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UNITED STATES DEPARTMENT OF INTERIOR  
GEOLOGICAL SURVEY

Lithologic Descriptions, Core and Cutting Samples,  
Mariano Lake-Lake Valley Drilling Project,  
McKinley County, New Mexico, Hole Number 7A

by

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This report is preliminary and has not been reviewed  
for conformity with U.S. Geological Survey editorial  
standards 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. 7A.

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.

## GENERAL DRILLING PLAN

The locations of all twelve drill holes are shown on figure 1, which is a portion of the Gallup 1° x 2° 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. 7a

The location of this well is shown on figure 2.

The vital statistics on this well include:

Spud date: March 9, 1981

Location: T. 19 N., R. 12 W., SE/4 sec. 31; Lat. 35°49'43", Long. 108°08'49'

Collar Elevation: 6515 ft (topo) Menefee Fm. (Cretaceous)

Top Cored Interval: 2930 ft (depth) Brushy Basin Shale Mbr.,

Morrison Fm. (Jurassic)

Bottom Cored Interval: 3231 ft (depth) Recapture Shale(?) Mbr.,

Morrison Fm. (Jurassic)

Total Depth: 3231 ft (depth) Recapture(?) Shale Mbr.

Morrison Fm. (Jurassic)

Core Recovery: 72 percent

Casing: 14 ft of 8 1/2 in. surface casing

Status of well: Abandoned, April 1, 1981.

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, resistance, neutron-neutron porosity, resistivity, deviation, gamma-gamma density, caliper, KUT, magnetic susceptibility, prompt fission neutron, and high resolution 4-arm digital dipmeter.

Cutting samples from rotary drilling were collected and described on 20-ft intervals from 0-2600 ft, and then on 10 ft intervals from 2600 ft to the core point at 2930 ft (table 1). Cutting samples were collected through the cored interval 2930-3231 ft but were not described.

Core samples were collected in 20 ft core runs, and are 3 in. in diameter. The core samples were described in the field (table 2), taped, boxed, and shipped to the USGS Core Library in Denver where they were frozen,



