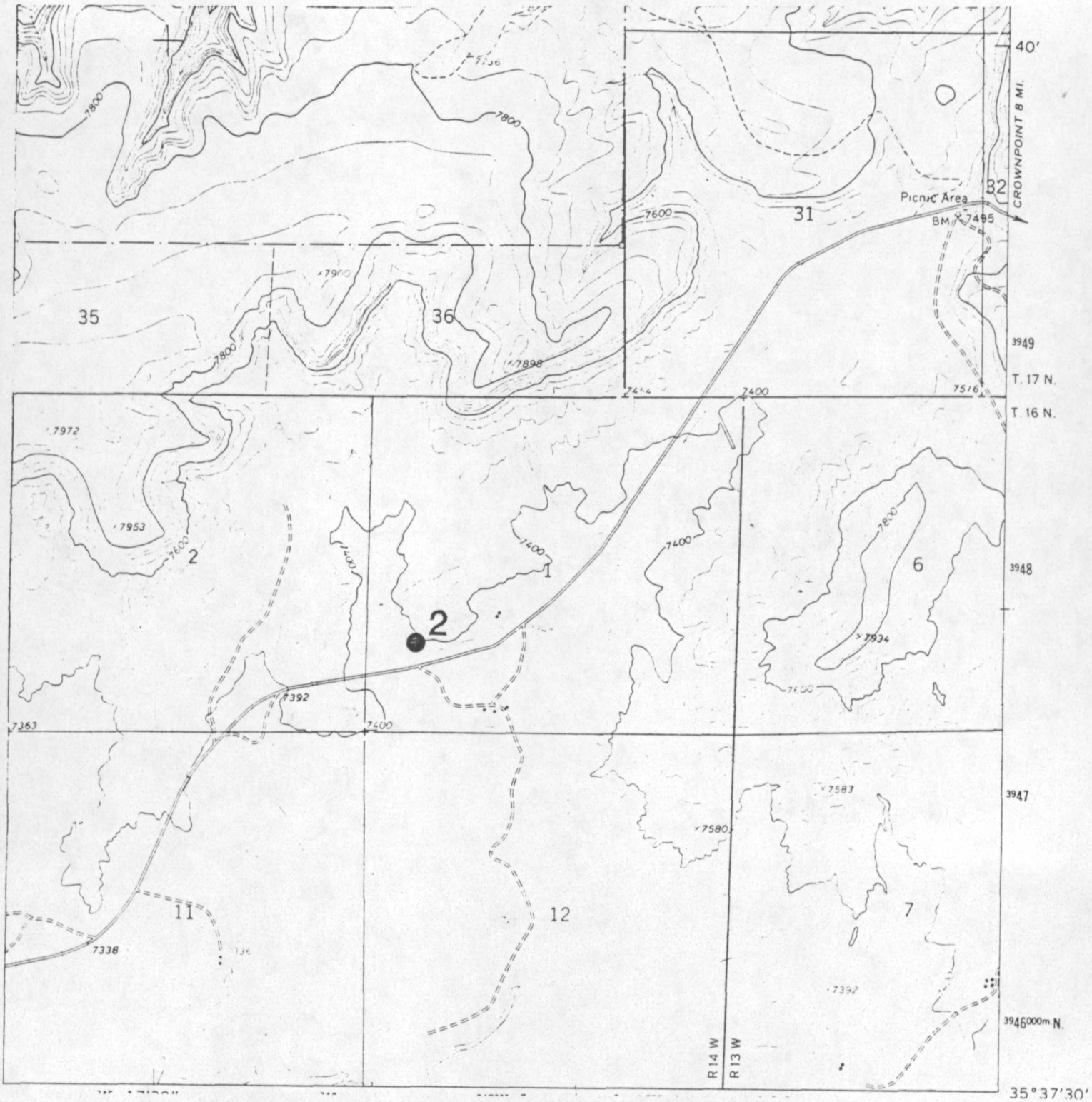

Figure 2. - Location of USGS Drill Hole 2, Dalton Pass 7 1/2' Quadrangle, T 16 N, R 14 W.

REFERENCES CITED

Reynolds, M. W., Ahlbrandt, T. S., Fox, J. E., and Lambert, P. W., 1975, Description of selected drill cores from Paleozoic rocks, Lost Soldier Oil Field, South Central Wyoming, Part 1: U.S. Geological Survey Open-File Report 75-662, 34 p.

USGS, 1981, Geophysical log suite from drill hole no 2, Mariano Lake-Lake Valley drilling project, McKinley County, New Mexico, USGS Open-File Report 81-172, 6 p.

Table 1. Descriptions of cuttings samples from Mariano Lake - Lake Valley Drilling Project, Hole No. 2, New Mexico

CHIP SAMPLE LOG FORM

Location: _____ Sec. 1 T. 16N R. 14W Quadrangle (7.5') DALTON PASS?

Hole No: S2 State: NEW MEXICO Date: 10/29/80

Company: U.S.G.S. County: McKINLEY Geologist: R. ZECH - D. MEUK

Lat/Long: 35°13'34" N 108°16'45" W Sheet 1 of 25.

Depth to bottom of sampled interval	Sample Number	Count/sec	Estimated % of Lithologies: Congl.	Sandst.	Siltst.	Shale	Shale Color	Coal	Limestone	Sandstones: Grain size	Sorting	Roundness	Feldspar	Carbonate	Pyrite	Access.	Sandstone Color	Formation/Member	COMMENTS MAY BE VALLY FILL
10	80-S2-10	110/110		20	20	60	5Y-6/4	-	-									MULATTO TONGUE MANCOS SHALE Kmm	SMALL IRONSTONE CHIPS
20	-20	110/110		15	25	60	5Y-4/4	-	-									Kmm	SILTSTONE IS LIMONITE STAINED
30	-30	120/110		20	20	60	5Y 4/4	-	-									Kmm	SILTSTONE IS LIMONITE STAINED
40	-40	110/110		30	30	40	5Y 4/4	-	-									Kmm	SMALL ROUNDED PEBBLES OF DISTINCT LIMONITE STAINED LARGE-CLEAR VEIN QUARTZ
50	-50	110/110		40	30	30	-	-	-	mL to cU	P	SR	O	1	1	1	10Y 4/2	Kmm	IRON STAINED CHIPS LIMONITE COLORED SILTSTONE.
60	-60	110/110		50	25	25	-	-	-	mL to cU	MP	SR	O	1	1	1	5Y 4/4	Kmm	IRON STAINED CHIPS LIMONITE COLORED SILTSTONE.
70	-70	110/110		-	20	80	N-4	-	-									Kmm/Kcdi DALCO COAL MBR. (CREVASSE CANYON) FM.	TRACE CARB. MATERIAL
80	-80	120/110		5	25	70	N-4	-	-									Kcdi?	CARB. FRAGMENTS IN SILTSTONE.
90	-90	120/110		40	20	40		-	-	fL	W	SR	O	TRACE	1	1	N5	Kcdi	CARB. MATERIAL ASSOCIATED W/ SANDSTONE.
100	-100	110/110		60	20	20		-	-	fU	W	SR	O	YES	1	1	N6	Kcdi	

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Table 1. Descriptions of cuttings samples from Mariano Lake - Lake Valley Drilling Project, Hole No. 2, New Mexico

CHIP SAMPLE LOG FORM

Location: _____ Sec. 1 T. 16N R. 14W Quadrangle (7.5') DALTON PASS

Hole No: S-2 State: NEW MEXICO Date: 10/29/80

Company: U.S.G.S. County: MCKINLEY Geologist: R. ZECH - D. MRUK

Lat/Long: _____ Sheet 2 of 25.