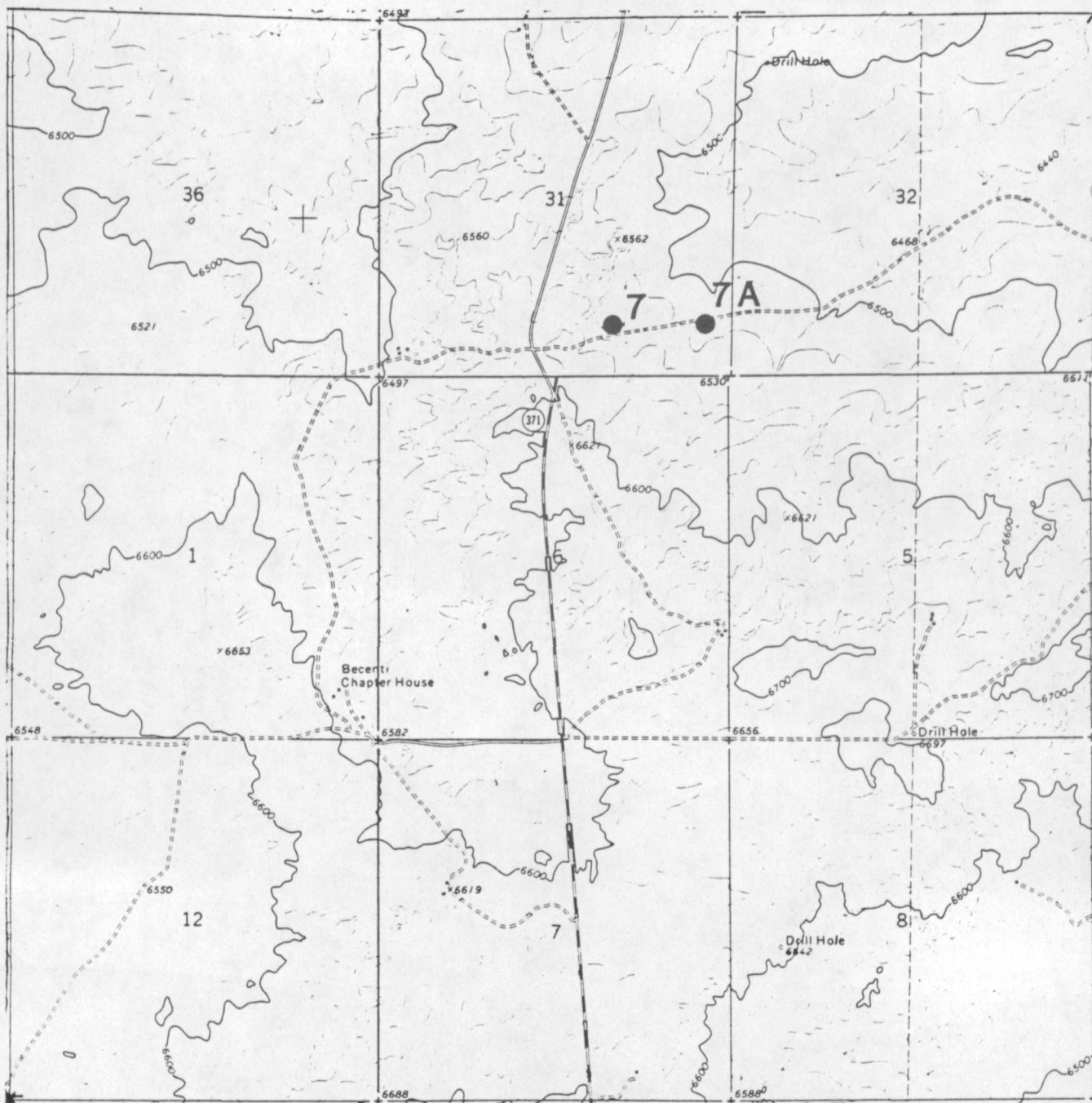


Figure 2.--Location of USGS Drill Hole No. 7A, Antelope Lookout Mesa 7 1/2' Quadrangle, T19N, R12W.



split, photographed, and sampled (for petrography, geochemistry, heavy-mineral-suite, clay-mineralogy, and paleomagnetic studies). A split of the core has been archived for future study.

Zones of uranium mineralization occur at: 3133-3139 ft and 3160-3169 ft. Other gamma-ray anomalies occur at: 2960, 2997, 3009 and 3111 ft.

Thin coal beds were penetrated at: 125, 135, 240, 360, 445, 451, 2754, 2764, and 2773 ft. The following core and cutting samples were described in the field. The abbreviations used in the core description are defined in Reynolds and others (1975).

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. 7A, Mariano Lake-Lake  
Valley drilling project, McKinley County, New Mexico, USGS Open-File  
Report 81-973, 4 p.

CHIP SAMPLE 106  
FORM

Location: 7A Sec. 31 T. 19N R. 12W Quadrangle (7.5') Apizaco Lookout Mesa  
 Hole No: 5-7A State: New Mexico Date: 3-11-81  
 Company: USGS County: McKinley Geologist: Kirk / Corden  
 Lat/Long: \_\_\_\_\_ Sheet 1 of 17

Table 1. Descriptions of cuttings samples from Mariano Lake - Lake Valley Filling Project, Hole No. 7a, New Mexico  
 Estimated % of Lithologies

Depth to top of Sample Interval	Sample Number	Sandstones						Grain Size	Lamination	Coal	Shale				Grain / cm	Comments
		Coarse	Med.	Fine	Very Fine	Thin	Thin	Thin	Thin	Thin	Shale	Siltst	Sandst.	Siltst		
20	80-57A-20								N8		N3		95		90	From 0-8' surficial debris, 12-16' hard limy sand, hematite stained gbs. calcareous ss.
40	80-57A-40								1-2 sand		5-6-1/2		55		75	Menafee
60	80-57A-60								1-2		N7		70			
80	80-57A-80								1-2		N3		80			
100	80-57A-100								1-2		N5		30			
120	80-57A-120								1-2		5-6-1/2		30			
140	80-57A-140								1-2		10-12-1/2		30			
160	80-57A-160								1-2		N2		40			
180	80-57A-180								1-2		N5		40			
200	80-57A-200								1-2		5-6-1/2		90			
									1-2		N4					
									1-2		N2					
									1-2		N4					
									1-2		N2					
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CHIP SAMPLE 106  
Form

Location: 7A Sec. 31 T. 19N R. 12W Quadrangle (9.5') Antelope Lake area  
Hole No: 5-7A State: New Mexico Date: 3-11-81  
Company: USGS County: McKinley Geologist: Kirk / Condon  
Lat/Long: \_\_\_\_\_ Sheet 2 of 17