Depth to bottom of sampled interval	Sample Number	Cuttings/Core	Estimated % of Lithologies: Congl.	Sandst.	Siltst.	Shale	Shale color	Coal	Limestone	Sandstones: Grain Size	Sorting	Roundness	Feldspar	Carbonate	Pyrite	Access.	Sandstone Color	Formation/Member	COMMENTS
110	80-82-110	100/105		40	10	50	N-3			LF	M	W					N-6	Kcdi	
120	-120	100/105		60	10	30	N-3			LF-UF	M-W	SR		DISS FLECKS			N-6	Kcdi	MOSTLY DISSAGREGATED NO CHIPS
130	-130	115/105		50	10	40	N-4			LF-UF	M-W	SR		FLECKS IN SS			N-6	Kcdi	SS IN WELL CEMENTED CHIPS
140	-140	105/105		60	20	20	N-3			LM	M	SR		FRAG. IN SS			N-6	Kcdi	
150	-150	110/105		60	20	20	N-3			UF	M-W	SR					N-6R	Kcdi	
160	-160	110/105		40	30(?)	30	N-3R			UF	M	SR		TRACE FLECKS			N-6R	Kcdi	
170	-170	120/105		50	20	30	N-3R			LF	MW	SR		FRAGS			N-6R	Kcdi	
180	-180	105/105		60	20	20	N-3R			UVF	W	SR-R		FRAGS IN SS			N-6R	Kcdi	FEW CHIPS OF CARB SHALE. INDURATE SS FRAG
190	-190	110/105		60	10	30	N-3R			UVF	W	SR		DISS. CARB. FLECKS			N-6R	Kcdi	FEW CHIPS OF CARB SHALE.
200	-200	110/105		30	20	50	N-3R			UF-UVF	W	SR		FLECKS			N-5R	Kcdi	CARB SHALE

Table 1. Descriptions of cuttings samples from Mariano Lake - Lake Valley Drilling Project, Hole No. 2, New Mexico

Depth to bttm of Sampled Interval	Sample Number	Cuttings/Sec	Estimated % of Lithologies							Sandstones								Formation/Member	COMMENTS
			Congl.	Sandst.	Siltst.	Shale	Shale Color	Coal	Limestone	Grain Size	Sorting	Roundness	Feldspar	Carbonates	Pyrite	Access.	Sandstone Color		
210	80-52-24	110/105		60	10	30	N-3			LF	MW	SR		FRAG			N-7	Kcdi	
220	-220	110/105		50	10	40	N-3	✓		LF -UF	MW	SR-R					N-4	Kcdi	
230	-227	105/105		60	10	30	N-3			LF	W	SA-SR		FLECKS		GRN? BLK	N-6	Kcdi	SHALE PARTING IN SS
240	-24	110/105		70	10	20	N-3			VFU	W	SR-R		FRAG		GRN BLK	N-6	Kcdi	HEM. STAINED SS. CARB. SHALE
250	-25	110/105		60	20	20	N-3			VFU	W	SR		FRAG		GRN BLK ORG	N-7	Kcdi	CARB. SHALE
260	-260	105/105		60	10	30	N-3	FRAGS IN SHALE ✓		LF	W	SR-SA		FRAG		BLK	N-6	Kcdi	CARB. SHALE
270	-27	110/105		60	10	30	5YR 5/1			UF	MW	SR-SA		DEC. FLECK		BLK	N-7	Kcdi	CARB SHALE
280	-28	110/105		70	20	10	5YR 5/1			LF-UF	F	SA		DEC. FLECK		GRN BLK	N-4	Kcdi	—
290	-29	110/105		70	20	10	N-3			UF	W	SR-R		FLECK		Mott. stained BLK & BLK	N-6	Kcdi	CARB SHALE
300	-30	110/105		30	10	60	N-3			U-F	W	SA-SR		FINE DEC		BLK	N-6	Kcdi	CARB. SHALE

CHIP SAMPLE LOG FORM

Location: _____ Sec. 1 T. 16N R. 14W Quadrangle (7.5') DALTON PASS

Hole No: S-2 State: NEW MEXICO Date: 10/29/80

Company: U.S.G.S. County: McKINLEY Geologist: R. FECH - D. MURK

Lat/Long: _____ Sheet 3 of 25.

Table 1. Descriptions of cuttings samples from Mariano Lake - Lake Valley Drilling Project, Hole No. 2, New Mexico

Depth to bottom of sampled interval	Sample number	Cuttings/sec	Estimated % of Lithologies							Sandstones								Formation/Member	COMMENTS
			Congl.	Sandst.	Siltst.	Shale	Shale color	Coal	Limestone	Grain size	Sorting	Roundness	Feldspar	Carbonate	Pyrite	Access.	Sandstone Color		
310	80-S2-310	105/100		60	10	30				UVF-LF	MW	SA-SR		Frags		blk gn		Kcdi	CARB. SHALE SLST IS LIMONITE STAINED ONE UVC QTZ GRAIN
320	-320	105/100		40	20	40				LF-LM	M	SA		Diss Frags		blk		Kcdi	CARB SHALE
330	-330	105/100		60	10	30				LF	M	SA		Flecks		O		Kcdi	
340	-340	105/100		60	10	25				UF	M	SA		Frags		blk		Kcdi	NO CHIPS.
350	-350	110/100		70	5	30				UF-LM	M	SA		Frags		dk min		Gallup Ss. Kg/Kcdi	CARB. SHALE
360	-360	110/100		70	0	20				UF-LM	M-W	SA-SR		Diss Frags		blk		Kg	CARB. SHALE (? WASH)
370	-370	110/100		80	0	20				UF	M-W	SR		Diss Frags		blk (?)		Kg	COMPLETLY. DISSAGG.
380	-380	110/100		80	0	20				UF	MW	SR		Frags		blk		Kg	
390	-390	110/100		80	0	20				UF	MW	SR		Diss Frags		blk		Kg	
400	-400	110/100		80	0	20				LF-UF-LM	M	SR-SA		Diss Frags		dk (?)		Kg	

CHIP SAMPLE LOG FORM

Location: _____ Sec. 1 T. 16N R. 14W Quadrangle (7.5') DALTON PASS

Hole No: S-2 State: NEW MEXICO Date: 10/29/81

Company: U.S.G.S. County: McKINLEY Geologist: R. Zeck - L. Gurdess

Lat/Long: _____ Sheet 4 of 25.

Table 1. Descriptions of cuttings samples from Mariano Lake - Lake Valley Drilling Project, Hole No. 2, New Mexico

Depth to bttm of sampled interval	Sample Number	Cuttings/Size	Estimated % of Lithologies							Sandstones								Formation/Member	COMMENTS
			Congl.	Sandst.	Siltst.	Shale	Shale color	Coal	Limestone	Grain Size	Sorting	Roundness	Feldspar	Carbonates	Pyrite	Access.	Sandstone Color		
410	80-52 410	110/100	-	80	0	20	N-4	✓	-	FL	M	SR	-	FLECKS	-	BIK	N-7	Kg(?)	CARB. SHALE
420	-420	110/100	-	80	0	80	N-3	✓	-	FU	M	SR	-	FLECKS STRINGERS	-	BIK	N-7	Kg	
430	-430	110/100	-	40	0	60	N-3	TR	-	FL	W	SR	-	FLECKS	-	-	N-6	Kg	
440	-440	110/100	-	70	0	30	5Y 2/1	✓	-	FL	MW	SR-SA	-	FLECKS	-	-	N-6	Kg	
450	-450	110/100	-	60	0	40	N-3	✓	-	FL	MW	SR-SA	-	FLECKS TRACE	-	-	N-7	Kg	
460	-460	105/100	-	80	0	20	N-3	TR	-	vFU	W	SR	-	-	-	BIK	N-7	Kg	
470	-470	105/100	-	70	0	30	5YR 3/1	-	-	vFU	W	SR	-	TRACE FLECKS	-	BIK	N-6	Kg	
480	-480	105/100	-	80	0	20	N-3	-	-	vFU	W	SR-SA	-	-	-	BIK	N-7	Kg	
490	-490	110/100	-	60	0	40	N-2	✓	-	vFU	W	SR	-	-	-	-	N-7	Kg	GRN. SHALE CHIPS
500	-500	100/100	-	70	0	30	5Y 2/1 N-2	-	-	vFU	MW	SA	-	-	-	-	N-6 / N-8	Kg	CAN DISTINGUISH 2 SHALES & 2. SANDSTONES

CHIP SAMPLE LOG FORM

Location: _____ Sec. 1 T. 16N R. 14W Quadrangle (F.S.) DALTON PASS

Hole No: S-2 Date: 10/29/80

Company: U.S.G.S. State: NEW MEXICO Geologist: GUNDERSON — ZECH

County: McKINLEY

Lat/Long: _____ Sheet 5 of 25.

Table 1. Descriptions of cuttings samples from Mariano Lake - Lake Valley Drilling Project, Hole No. 2, New Mexico

Depth to top of sampled interval	Sample number	Cuttings/sec	Estimated % of lithologies							Sandstones								Formation/Member	COMMENTS
			Congl.	Sandst.	Siltst.	Shale	Shale color	Coal	Limestone	Grain size	Sorting	Roundness	Feldspar	Carbonate	Pyrite	Access.	Sandstone Color		
510	80-S2-510	105/100		10	-	90	N-2	TR		vfU	M	SA					N-6	Km	RISIDUAL SANDSTONE FROM FOOTAGE ABOVE.
520	-520	110/100		10	-	90	N-2	-		vfU	M	SA					N-6	Km	
530	-530	110/100		10	10	80	N-2	TR						DIS FLECKS			N-6	Km	
540	-540	110/100		-	10	90	5YR 2/1	-										Km	
550	-550	110/100		-	5	95	N-2	✓						DIS. FLECKS				Km	
560	-560	110/100		-	5	95	N-2	-										Km	MANCOS BECOMING SILTIER.
570	-570	110/100		10	5	85	N-2	✓		FU	MW	SR-SA		FLECKS			N-5	Km	LIMMONITE STAINED SILTSTONE. CALCITE GRAINS
580	-580	110/100		TR	20	80	N-2	-									N-5	Km	SAND IN MATRIX MANCOS SILTY CALCITE, PEBBLE QTZ GRAIN.
590	-590	110/100		-	-	100	N-2	-										Km	SILTY MANCOS GRN. SHALE (5GY 2/1)
600	-600	110/100		10	-	90	N-2	✓		PL	MW					BIK		Km	SILTY - SHALE CALCITE

CHIP SAMPLE LOG FORM

Location: _____ Sec. 1 T. 16N R. 16W Quadrangle (7.5') DALTON PASS

Hole No: S-2 State: NEW MEXICO Date: 10/29/80

Company: _____ County: MCKINLEY Geologist: GUNDERSON - ZECH

Lat/Long: _____ Sheet 6 of 25.

Table 1. Descriptions of cuttings samples from Mariano Lake - Lake Valley Drilling Project, Hole No. 2, New Mexico

Depth to bttm of sampled interval	Sample Number	Cuttings/Sec	Estimated % of Lithologies							Sandstones								Formation/Member	COMMENTS
			Congl.	Sandst.	Silts.	Shale	Shale color	Coal	Limestone	Grain Size	Sorting	Roundness	Feldspar	Carbonat.	Pyrite	Alteres.	Sandstone Color		
610	80-52-610	110/100		TRACE		100	N-3											Km (con't)	UVC QTZ GRAIN SILTY SHALE
620	-620	110/100		TRACE		100	N-2	TRACE						FLECKS				Km	SILTY SHALE SAND IN MATRIX
630	-630	115/100				100	N-2							FLECKS				Km	SILTY
640	-640	110/100		5		95	5YR 2/1			LF	W	SR					N-6	Km	CALCITE SILTY
650	-650	115/100		TRACE		100	5YR 2/1											Km	SILTY
660	-660	115/100				100	5YR 2/1	TRACE										Km	SILTY
670	-670	115/100		TRACE		100	N-2											Km	SILTY
680	-680	115/100		5	35	60	N-2											Km	TRACE CALCITE
690	-690	120/100				100	N-3											Km	CALCITE SILTY
700	-700	110/100				100	N-3											Km	LT. GRN MONT. DST CLAST SILTY SHALE

CHIP SAMPLE LOG FORM

Location: _____ Sec. 1 T. 16N R. 14W Quadrangle (7.5') DALTON PASS

Hole No: S-2 State: NEW MEXICO Date: 10/29/80

Company: U.S.G.S. County: McKINLEY Geologist: MARLY - ZECH

Lat/Long: _____ Sheet 7 of 25.

CHIP SAMPLE LOG FORM

Location: _____ Sec. 1 T. 16N R. 14W Quadrangle (7.5') DALTON PASS

Hole No: S-2 State: NEW MEXICO Date: 10/29

Company: U.S.G.S. County: McKINLEY Geologist: MEHL — GUNDERSON

Lat/Long: _____ Sheet 3 of 25.

Description of Drill Cuttings
Varley Drilling Co. [illegible]

Depth to bottom of Sampled Interval	Sample Number	Comb/Sca	Estimated % of Lithologies: Congl.	Sandst.	Siltst.	Shale	Shale Color	Coal	Limestone	Sandstones: Grain Size	Sorting	Roundness	Feldspar	Carbonate	Pyrite	Access.	Sandstone Color	Formation/Member	COMMENTS
710	80-52-710	110/100				100	N-3											Km (cont)	CALCITE SILTY
720	-720	110/100		TRACE	10	90	N-3											Km	SILTY
730	-730	115/100				100	N-3											Km	CALCITE SILTY
740	-740	115/100			10	90	N-3							FLECKS				Km	CALCITE SILTY
750	-750	110/100			5	95	N-3	TRACE						FLECKS				Kmj (?) Juana Lopez	CALCITE SILTY MBr - MANCOS SHALE
760	-760	115/100			5	95	5YR 3/1	TRACE										Kmj	CALCITE SILTY
770	-770	115/100			5	95	5YR 3/1		✓ (DARK)									Kmj	SILTY
780	-780	115/100			5	95	5YR 3/1											Kmj	TRACE CALCITE SILTY
790	-790	110/100				100	5YR 2/1											Kmj	CALCITE
800	-800	110/100			5	95	5YR 2/1											Kmj	CALCITE SILTY

Descriptions of cuttings samples from Garland Lake - Valley Drilling Project - Well No. 2, New Mexico

CHIP SAMPLE LOG FORM

Location: _____ Sec. 1 T. 16N R. 14W Quadrangle (7.5') DALTON PASS

Hole No.: S-2 State: New Mexico Date: 10/29/81

Company: U.S.G.S. County: McKINLEY Geologist: GUNDERSON - MELK

Lat/long: _____ Sheet 9 of 25.