Depth to bottom of sample (interval)	Sample Number	Sandstones						Grain Size	Color	Shale	Siltst.	Sandst.	Congl.	Grain Size	Comments	Remarks / Notes	Comments
		Grain Size	Color	Shale	Siltst.	Sandst.	Congl.	Grain Size	Color	Shale	Siltst.	Sandst.	Congl.	Grain Size			
220	80-57A 120	75	5G-4/12 N4 104/14	10	40	40		104/14	5G-4/12 N4 104/14	10	40	40		104/14	N6 tr. 104/14	Med. fine	
240	80-57A 240		5G-4/12 N4 104/14	50	50	50			5G-4/12 N4 104/14	50	50	50			N6 tr. 104/14		N2 carb. shale tr. pyrite in carb. shale
260	80-57A 260		5G-4/12 N4 104/14	40	60	60			5G-4/12 N4 104/14	40	60	60			N6 tr. 104/14		tr. carb. shale (N2)
280	80-57A 280		5G-4/12 N4 104/14	70	30	30			5G-4/12 N4 104/14	70	30	30			N6 tr. 104/14		pyrite in carb. shale
300	80-57A 300		5G-4/12 N4 104/14	50	50	50			5G-4/12 N4 104/14	50	50	50			N6 tr. 104/14		
320	80-57A 320		5G-4/12 N4 104/14	25	75	75			5G-4/12 N4 104/14	25	75	75			N6 tr. 104/14		tr. N2 shale
340	80-57A 340		5G-4/12 N4 104/14	25	75	75			5G-4/12 N4 104/14	25	75	75			N6 tr. 104/14		5G. Has a lot of matrix
360	80-57A 360		5G-4/12 N4 104/14	30	70	70			5G-4/12 N4 104/14	30	70	70			N7		N2 shale w/ pyrite clay matrix in 55
380	80-57A 380		5G-4/12 N4 104/14	70	30	30			5G-4/12 N4 104/14	70	30	30			N7		
400	80-57A 400		5G-4/12 N4 104/14	40	60	60			5G-4/12 N4 104/14	40	60	60			N7		



CHIP SAMPLE 106  
FORM

Location: 7A Sec. 31 T. 19N R. 12W

Quadrangle (9.s.) Antelope Creek  
Mesa

Hole No: 5-7A State: New Mexico

Date: 3-11-81

Company: USGS County: McKinley

Geologist: Kirk / Condon

Lat/long: \_\_\_\_\_ Sheet 3 of 17

Table 1. Descriptions of cuttings samples from Mariano Lake Valley Drilling Project, Hole No. 7A, New Mexico																		
Depth to top of Lake Valley Drilling Project, Hole No. 7A, New Mexico	Sample Number	Core/Sec	Coring				Limestone	Coal	Shale			Congl.	Sandst.	Siltst.	Fossils	Sandstone Color	Fossils / matrix	Comments
			Congl.	Sandst.	Siltst.	Shale			Stale color									
420	80-57A-420	75		70		30	N4 (down) 50-412	tr.								N7	Menefee Fm	carb. shale, alum pyrite
440	80-57A-440			80		20	N4	tr.	LF	M.	SA.	tr.				N6		pyrite w/ coal
460	80-57A-460			40		30	N4	30	LF	MM		tr.				N7	clay/coal mbr Menefee Fm	Carl - shale
480	80-57A-480			80		18	N4	2	LF	MM		tr.				N8		sugary white ss, pyrite in coals, clayey ss. matrix
500	80-57A-500			90		9	N4	1	LF	W.	SA	tr.				5YR 5/1	Menefee Fm	sugary white ss.
520	80-57A-520			60		40	N4	tr.	LF	MM	SA.	tr.				5YR 8/1		white shale flakes, white clay nests in ss
540	80-57A-540			75		25	N4	tr.	LF		SA	tr.				N6 to 5YR 8/1		
560	80-57A-560			70		30	N4		LF		SA	tr.				N6		clayey ss. matrix, bentonitic clay (?)
580	80-57A-580			80		20	N4	tr.	LF			tr.				N6		clayey ss. matrix, tr. pyrite in NY shale
600	80-57A-600			90		10	N4	tr.	LF			tr.				N6		clayey ss. matrix

Location: -74 Sec. 31 T. 19N R. 13W Quadrangle (7.5') Antelope Lookout  
Mesa  
Hole No: 5-7A State: New Mexico Date: 3-11-81  
Company: USGS County: McKinley Geologist: Bick / Condon  
Lat/Long: \_\_\_\_\_ Sheet 4 of 17

Sandstones

Lake Valley Drilling Project, Hole No. 7A, New Mexico															Sandstones							
Sample Number	Depth to top of Lithology Interval	Grain/Inch	Congl.	Sandst.	Siltst.	Shale	silt color	Coal	Limestone	Brack Shale	Sorting	Roundness	Feldspar	Carbonates	Rhyolite	Roots	Sandstone Color	Remarks	Comments			
620	80-57A-120	75	90	10	N4				unf.	Med. S.R.	+	abund.						N/C	Fin.	clayey ss. matrix		
640	80-57A-640		85	15	N4				I.F.			10% tr.A						N/C		clayed ss. matrix		
660	80-57A-660		90	10	N4			tr.	I.F.			tr.	10%					N/C		clay neds. in ss.		
680	80-57A-680		85	15	tr. SKB4			tr.	unf.			1-20%						N/C				
700	80-57A-700		90	10	N4				I.F.			tr.						N/C		clayed ss. matrix		
720	80-57A-720		70	30	N4				unf.			20%	tr.					N/C		clayed ss. matrix limonite stained gr. grains		
740	80-57A-740		60	40	tr. N2 (med)			tr.	I.F.			20%	tr.					N/C		heavy material in ss. disaggregated ss. clayed matrix in ss.		
760	80-57A-760		60	40	tr. N2 (med)			tr.	unf.			tr.	tr.					N/C				
780	80-57A-780		70	30	N4				unf.			10%	tr.					N/C				
800	80-57A-800		85	25	N4				unf.			tr.	abund.					N/C				