Depth to bottom of sampled interval	Sample Number	Cuttings/Sec	Estimated % of Lithologies							Sandstones								Formation/Member	COMMENTS
			Congl.	Sandst.	Siltst.	Shale	shale color	Coal	Limestone	Grain Size	Sorting	Roundness	Feldspar	Carbonate	Pyrite	Access.	Sandstone Color		
810	80-S2-810	110/100		TR	5	95	5YR 2/1	-	-									Km	CALCITE SLIGHTLY SILTY SHALE
820	-820	110/100		-	5	95	5YR 2/1	-	-									Km	SILTY CALCITE QTZ. GRAINS (COARSE?)
830	-830	110/100		TR	-	100	N-2	-	-									Km	SILTY SHALE TRACE SAND IN MATRIX CALCITE
840	-840	110/100		TR	5	95	N-2	-	-					FLECKS				Km	SAND TRACE IN MUD
850	-850	120/100		-	TR	1-100	N-2	-	-									Km	SILTY CALCITE
860	-860	110/100		TR	-	100	N-2	-	-									Km	SILTY CALCITE
870	-870	105/100		TR	5	95	N-2	-	-									Km	CALCITE TRACE SHALE NOT VERY SILTY
880	-880	110/100		-	-	100	N-2	-	-									Km	SLIGHTLY SILTY IN PLACES CALCITE
890	-890	110/100		-	-	100	N-2	-	-									Km	SLIGHTLY SILTY IN PLACES CALCITE POSSIBLE PLANT FRAG. (?)
900	-900	110/100		-	-	100	N-2	-	-									Km	SLIGHTLY SILTY CALCITE

Table I. Descriptions of cuttings samples from Mariano Lake - Lake Valley Drilling Project, Hole No. 2, New Mexico

Depth to bttm of Sampled Interval	Sample Number	Cuttings/Core	Estimated % of Lithologies							Sandstones								Formation/Member	COMMENTS
			Congl.	Sandst.	Siltst.	Shale	Shale Color	Coal	Limestone	Grain Size	Sorting	Rounded	Feldspar	Carbonat.	Pyrite	Access.	Sandstone Color		
910	80-52-910			-	-	100	N-2											Km	CALCITE
920	-920			-	-	100	N-2	TR ✓										Km	SILTY SHALE CALCITE
930	-930			-	-	100	N-2											Km	CALCITE SLIGHTLY SILTY
940	-940			-	-	100	N-2											Km	
950	-950			-	-	100	5YR 2/1											Km	SLIGHTLY SILTY
960	-960			TR	-	100	N-2											Km	QTZ. GR. mL CALCITE
970	-970			-	-	100	N-2											Km	SOME SILTY SHALES CALCITE
980	-980			-	-	100	N-2											Km	CALCITE
990	-990			-	-	100	N-2											Km	SLIGHTLY SILTY SHALE CALCITE
1000	-1000			-	-	100	N-2											Km	CALCITE

CHIP SAMPLE LOG FORM

Location: _____ Sec. 1 T. 16N R. 14W Quadrangle (7.5') DALTON PASS

Hole No.: 2 State: New Mexico Date: 10/30/80

Company: U.S.G.S. County: McKinley Geologist: MRUK - GUNDERSON

Lat/Long: _____ Sheet 10 of 25.

Table 1. Descriptions of cuttings samples from Mariano Lake - Lake Valley Drilling Project, Hole No. 2, New Mexico

CHIP SAMPLE LOG FORM

Location: _____ Sec. 1 T. 10N R. 16W Quadrangle (7.5') DALTON PASS

Hole No: 2 Date: 10/30/80

Company: U.S.G.S. State: NEW MEXICO Geologist: GUNDERSON - MEULK

County: McKINLEY Lat/Long: _____ Sheet 11 of 25.

Depth to Bttm of Sampled Interval	Sample Number	Cuttings/Ice	Estimated % of Lithologies							Sandstones								Formation/Member	COMMENTS
			Congl.	Sandst.	Siltst.	Shale	Shale color	Coal	Limestone	Grain Size	Sorting	Roundness	Feldspar	Carbonate	Pyrite	Access.	Sandstone Color		
1010	80-52-1010	110/105		–	–	100	N-2											Km	CALCITE
1020	-1020	110/105		–	–	100	N-2											Km	
1030	-1030	115/105		–	–	100	N-2											Km	SLIGHTLY SILTY CALCITE GYPSUM (?)
1040	-1040	110/105		TR	–	100	5YR 2/1											Km	CALCITE
1050	-1050	105/105		–	5	1/95	5YR 2/1											Km	CALCITE
1060	-1060	110/105		TR	5	95	5YR 2/1							FLECK				Km	CALCITE
1070	-1070	110/105		–	5	95	N-2							FLECKS				Km	CALCITE
1080	-1080	105/105		–	–	100	5YR 2/1 / N-2											Km	CALCITE
1090	-1090	115/105		–	5	95	N-2											Km	GYPSUM (?)
1100	-1100	115/105		TR	5	95	N-2											Km	CALCITE LIMONITE STAINED SILTSTONE

Table I. Descriptions of cuttings samples from Mariano Lake - Lake Valley Drilling Project, Hole No. 2, New Mexico

CHIP SAMPLE LOG FORM

Location: _____ Sec. 1 T. 16N R. 14W Quadrangle (7.5') DALTON PASS

Hole No.: S-2 State: NEW MEXICO Date: 10/30/80

Company: U.S.G.S. County: McKINLEY Geologist: Gundersen - Mark

Lat/Long: _____ Sheet 12 of 25.

Depth to bottom of Sampled Interval	Sample Number	Cuttings/Core	Estimated % of Lithologies: Congl.	Sandst.	Siltst.	Shale	Shale Color	Coal	Limestone	Sandstones: Grain Size	Sorting	Roundness	Feldspar	Carbonate	Pyrite	Access.	Sandstone Color	Formation/Member	COMMENTS
1110	80-S2-110	105/105		TR	5	95	5YR 2/1											Km	SILTY SHALE CALCITE GYPSUM (?)
1120	-1120	105/105		-	-	100	N-2											Km	SLIGHTLY SILTY CALCITE
1130	-1130	105/105		2	-	98	N-3											Km	SILTY CALCITE
1140	-1140	105/105		-	TR	100	N-3											Km	LIMMONITIC SILTSTONE!
1150	-1150	105/105		-	5	95	N-3											Km	CALCITE
1160	-1160	110/105		-	5	95	N-2											Km	LIMMONITIC SILTSTONE CALCITE
1170	-1170	110/105		-	-	100	N-2											Km	CALCITE
1180	-1180	105/105		-	5	95	N-2											Km	CALCAREOUS SILTSTONE LIMMONITIC SILTSTONE
1190	-1190	110/105		TR	5	95	N-2											Km	CALCITE SILTY SHALE
1200	-1200	100/105		-	5	95	N-2											Km	CALCITE SILTY

Table 1. Descriptions of cuttings samples from Mariano Lake - Lake Valley Drilling Project, Hole No. 2, New Mexico

Depth to bttm. of sampled interval	Sample Number	Cuttings/Sec	Estimated % of Lithologies							Sandstones								Formation/Member	COMMENTS
			Congl.	Sandst.	Siltst.	Shale	Shale Color	Coal	Limestone	Grain Size	Sorting	Roundness	Feldspar	Carbonate	Pyrite	Access.	Sandstone Color		
1210	80-52-1210	115/100		30	-	70				UF/UM	F-P	SA						Km	
1220	-1220	120/100		20	-	80				Lower UVF	F	SA					SMALL BRIGHT RED GRAINS	Km	
1230	-1230	100/100		15	-	85				Lower fine	M	SA						Km	
1240	-1240	110/100		20	-	80				upper very fine lower fine	M	SA						Km	
1250	-1250	110/100		40	-	60				UM-1F	M-P	SA-A					SHELL FRAGS	Two Wells Tongue of Dakota Ss K-25	LIMONITE STAINED CALCITE CEMENTED CHIPS
1260	-1260	110/100		50	-	50				UVC UF	F-P	SA-A			✓			Kdt	
1270	-1270	110/100		50	-	50				1C UF	P	SA-SR			✓			Kdt	
1280	-1280	110/100		30	-	70				M	M	SA						Whitewater Arroyo Tongue of Mancos Shale Kdt/Kmw	
1290	-1290	110/100		20	-	80				LC-LM	P	SA						Kmw	Limonite Stained
1300	-1300	110/100		10	-	90				UF	M	SA			✓(?)			Kmw	

CHIP SAMPLE LOG FORM

Location: _____ Sec. 1 T. 16N R. 14W Quadrangle (7.5') Dexter Pass

Hole No.: S2 State: New Mexico Date: 10/30/80

Company: U.S.G.S. County: McKinley Geologist: Zech, Hammond

Lat/Long: _____ Sheet 13 of 25.