CHIP SAMPLE 106

Location: 7A Sec. 31 T. 19N R. 12W

Quadrangle (9.5) Fitchburg Lookout  
Mesa

Hole No: 5-7H

State: New Mexico

Date: 3-11-81

Company: USGS

County: Mc Kinkay

Geologists: Kirk / Condon

Lat/Long:

Sheet 5 of 12

Table 1. Descriptions of cuttings samples from Mariano Lake Valley Drilling Project, Hole No. 7a, New Mexico

[illegible]

CHIP SAMPLE 106  
FORM

Location: 7A Sec. 31 T. 19N R. 12W Quadrangle (v.s.) Antelope Lookout Mesa  
 Hole No: 5-7A State: New Mexico Date: 3-11-81  
 Company: USGS County: McKinley Geologist: Kirk / Condon  
 Lat/Long: \_\_\_\_\_ Sheet 6 of 17

Depth to top of sample (inches)	Sample Number	Estimated % of Lithologies						Lithology	Grain Size	Sorting	Roundness	Friability	Lamination	Bedding	Streak Color	Remarks	Subs. Color	Remarks	Comments
		Coarse	Med.	Fine	Silt	Shale	Sand	Silt											
1020	80-57A-1020	75				40	60		u.F.	M.	S.R.	tr.			u.F.	tr. 10YR 6/6	N7-N6	Point Lookout Sandstone (or Spotted) Lith. (see notes)	
1040	80-57A-1040					5	95		u.F.	M.	S.R.	1/2			u.F.	tr. 10YR 6/6	N7	Point Lookout Sandstone	
1060	80-57A-1060					20	75		u.F.	M.W.		20%			u.F.	tr. 10YR 6/6	N7		
1080	80-57A-1080					10	85		u.F.	M.		10%			u.F.	tr. 10YR 6/6	N7		clay nests in ss
1100	80-57A-1100					7	90		u.F.	M.W.		20%			u.F.	tr. 10YR 6/6			
1120	80-57A-1120					5	85		u.F.	M.W.		tr.			u.F.	tr. 10YR 6/6			
1140	80-57A-1140					5	95		u.F.	M.	S.R.	20%			u.F.	tr. 10YR 6/6			gy (p)
1160	80-57A-1160					10	90		u.F.	M.W.	S.R.	10%			u.F.	tr. 10YR 6/6			clay nests in ss, shell frag. (s)
1180	80-57A-1180					10	90		u.F.	M.W.	S.R.				u.F.	tr. 10YR 6/6	N6		muddy sample
1200	80-57A-1200					20	70		u.F.		S.R.	tr.			u.F.	tr. 10YR 6/6	N6	Point Lookout Sandstone (or Spotted) Lith. (see notes)	clay nests in ss



CHIP SAMPLE 106  
FORM

Location: 7A Sec. 31 T. 19N R. 16W Quadrangle (9.5') Antelope Lookout Mesa  
Hole No: S-7A State: New Mexico Date: 3-12-81  
Company: USGS County: McKinley Geologist: Kirk / Condon  
Lat/Long: \_\_\_\_\_ Sheet 7 of 12

Sample Number		Depth to top of Sample Interval (m)	Estimated % of Lithologies										Grain Size	Lamination	Bed	Shale	Siltst	Sandst.	Congl.	Coarsh/fin	Comments	Formal Name					
			Coarsh	Sandst.	Siltst	Shale	Streak	Color	Coal	Lamination	Bed	Sorting											Rounded	Feldspar	Carbonates	Pyrite	Flint
1220			NO SAMPLE																								
1240	50-57A-1240	75		85	100%	10	N4	1		W.F.	M.	S.R.	tr.	tr.										Grits in Coal Nbr. Crosse Canyon Fm			
1260	80-57A-1260			83	100%	2	tr. 5YR 7/2	tr.		W.F.	M.	S.R.	tr.	tr.											muddy sample		
1280	80-57A-1280			93	100%	10	tr. 5YR 6/1	2		W.F.	M.W.	S.R.	tr.	tr.											pyrite on coal		
1300	80-57A-1300			5		15	N4	tr.		W.F.			tr.												clayey matrix		
1320	80-57A-1320			67	100%	5	5YR 3/4	tr.		W.F.	M.		tr.	tr.													
1340	80-57A-1340			73	100%	2	10YR 4/2	tr.			M.		tr.														
1360	80-57A-1360			70	100%	tr.	5YR 4/2	tr.		W.F.	M.		tr.	tr.													
1380	80-57A-1380			60	100%	10	5YR 4/2			W.F.	M.W.																
1400	80-57A-1400			65	100%	5	5YR 4/2	tr.		W.F.	M.W.			tr.													