Table 1. Descriptions of cuttings samples from Mariano Lake - Lake Valley Drilling Project, Hole No. 2, New Mexico

Depth to bttm of Sampled Interval	Sample Number	Cuttings/Size	Estimated % of Lithologies: Congl.	Sandst.	Siltst.	Shale	Shale color	Coal	Limestone	Sandstones: Grain Size	Sorting	Roundness	Feldspar	Carbonac.	Pyrite	Access.	Sandstone Color	Formation/Member	COMMENTS
1310	80-52-1310			20	-	80				U-L F	M	SR-SA						Kmw	MATTY GRAINS LIMONITE STAINED.
1320	-1320			30	-	70				LC UF	MP	SA-SR						Kmw	
1330	-1330			40	-	60				UC/UF	FP	SA-SR				DARK MIN		DAKOTA SS Kmw/Kd	LIMONITE STAINED SAND GRAINS
1340	-1340			60	-	40				UC/UF	MP	SA-SR						Kd	
1350	-1350			70	-	30				LC/UF	P	SA-SR		✓				Kd	
1360	-1360			70	-	30				UC/UF	P	SA-SR		✓	✓	BLK MIN		Kd	
1370	-1370			60	-	40				UF/UM	MP	SR		✓				Kd	SOME OF FINER LIMONITE STAINED
1380	-1380			70	-	30				LF-VFU	W	SR						Kd	FEW VERY COARSE GRAINS
1390	-1390			75	-	25				LF	W	SR		✓				Kd	FEW VERY COARSE GRAINS SOME LIMONITE STAINS
1400	-1400			60	-	40				UF-LF	W	SA-SR		flecks ✓	flecks ✓	GRN Chlorite		Kd	

CHIP SAMPLE LOG FORM

Location: _____ Sec. 1 T. 16W R. 14W Quadrangle (F.S.) DALTON PASS

Hole No: S-2 State: NEW MEXICO Date: 10/30/80

Company: _____ County: MCKINLEY Geologist: HAMMOND - FOSTER

Lat/Long: _____ Sheet 14 of 25.

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Table 1. Descriptions of cuttings samples from Mariano Lake - Lake Valley Drilling Project, Hole No. 2, New Mexico

Depth to bottom of sample interval	Sample number	Cuttings/sec	Estimated % of lithologies: Congl.	Sandst.	Siltst.	Shale	Shale color	Coal	Limestone	Sandstones: Grain size	Sorting	Roundness	Feldspar	Carbonac.	Pyrite	Access.	Sandstone color	Formation/Member	COMMENTS
1410	80-S2-MC	100/100	-	60	-	40				F	W	SA-SR						Kd	CHERT GRAINS
1420	-1420	100/100	-	60	-	40				Vc Mostly UF	W	Sr			✓			Kd	
1430	-1430	105/100	-	70	-	30				F	W	Sr		✓				Kd	WHITE CHERT
1440	-1440	110/100	-	80	-	20				LF-LM	W	R-Sr		✓	✓	GRN		Kd	CRNG GRAINS
1450	-1450	100/100	-	70	-	1-30				F & LVC	M	Sr			✓			Kd	WHITE CHERT
1460	-1460	115/100	-	70	-	30				F-UC	M	Sr-Sa		✓		GRN		Kd	
1470	-1470	105/100	-	40	-	60		✓		UF-LM	M	Sr		Trace		LOTS OF GRN		BRUSHY BASIN Kd / Jmb	Mor. MORRISON FORMATION
1480	-1480	110/100	-	60	-	40				UF-UM	M	Sr-Sa		Trace	✓			Jmb	WHITE CHERT
1490	-1490	115/100	-	60	-	40				UF-LM	MW	Sr		✓	✓			Jmb	
1500	-1500	110/100	-	50	-	50				UF-LM	MW	Sr		Trace	Trace Ø			Jmb	WHITE CHERT

CHIP SAMPLE LOG FORM

Location: _____ Sec. 1 T. 16N R. 14W Quadrangle (7.5') DALTON PASS

Hole No: S-2 State: NEW MEXICO Date: 10/30/80

Company: U.S.G.S. County: McKINLEY Geologist: KIRK GUNDERSON

Lat/Long: _____ Sheet 15 of 23.

Table 1. Descriptions of cuttings samples from Mariano Lake - Lake Valley Drilling Project, Hole No. 2, New Mexico

CHIP SAMPLE LOG FORM

Location: _____ Sec. 1 T. 14N R. 14W Quadrangle (7.5') DALTON PASS

Hole No: S2 State: NEW MEXICO Date: 10/20/80

Company: U.S.G.S. County: MCKINLEY Geologist: KIRK CUNDERSON

Lat/Long: _____ Sheet 16 of 25.

Depth to bottom of sampled interval	Sample number	Cuttings/Sec	Estimated % of Lithologies: Congl.	Sandst.	Siltst.	Shale	Shale color	Coal	Limestone	Sandstones: Grain Size	Sorting	Roundness	Feldspar	Carbonac.	Pyrite	Access.	Sandstone Color	Formation/Member	COMMENTS
1510	80-92 -1510	110/105		95		2 3	5Y 6/1 N2			LM	MW	Sr	TRACE	0	0	LT. GRY DK. CHERT	5Y 6/1	Jmb	
1520	-1520	115/105		98		2	TRACE of ABOVE			LM	MW	Sr	TRACE	0	0		5Y 6/1	Jmb	
1530	-1530	110/105		40		60	TRACE OF GREEN N4			LM	MW	Sr	0	?	0	GYP	5Y 6/1	Jmb	
1540	-1540	110/105		15		85	TRACE OF GREEN N3		✓				TRACE	✓				Jmb	
1550	-1550	110/105		20		60 20	BLK-N3 GREEN			UF		Sr		*✓		RED CHERT		Jmb	
1560	-1560	110/105		10		40 50	GREEN BLK								✓ LOTS			WEST WATER CANYON Mbr. MORRISON FORM. Jmb/Jmw	
1570	-1570	115/105		40		10 40	BLK GREEN			UC	P	Sr-Sa	1%	?	✓ W BH.	RED CHERT		Jmw	
1580	-1580	110/105		80		10 10	BLK GREEN			UC	P	Sa	4%	0	0	RED CHERT		Jmw	
1590	-1590	110/105		80		15 5	BLK GREEN			LVC	P	Sa	6%	0	0	0		Jmw	
1600	-1600	105/105		83		10 2	BLK GREEN			UC & UVC	P	Sa	LARGE	0		RED CHERT		Jmw	

Table 1. Descriptions of cuttings samples from Mariano Lake - Lake Valley Drilling Project, Hole No. 2, New Mexico

CHIP SAMPLE LOG FORM

Location: _____ Sec. 1 T. 14N R. 14W Quadrangle (7.5') DALTON PASS

Hole No: 52 Date: 10/30/80

Company: U.S.G.S. State: New Mexico Geologist: Kirk Gunderson

County: McKinley

Lat/Long: _____ Sheet 17 of 25.