CHIP SAMPLE 106  
FORM

Location: 7A Sec. 31 T. 19N R. 12W Quadrangle (9.5') Antelope Lookout Mesa  
 Hole No: S-7A State: New Mexico Date: 3-12-81  
 Company: USGS County: McKinley Geologist: Kirk / Cariden  
 Lat/long: \_\_\_\_\_ Sheet 8 of 17

Table 1. Descriptions of cuttings samples from Mariano Lake - Lake Valley Drilling Project, Hole No. 7a, New Mexico  
 Estimated % of lithologies

Sample Number Depth to top of interval	Gravel	Sand	Silt	Shale	Stucco color	Coal	Limestone	Grit size	Sorting	Rounded	Feldspar	Lunettes	Pyrite	Fossils	Succinic color	Remarks / notes	Comments
1420	80-57A-1420	75	10	10	N4 tr. 56-5/6 tr. N2			u.f.	15	SR	12	tr.		blk. tan chert	N6	Subsided Col Nbr (revised) Canyon Fm.	muddy sample
1440	80-57A-1440		5	15	N4 tr. 56-4/12	tr.		u.f.			tr.	tr.		blk. tan chert	N6 (200)		muddy sample
1460	80-57A-1460		10	20	N4			u.f.			tr.	tr.		blk. tan chert	N6		muddy sample, other variety of mudstone present but cannot find muddy
1480	80-57A-1480		10	15	N4 tr. 56-4/12			u.f.					tr.	blk. tan chert			clay nests, muddy sample
1500	80-57A-1500		5	20	N4	2		u.f.		SR		tr.		blk. tan chert			pyrite on shell frags(?) above shell frags, muddy sample
1520	80-57A-1520		5	20	N4 tr. 56-4/12	tr.		u.f.		SR		tr.		blk. tan chert			muddy sample
1540	80-57A-1540		10	20	N4			u.f.		SR	10	tr.		blk. tan chert			shell frags(?) muddy sample
1560	80-57A-1560		5	25	N4 tr. 56-4/12			u.f.		SR	10	tr.		blk. tan chert			shell frags(?)
1580	80-57A-1580		5	15	N4 tr. 56-4/12			u.f.		SR	20	tr.		blk. tan chert			shell frags, muddy sample
1600	80-57A-1600		10	25	N4 tr. 56-4/12	tr.		u.f.				tr.		blk. tan chert			clay nests



CHIP SAMPLE 106  
FORM

Location: 7A Sec. 31 T. 19N R. 12W Quadrangle (7.5') Antelope Landmark Mesa  
Hole No: 5-7A State: New Mexico Date: 3-12-81  
Company: USGS County: McKinley Geologist: Kirk / Condon  
Lat/Long: \_\_\_\_\_ Sheet 9 of 17

Table 1. Descriptions of cuttings samples from Mariano Lake -  
Lake Valley Drilling Project, Hole No. 7a, New Mexico  
Estimated % of lithologies

Depth to top of sample interval	Sample Number	Core/Len	Congl.	Sandst.	Siltst.	Shale	Stale	Coal	Limestone	Brack. Sst.	Sorting	Rounded	Feldspar	Carbonates	Pyrite	Roots	Sandstone Color	Forming / number	COMMENTS
1620	80-57A-1120	75		50	10% tr.	tr.	5YR 3/2 5G 6/1	tr.		LF- UF- M.		SR/ SA				tan + blk + clert	N16		carb. shale
1640	80-57A-1640		70	10% tr.	tr.	tr.	N4 5YR 3/2			UF- UF- M.				tr.		tan + blk + red + clert			hematite stained gta.
1660	80-57A-1660		53	10% tr.	tr.	tr.	5YR 3/2 5YR 3/2	tr.		LF- UF- M.				tr.	tr.	tan + blk + red + clert			pyrite in coals gyp.
1680	80-57A-1680		70	10% tr.	tr.	tr.	5YR 3/2 5YR 3/2	tr.		UF- LF- M.			tr.	tr.	tr.	tan + blk + red + clert			
1700	80-57A-1700		83	10% tr.	tr.	tr.	5YR 3/2 5YR 3/2	tr.		LF- UF- M.			tr.	tr.	tr.	tan + blk + red + clert			hematite stained gta.
1720	80-57A-1720		77	10% tr.	tr.	tr.	5YR 3/2 5YR 3/2	tr.		UF- LF- M.					tr.				
1740	80-57A-1740		78	10% tr.	tr.	tr.	5YR 3/2 5YR 3/2	tr.		UF- LF- M.							N7		
1760	80-57A-1760		90	10% tr.	tr.	tr.	5YR 3/2 5YR 3/2	tr.		UF- LF- M.			tr.	tr.		tan + blk + red + clert			tr. 10% 10% 10% 10%
1780	80-57A-1780		85	10% tr.	tr.	tr.	5YR 3/2 5YR 3/2	tr.		UF- LF- M.						tan + blk + red + clert			
1800	80-57A-1800		75	10% tr.	tr.	tr.	5YR 3/2 5YR 3/2	tr.		UF- LF- M.				tr.	tr.	tan + blk + red + clert			2% of ss. is 10% 10% 10% 10%