Depth to bottom of Sampled Interval	Sample Number	Cmnt/Sec	Estimated % of Lithologies: Congl.	Sandst.	Siltst.	Shale	Shale Color	Coal	Limestone	Sandstones: Grain Size	Sorting	Roundness	Feldspar	Carbonate	Pyrite	Access.	Sandstone Color	Formation/Member	COMMENTS
1610	80-52 -1610	105/105		90		1 9	GREEN BLK			UC	P	Sa	5	NO	NO	RED CHERT	5Y 4/1	Jmw WESTWATER CANYON	HEMATITE STAINS ON SOME QTZ GRAINS
1620	-1620	110/105		90		10	GREY			LC	P	Sa	5				5Y 4/1	Jmw	HEMATITE STAINS ON SOME QTZ GRAIN
1630	-1630	110/105		80		18 2	BLK GREEN			UC	P	Sa	7			RED CHERT	5Y 4/1	Jmw	HEMATITE STAINS ON SOME QTZ GRAINS
1640	-1640	110/105		90		10	GREY-BLK			LC	P	Sa-Sr	5			RED CHERT	5Y 4/1	Jmw	
1650	-1650	110/105		80		5 15	GREEN GREY			Some Feldspar grains UC	P	Sa	6-7				5Y 4/1	Jmw	SOME FELDSPAR GRAINWILD
1660	-1660	110/105		90		2 8	GREEN BLK			Feld. grains UC	P	Sa	6-7				5Y 4/1	Jmw	
1670	-1670	110/105		90		10	GREY			UC	P	Sa	5			RED CHERT RED LITHIC MOST (or Silicst.)	5Y 4/1	Jmw	
1680	-1680	120/105		95		5	BLK			Feld. grains UC	P	Sa	4				5YR 6/1	Jmw	HEMATITE STAINES ON SOME QTZ GRAINS
1690	-1690	110/105		85		15	DRK GREY			Some UC LC	F	Sa-Sr	4			RED LITHIC FRAG	5YR 6/1	Jmw	
1700	-1700	115/105		80		20	GREY			Some UC LC	F	Sa-Sr	5			RED & BLK CHT RED LITHIC		Jmw	HEMATITE STAINES ON SOME QTZ GRAINS

Table 1. Descriptions of cuttings samples from Mariano Lake - Lake Valley Drilling Project, Hole No. 2, New Mexico

CHIP SAMPLE 106 FORM

Location: _____ Sec. 1 T. 14N R. 14W Quadrangle (7.5') Dancing Pass

Hole No.: S2 State: New Mexico Date: 10/30/80

Company: U.S.G.S. County: McKinley Geologist: Kirk Gunderson

Lat/long: _____ Sheet 18 of 25.

Depth to bottom of Sampled Interval	Sample Number	Cuttings/Sec	Estimated % of Lithologies: Congl.	Sandst.	Siltst.	Shale	Shale Color	Coal	Limestone	Sandstones: Grain Size	Sorting	Roundness	Feldspar	Carbonates	Pyrite	Access.	Sandstone Color	Formation/Member	COMMENTS
1710	80-52-110	110/110		97		3	GREY			LC	F	Sr-Sa	3			BLK CHT / RED LITHIC FRAG	10R 6/2	WESTWATER CANYON Jmw	WESTWATER Canyon Facies Fairly well oxidized at this pt - 30' transition zone. Hematite stained qtz
1720	-1720	110/110		98		2	BLK			UC grains LC	F	Sr-Sa	2-3			GREEN CHIPS	10R 6/2	Jmw	
1730	-1730	110/110		98		2	GREY			UC	F	Sr-Sa	3			RED LITHIC FRAG / GREEN MUDSTONE	10R 6/2	Jmw	LARGE FELDSPAR GRANULES HEMATITE STAINED QTZ
1740	-1740	110/110		95		5	GREY			LC	F	Sr-Sa	3				10R 6/2	Jmw	FELDSPAR GRANULES HEMATITE STAINED QTZ
1750	-1750	120/110		95		1 4	GREEN GREY			UC	F	Sr-Sa	3-4				10R 6/2	Jmw	HEMATITE STAINED QTZ
1760	-1760	110/110		95		1 4	GREEN GRAY			SOME UC LC	F	Sr-Sa	3-4				10R 6/2	Jmw	GASTROPOD FRAG HEMATITE STAINED QTZ LARGE FELD. GRANULES
1770	-1770	110/110		95		5	BLK			GRANULE LC	F	Sr-Sa	4-5			BLK CHT / RED LITHIC FRAG / GRN MUD CHIPS	10R 6/2	Jmw	HEMATITE STAINED QTZ
1780	-1780	120/110		95		5	BLK			FELD. GRAN. LC	F	Sr-Sa	3			RS CHIPS / GRN MUD CHIPS	10R 6/2	Jmw	HEMATITE STAINED QTZ
1790	-1790	110/110		98		2	BLK			UC	F	Sr-Sa	3			WHITE / RED LITHIC / GRN MUDS	10R 6/2	Jmw	LOTS OF HEMATITE STAINED QTZ
1800	-1800	110/110		80		5 15	GREEN GREY			FELD. GRAN. LC-UC	P	Sr-Sa	3			LCR CHT / GRN MUDS / BLK CHT	10R 6/2	Jmw	LOTS OF HEMATITE STAINED QTZ.

Table 1. Descriptions of cuttings samples from Mariano Lake - Lake Valley Drilling Project, Hole No. 2, New Mexico

Depth to bttm of sample interval	Sample Number	Cont/Sec	Estimated % of Lithologies: Congl.	Sandst.	Siltst.	Shale	Shale color	Coal	Limestone	Sandstones: Grain size	Sorting	Roundness	Feldspar	Carbonate	Pyrite	Access.	Sandstone Color	Formation/Member	COMMENTS
1810	80-62-1810	110/110		80		(2-3) 20	GRN BLK			LC-VF	P	Sa-Sr	2		✓	WHITE CHERT / GRN MUDST	10R4/2	Jmr(?)	HEMATITE STAINED QTZ
1820	1820	110/110		70		(5) 30	GRN BLK			LF-LC	P	Sa-r	2			WHITE CHERT / GRN MUDST	10R4/2	Jmr(?)	TRANSLUCENT GRN GRAIN FELDSPAR GRANULAR HEMATITE STAINED QTZ
1830	1830	120/110		80		(2-3) 20	GRN BLK			LF-LC	P	Sr-r	TRACE			WHITE & GRN CHERT	10R4/2	Jmr(?)	HEMATITE STAINED QTZ Feld GRANULARS
1840	1840	110/110		70		5 25	GRN BLK			LM-LC	P	Sr-r	3	✓		RED LITHIC FRAG / WHITE CHERT	1-2% 10R4/2	Jmr(?)	HEMATITE STAINED QTZ
1850	1850	110/110		85		(3) 15	GRN BLK			LM-LC	P	Sr-r	3		✓		10R4/2	Jmr(?)	HEMATITE STAINED QTZ. LIMONITE STAINED LITHIC FRAG. LARGE Feld. GRANULES
1860	1860	110/110		85		3 12	GRN BLK			UF-LC	P	Sr-r	2			RED LITHIC FRAG	10R4/2	Jmr(?)	HEMATITE STAINED QTZ LIMONITE STAINED LITHIC FRAG.
1870	1870	110/110		85		3 12	GRN BLK			UF-LC	P	Sr-r	3		✓	RED LIMONITE LITHIC FRAG	10R4/2	Jmr(?)	HEMATITE STAINED QTZ FELDSPAR GRANULES
1880	1880	110/110		85		3 12	GRN BLK			UF-LC	P	Sr-r	3		✓	WHITE CHERT / RED LITHIC FRAG	10R4/2	Jmr(?)	HEMATITE STAINED GRANULES FELDSPAR GRANULES LIMONITE STAINED LITHIC FRAG.
1890	1890	120/110		80		(3) 20	GRN BLK			UF-LC	P	Sr-r	3			RED LITHIC FRAG / MUDS	10R4/2 MUDS?	Jmr(?)	HEMATITE STAINED QTZ LIMONITE STAINED LITHIC FRAG?
1900	1900	110/110		80		(3) 20	GRN BLK			UF-LC	P	Sr-r	3				10R4/2	Jmr(?)	HEMATITE STAINED QTZ.

CHIP SAMPLE LOG FORM

Location: _____ Sec. 1 T. 16N R. 16W Quadrangle (7.5') DALTON PASS

Hole No: S2 State: NEW MEXICO Date: 10/30/80

Company: U.S.G.S. County: McKINLEY Geologist: HAMMOND, MURK

Lat/Long: _____ Sheet 19 of 25.

Table 1. Descriptions of cuttings samples from Mariano Lake - Lake Valley Drilling Project, Hole No. 2, New Mexico

Depth to Bttm of Sampled Interval	Sample Number	Cuttings/Line	Estimated % of Lithologies: Congl.	Sandst.	Siltst.	Shale	Shale color	Coal	Limestone	Sandstones: Grain Size	Sorting	Roundness	Feldspar	Carbonates	Pyrite	Access.	Sandstone Color	Formation/Member	COMMENTS
1910	80-S2 -1910	110/110		90		10	N2			UF-LC	P	Sr-r	3	TRACE	✓		10R 4/2	Jmr(?)	HEMATITE STAINED QTZ RED LITH. FRAG
1920	-1920	110/110		85		15	N2			LF-UC	P	Sa-Sr	2-3				10R4/2	Jmr(?)	HEMATITE STAINED QTZ. RED & LIMONITE STAINED LITHIC FRAG. GRD. MUD CHIPS FROM PRI SHY Basin
1930	-1930	110/110		90		10	N2			LF-UC	P	Sa-Sr	3				10R4/2	Jmr(?)	GRADUAL FELDSPARS > 1%
1940	-1940	110/110		95		5	N2			LF-UC	P	Sa-Sr	2				10R4/2	Jmr(?)	TRACE OF RED LITHIC FRAG.
1950	-1950	110/110		MUD TOO THICK: SAMPLES VERY MUDDY LITHOLOGIES															
1960	-1960	110/110																	
1970	-1970	110/110																	
1980	-1980	110/110																	
1990	-1990	125/110																	
2000	-2000	110/110																	

CHIP SAMPLE LOG FORM

Location: _____ Sec. 1 T. 16N R. 16W Quadrangle (7.5') DALTON PASS

Hole No.: S2 State: NEW MEXICO Date: 10/30/80

Company: USGS County: McKINLEY Geologist: MARK HAMMOND

Lat/Long: _____ Sheet 20 of 25.

Table 1. Descriptions of cuttings samples from Mariano Lake - Lake Valley Drilling Project, Hole No. 2, New Mexico

CHIP SAMPLE LOG FORM

Location: _____ Sec. 1 T. 14N R. 14W Quadrangle (7.5') DALTON PASS

Hole No: S2 State: NEW MEXICO Date: 10/30/80

Company: U.S.G.S. County: McKINLEY Geologist: MARK HARMON

Lat/Long: _____ Sheet 21 of 25.

Depth to Bottom of Sampled Interval	Sample Number	Cuttings/Core	Estimated % of Lithologies: Congl.	Sandst.	Siltst.	Shale	Shale color	Coal	Limestone	Sandstones: Grain size	Sorting	Roundness	Feldspar	Carbonate	Pyrite	Access.	Sandstone Color	Formation/Member	COMMENTS
2010	80-S2 -2010	110/110	MUD TOO THICK: SAMPLES VERY MUDDY, MIXED LITHOLOGIC																
2020	-2020	110/110																	
2030	-2030	120/110																	
2040	-2040	110/110				100	5YR 2/1											Jmr(?)	VERY SMALL SAMPLE
2050	-2050	110/110				1 100	5YR 2/1											Jmr(?)	VERY LITTLE SAMPLE
2060	-2060	110/110				100	5YR 2/1											Jmr(?)	Much Drilling
2070	-2070	120/110				1-2 98	RED MUD CHIPS											Jmr(?)	
2080	-2080	110/110				100	N2											Jmr(?)	
2090	-2090	110/110				100	N2											Jmr(?)	
2100	-2100	110/110				98 1	RED MUDST											Jmr(?)	

Table I. Descriptions of cuttings samples from Mariano Lake - Lake Valley Drilling Project, Hole No. 2, New Mexico

Depth to bttm of Sampled Interval	Sample Number	Cuttings/Sec	Estimated % of Lithologies: Congl.	Sandst.	Siltst.	Shale	Shale Color	Coal	Limestone	Sandstones: Grain Size	Sorting	Roundness	Feldspar	Carbonates	Pyrite	Access.	Sandstone Color	Formation/Member	COMMENTS
2110	80-52-2110	110/110				100	5G 4/1											Jmr(?)	DISAG. SAND FROM WESTWATER CANYON IN MUD MATRIX
2120	-2120	110/110				100	5Y 2/1											Jmr(?)	DISAG. SAND FROM WESTWATER CANYON IN MUD MATRIX
2130	-2130	120/110				100	5Y 2/1											Jmr(?)	CHUNK of SILTSTONE WASHED DOWN SAND RED LITHIC FRAG.
2140	-2140	110/110				100	5Y 2/1											Jmr(?)	8-9% SAMPLE DISAG WASHED DOWN SAND RED LITH. FRAGS SHALE CHIPS "CRUMBLED"
2150	-2150	110/110		30		70	5Y 2/1			UM-UF	M-P	Sa-Sr	TRACE			DARK GRN CHIP	10R 4/2	Jmr/Jcs COW SPRINGS SANDSTONE	RED LITH. FRAGS
2160	-2160	110/110		30		70	5Y 2/1			UM-UF	M-P	Sa-Sr	1-2				10R 4/2	Jcs (?)	LT. GN MUDST. 5-10% GN MUDST. (CRUMB BASIN?)
2170	-2170	130/110		50	30	20	5Y 2/1			UF-LM	M	Sa-Sr	1-2			TRACE RED CHERT BLK	10R 4/2	Jcs (?)	SILTSTONE IS RED LITHIC FRAG. HEMATITE STAINED SAND GRAINS
2180	-2180	130/110		60	10	5 25	5G 6/1 5Y 2/1			LC-UF	P	Sa-Sr	1-2				10R 4/2	Jcs (?)	SILTSTONE IS RED LITH. FRAG HEMATITE STAINED SAND GRAINS
2190	-2190	110/110		70		10 20	5G 6/1 5Y 2/1			UC-UF	P	Sa-Sr	1			BLK	10R 4/2	Jcs (?)	GRN. SHALE CHIPS TRACE OF RED LITH. FRAGS
2200	-2200	110/110		60		10 30	5G 6/1 5Y 2/1			UC-LF	P	Sa-Sr	2			GRAINS LA. DARK ALG.	10R 4/2	Jcs (?)	RED LITH. FRAG 3-5% GN SHALE CHIPS HEMATITE STAINED CHIPS

CHIP SAMPLE LOG FORM

Location: _____ Sec. 1 T. 16N R. 16W Quadrangle (7.5') DEATON PASS

Hole No: S2 State: NEW MEXICO Date: 10/30/80

Company: USGS County: MCKINLEY Geologist: ZECH, CHARLTON

Lat/Long: _____ Sheet 22 of 25.