Location: 7A Sec. 31 T. 19N R. 12W Quadrangle (7.5') Antelope Creek  
Mesa  
Hole No: 5-7A State: New Mexico Date: 3-12-81  
Company: USGS County: McKinley Geologist: Kirk/Condon  
Lat/Long: \_\_\_\_\_ Sheet 10 of 19

Project, Hole No. 1A,  
Estimated % of Lithologies

Depth to top of Sample Interval	Sample Number	Core/Lin	Sediment				Lithology	Grain Size	Sorting	Roundness	Foliation	Rhyolite	Flattening	Sediment Color	Comments
			Gravel	Sand	Silt	Shale									
1820	80-51A-1920	75	18	2	10%	NY (40) 50-612 (40)	NY	NY	NY	NY	NY	NY	NY	NY	limonite stained ss. (10/10/61)
1840	80-51A-1840		20	2	10%	NY (40) 50-612 (40)	NY	NY	NY	NY	NY	NY	NY	NY	
1860	80-51A-1860		20	2	10%	NY (40) 50-612 (40)	NY	NY	NY	NY	NY	NY	NY	NY	shell frags.
1880	80-51A-1880		17	3	10%	NY (40) 50-612 (40)	NY	NY	NY	NY	NY	NY	NY	NY	carb. debris w/ pyrite shell frags.
1900	80-51A-1900		18	2	10%	NY (40) 50-612 (40)	NY	NY	NY	NY	NY	NY	NY	NY	shell frags., carb. debris
1920	80-51A-1920		18	2	10%	NY (40) 50-612 (40)	NY	NY	NY	NY	NY	NY	NY	NY	shell frags.
1940	80-51A-1940		20	2	10%	NY (40) 50-612 (40)	NY	NY	NY	NY	NY	NY	NY	NY	hematite stained (rose?) + gtz
1960	80-51A-1960		20	2	10%	NY (40) 50-612 (40)	NY	NY	NY	NY	NY	NY	NY	NY	shell frags., carb. debris
1980	80-51A-1980		20	2	10%	NY (40) 50-612 (40)	NY	NY	NY	NY	NY	NY	NY	NY	shell frags., oxidized pyrite



CHIP SAMPLE 106  
FORM

Location: 7A Sec. 31 T. 19N R. 16W Quadrangle (1:5) Hyattsville - Los Horn  
Hole No: 5-7A State: New Mexico Date: 3-13-81  
Company: LLS 65 County: McKinley Geologist: Kirk / Gordon  
Lat/Long: \_\_\_\_\_ Sheet 11 of 17

Table 1. Descriptions of cuttings samples from Mariano Lake -  
Lake Valley Drilling Project, Hole No. 7a, New Mexico  
Estimated % of Lithologies

Sample Number	Core/Log	Sandstones						Limestone	Coal	Shale Color	Shale	Siltst	Sandst.	Congl.	Comments	Form. thin / number	Comments
		Grain Size	Sorting	Roundness	Feldspar	Carbonates	Pyrite	Fluores.	Sandstone Color								
2030	80-57A-2030	75								N7							Pyrite on carb. shale Renovate stained gr.
2040	80-57A-2040																tr. 101R 616 ss. carb. shale w/ pyrite abun. shell frags.
2060	80-57A-2060																tr. 101R 616 ss. abun. shell frags. Renovate stained gr.
2080	80-57A-2080																tr. 101R 616 ss. N2 shale w/ pyrite
2100	80-57A-2100																tr. 101R 616 ss. shell frags. N2 shale w/ pyrite
2120	80-57A-2120																shell frags.
2140	80-57A-2140																abun. shell frags.
2160	80-57A-2160																shell frags.
2180	80-57A-2180																carb. shale w/ pyrite shell frags.
2200	80-57A-2200																tr. shell frags.

CHIP SAMPLE 106  
FORM

Location: 7A Sec. 31 T. 14N R. 12W Quadrangle (9.5) Antelope Lockout  
Hole No: 5-7A State: New Mexico Date: 3-13-81  
Company: USGS County: McKinley Geologist: Kirk / Condon  
Lat/long: \_\_\_\_\_ Sheet 12 of 17

Table 1  
Descriptions of cuttings samples from Mariano Lake -  
Lake Valley Drilling Project, Hole No. 7A, New Mexico  
Estimated % of Lithologies

Depth to top of Lithology	Sample Number	Grain Size	Long.	Sand.	Silt.	Shale	Shale color	Coal	Lithology	Grain Size	Sorting	Rounded	Fiducial	Carbon.	Pyrite	Notes	Subsac Color	Formation/Member	Comments
2230	80-57A- 2220	5	10			87	N4 (dm) 56612 (mm) fr. 57A314 fr. N2		N8 3	UFF	MM	SR				blk + tan chert	N7 fr. 014616	Juan Lopez NW Maneros Shale	fr. pyrite in N2 shale, tri. shell frags.
2240	80-57A- 2230		10			87	N4 (dm) 56612 (mm) fr. 57A314 fr. N2		N8 3								N7		shell frags., fr. pyrite on N2 shale
2260	80-57A- 2250		5			93	N4 (dm) 56612 (mm) fr. 57A314 fr. N2		2										pyrite, disaggregated ss.
2280	80-57A- 2270		5			95	N4 (dm) 56612 (mm) fr. 57A314 fr. N2		fr.								N7	Maneros Shale	shell frags., disaggregated ss.
2300	80-57A- 2290		5			95	N4 (dm) 56612 (mm) fr. 57A314 fr. N2												
2320	80-57A- 2310		5			95	N3 (dm) fr. 57A314 fr. N8				MM	SR	fr.		fr.	blk chert			pyrite in shale
2340	80-57A- 2330		5			95	N4 (dm) 56612 (mm) fr. 57A314 fr. N2												
2360	80-57A- 2350		10			90	N4 (dm) 56612 (mm) fr. 57A314 fr. N2			UFF							N7		pyrite in N2 shale, shell frags. (?)
2380	80-57A- 2370		15			85	N4 (dm) 56612 (mm) fr. 57A314 fr. N2			UFF					fr.	blk chert	N7 fr. 014616		shell fragments, white clay nests
2400	80-57A- 2390		10			90	N4 (dm) 56612 (mm) fr. 57A314 fr. N2			UFF						blk + tan chert dysm acc.			



CHIP SAMPLE 106  
FORM

Location: 7A Sec. 31 T. 19N R. 12W Quadrangle (9.5) Antelope Lookout Mesa  
 Hole No: 5-7A State: New Mexico Date: 3-13-81  
 Company: USGS County: McKinley Geologist: Lick / Condon  
 Lat/Long: \_\_\_\_\_ Sheet 13 of 17

Sandstones

Table 1. Descriptions of cuttings, samples from Mariano Lake - Lake Valley Drilling Project, Hole No. 7a, New Mexico  
 Estimated % of Lithologies

Sample Number	Core/box	Grain	Sorting	Roundness	Feldspar	Lenses	Pyrite	Flint	Surface Color	Remarks / Notes	Comments
2420	30-57A-2420	75	5	5	94	N3	tr. N8	tr. N8	N7	tr. N8	white clay nests, hematite stained ss
2440	30-57A-2440		5	5	95	N3-N4 (85)	50-412 (6)	tr. N8	N7	tr. N8	white clay nests
2460	30-57A-2460		5	5	95	N4	50-412 (5)	tr. N8	N7	tr. N8	disaggregated ss, clay nests
2480	30-57A-2480	60-60	5	5	95	N4	50-412 (5)	tr. N8	N7	tr. N8	shell frag., pyrite on N2 shot, tr. N8
2500	30-57A-2500	60	15	15	85	N2	50-412	tr. N8	N7	tr. N8	pyrite on N2 shot, tr. N8
2520	30-57A-2520		20	20	80	N2					gypsum (?), pyrite, calcareous
2540	30-57A-2540		20	20	80	N2					shell frags., gypsum, carb. material
2560	30-57A-2560		10	10	90	N2					pyrites, very calcareous
2600	30-57A-2600		20	20	80	N2					



CHIP SAMPLE 106  
FORM

Location: 7A Sec. 31 T. 19N R. 12W Quadrangle (7.5) Hatch McKinley  
Hole No: 5-7A State: New Mexico Date: 3-18-81  
Company: USGS County: McKinley Geologist: Huffman/Robinson  
Lat/Long: \_\_\_\_\_ Sheet 14 of 17