Table 1. Descriptions of cuttings samples from Mariano Lake - Lake Valley Drilling Project, Hole No. 2, New Mexico

Depth to top of sampled interval	Sample number	Core b/sec	Estimated % of Lithologies: Congl.	Sandst.	Siltst.	Shale	Shale color	Coal	Limestone	Sandstones: Grain size	Sorting	Roundness	Feldspar	Carbonate	Pyrite	Access.	Sandstone Color	Formation/Member	COMMENTS
2210	80-S2-2210			60		40	5YR2/1			UC UF	M-P	Sr-r	2-3			RED CHERT	5R2/2	Jcs (?)	RED LITH FRAG GRN CLAY CHIPS (5%) HEM. STAINED QTZ
2220	-2220			50		50	5YR 2/1			UF-C	M-P	Sr-r	3					Jcs (?)	HEM. STAINED QTZ RED LITH. FRAG. GRN CLAY CHIPS
2230	-2230			50		50	5YR 2/1			UC-UF	P	Sr-Sa	2				5R 2/2	Jcs (?)	10% LITHIC FRAG GRN CHIPS RED & WHITE CHERT
2240	-2240			60		20 20	RED			UC-UF	M	Sr-Sa	2					Summerville FOR. Js	RED CHERT & WHITE CHERT GRN CLAY CHIPS HEM. STAINED QTZ
2250	-2250			40		30 30	RED 5YR2/1 BLK N1			Um-UF	M	Sr-Sa	3					Js	GRN MUDST.
2260	-2260			60		25 15	GRN RED			Um-LC	P	Sr-Sa	1-2					Js	HEM. STAINED QTZ SOME SILT
2270	-2270			60		35 5	GRN RED			Um-LC	P-P	Sr-Sa	1					Js	HEM. STAINED. QTZ
2280	-2280			30		30 40	GRN MANCOS SH			UP-LC	P	Sr-Sa	1					Js	
2290	-2290			20		30 10 40	LS & Limestone (LAKE?) RED GRN											Js	
2300	-2300			20		30 10 40	LS & Limestone (LAKE?) RED GRN											Js	

CHIP SAMPLE LOG FORM

Location: _____ Sec. 1 T. 16N R. 14W Quadrangle (7.5') DALTON PASS

Hole No: S2 State: NEW MEXICO Date: 10/30/80

Company: U.S.G.S. County: McKINLEY Geologist: ZACH GUNDERSON

Lat/Long: _____ Sheet 23 of 25.

Table 1. Descriptions of cuttings samples from Mariano Lake - Lake Valley Drilling Project, Hole No. 2, New Mexico

CHIP SAMPLE LOG FORM

Location: _____ Sec. 1 T. 10N R. 14W Quadrangle (F.S.) DANTON PASS

Hole No: S2 State: NEW MEXICO Date: 11/1/80

Company: U.S.G.S. County: McKINLEY Geologist: GUNDERSON, ZECH

Lat/Long: _____ Sheet 24 of 25.

Depth to bottom of sampled interval	Sample number	Cuttings/Core	Estimated % of lithologies: Congl.	Sandst.	Siltst.	Shale	shale color	Coal	Limestone	Sandstones: Grain size	Sorting	Roundness	Feldspar	Carbonate	Pyrite	Access.	Sandstone Color	Formation/Member	COMMENTS
2310	80-S2-2310	120/105		5 Disem Grains	5 WHITE	65 15 10 5	BLK RED SILTY GRN Lt Grn			UC		Sr-Sa					WHITE	Js	RED SILTY SHALE SILTY GRN W/ BLK ANC.
2320	2320	125/105		5 Disem Grains		65 20 10	BLACK RED SILTY GRN SH.			MC TRACE CO		Sr-Sa	TRACE					Js	SILTY GRN SHALE DARKER GRN SHALE
2330	2330	125/105		5 Disem Grains		70 15 10	BLK RED SILTY GRN			UC		Sr-Sa	TRACE				Beige	Js	WHITE SHALE ONE SS CHIP
2340	2340	125/105		8 Disem Grains		70 15 7	BLK RED SILTY GRN			UC		Sr-Sa						Js	SS CHIP; WELL Rsm U FINE GRAINED, Lt. RED LIMESTONE CHIP SHELL FRAG.
2350	2350	105/105		5 Disem Grains		65 15 10	BLK RED GRN			M-UC		Sr-Sa	TRACE					Js	WHITE CLAYEY CHIPS (TRACE) < 2% SS chips
2360	2360	110/105		5 Disem Grains		65 20 10	Black N3 red - 5R 4/2 green (darker) 5G 6/1			M-C		Sr-Sa	TRACE					Js	RED SHALE IS SILTY Minor AMT OF WHITE CLAYEY CHIPS
2370	2370	115/105		5 Disem Grains		65 15 15	N3 5R 4/2 5G 6/1 / 5G 6/1			M-C		Sr-Sa	TRACE					Js	RED SHALE IS VERY SILTY Minor amt. SS chips TRACE Lt. grn SH.
2380	2380	115/105		20 Disem Grains		60 10 10	N3 5R 4/2 5G 6/1			cm-uM	P-F	Sr						Js	BAD SAMPLE - ALMOST ALL MUD MATRIX MUCH CALCITE HEMATITE STAINED QTZ.
2390	2390	125/105		10 Disem Grains		80 2 8	N3 5R 4/2 5G 4/1			L-M	P	Sr						Js	ORANGE (HEM) QTZ. RED SHALE IS SILTY
2400	2400	125/105		5 Disem Grains		75 15 5	N3 5R 4/2 5G 6/1			LM-F	P-F	Sr						Js	LARGE DK GN GN SHALE CHIPS ORANGE QTZ (HEM) RED SHALES SILTY.

Table 1. Descriptions of cuttings samples from Mariano Lake - Lake Valley Drilling Project, Hole No. 2, New Mexico

Depth to bttm of sampled interval	Sample Number	Count/sec	Estimated % of Lithologies: Congl.	Sandst.	Siltst.	Shale	Shale color	Coal	Limestone	Sandstones: Grain size	Sorting	Roundness	Feldspar	Carbonate	Pyrite	Access.	Sandstone Color	Formation/Member	COMMENTS
2410	80-S2 -2410	125		15	5 RED	70	NZ		10 5YR 8/1	LM-LF	M	SR			✓			Todilto Limestone	5% of shale is Lt. gym. SS is lsc. Limonite STAINED QTZ (reddish)
2420	-2420	125/105		10	5 RED	65	NZ		20 5YR 8/1	LF-UF	M-W	SA-SR						Je	ORANGE QTZ SS is lsc. Limonite stained QTZ (reddish)
2430	-2430	120/105		13		60 2	NZ GRN		25 5YR 8/1	UVF-UF	M-P	SA-R						Je	SS is lsc Limonite stained qtz (reddish)
2440	-2440	120/105		30		50	NZ		20 5YR 8/1	UVF-UF	M	SR-R						Entrada SANDSTONE Je/Je	Minor amts of RED SHALE & GRN SHALE LIMONITE STAINED QTZ (REDDISH)
2450	-2450	110/105		40		1 55	NZ		10 8YR 8/1	UVF-UF	M	SR-R					5YR 7/2	Je	TRACE RED & GRN SHALE
2460	-2460	125/105		50		40	NZ		10 8YR 8/1	UVF-UF	M	SR-R					5YR 7/2	Je	VERY MINOR SAMPLE LSC SS & CHINO RED CHERT GRAIN
TD 2469																			

CHIP SAMPLE LOG FORM

Location: _____ Sec. 1 T. 16N R. 14W Quadrangle (7.5') DALTON PASS

Hole No: S2 State: NEW MEXICO Date: 11/1/80

Company: U.S.G.S. County: MCKINLEY Geologist: ZECH, GUNDERSON

Lat/long: _____ Sheet 25 of 25.