Sample Number (Hole No. & Depth)	Grain Size	Sand %	Silt %	Shale %	Silt & Shale Color	Lithology	Grain Size	Sorting	Roundness	Feldspar	Lithology	Rhyolite	Hornbl.	Silt & Shale Color	Comments
2610	80-57A-2610	60	10	90	N2 5YR 6/4	U.F. W	5R	W	SR	fr.	fr.			N7	tr. gypsum, calcareous
2620	80-57A-2620		50	50	5YR 6/4	I.F. MW		MW							Darkish Sandstone calcareous
2630	80-57A-2630		70	30	N2 5YR 6/4	I.F. MW		MW							Calcareous, abun. gypsum, limonite stained ss.
2640	80-57A-2640		75	25	N2 5YR 6/4	U.F. M		M							Calcareous
2650	80-57A-2650		20	80	N2	I.F. MW		MW							
2660	80-57A-2660		20	80	N2 5YR 6/4	I.F.									
2670	80-57A-2670		25	75	N2	U.F.								5YR 6/4	Calcareous shale, pyrite, carbonaceous material
2680	80-57A-2680		50	50	N2	I.F.								N7	gypsum, calcareous, carbonaceous material
2690	80-57A-2690		50	50	N2	I.F.									
2700	80-57A-2700		50	50	N2	U.F. W		W							gypsum, very calcareous

CHIP SAMPLE 106  
Form

Location: 7H Sec. 31 T. 19N R. 12W

Quadrangle (v.s.) Antelope Lookout  
Mesal

Hole No: 5-7A

State: New Mexico

Date: 3-18-81

Company: USGS

County: McKinley

Geologist: Huffman/Robinson

Lat/Long: \_\_\_\_\_

Sheet 15 of 17

Table 1. Descriptions of cuttings samples from Mariano Lake -  
Lake Valley Drilling Project, Hole No. 7a, New Mexico  
Estimated % of Lithologies

Sample Number		Core/Lin	Length	Sandst.	Siltst	Shale	Shale color	Cgl	Lithology	Grain Size	Sorting	Roundness	Feldspar	Lenses	Pyrite	Fluores.	Subsidiary Color	Formation / member	Comments
Depth to top of Sample Interval	2710	80-57A-2710	10	50	SD	NZ			40E W	W	SR						N7	Dakota Sandstone	gypsum, Very Calcareous
2720	80-57A-2720		50	50	50				40E W	W									gypsum, gtz. overgrowths, Calcareous
2730	80-57A-2730		60	60	40				IF MW	MW									grn-574 sh. frags., gypsum, Calcareous, gtz. overgrowths, hematite stained ss
2740	80-57A-2740		50	50	50			tr	IF MW	MW									gtz. overgrowths, gypsum, Calcareous
2750	80-57A-2750		50	50	50				40E W	W									gtz. overgrowths, Calcareous
2760	80-57A-2760		40	40	60				40E W	W									pyrite, gtz. overgrowths, Calcareous
2770	80-57A-2770		75	75	25				40E M	M									gypsum, gtz. overgrowths, Calcareous
2780	80-57A-2780		90	90	10				40E		SR								gtz. overgrowths, carb. material, Calcareous
2790	80-57A-2790		30	30	70				IF		SR/ SD								
2800	80-57A-2800		10	10	40				IF	SR	SR/ SD								



CHIP SAMPLE LOG  
Form

location: 7A Sec. 31 T. 19N R. 12W Quadrangle (9.5) Antelope Lookout Mesa  
 Hole No: 5-7A State: New Mexico Date: 3-18-81  
 Company: USGS County: McKinley Geologist: Nuttman / Robinson  
 Lat/Long: \_\_\_\_\_ Sheet 16 of 17

Table 1. Descriptions of cuttings samples from Mariano Lake - Lake Valley Drilling Project Hole No. 7a, New Mexico - Sandstones  
 - Estimated % of Lithologies

Sample Number	Core Interval	Gravel	Sandst.	Siltst.	Shale	Shale Color	Cal	Lamination	From Sec	Sorting	Roundness	Feldspar	Lithology	Pyrite	Horst.	Substr. Color	Formation / member	Comments
2810	80-57A 2810	10	10	40	40	N2			IF	N7	S.A. / S.D.	tr.				N7	Dakota Sandstone	gtz overgrowths, calcareous
2820	80-57A 2820	40	40	60	60	N2						tr.					Brushy Basin Morrison Fm.	pyrite, calcareous gtz. overgrowths
2830	80-57A 2830	40	40	60	60	50-16/1	tr.					abn.						calcareous gtz. overgrowths
2840	80-57A 2840	40	40	60	60		tr.					tr.						
2850	80-57A 2850	1	1	1	1		NO											
2860	80-57A 2860	20	20	80	80	N2	tr.		UVE	UVE	S.R.					N7	Brushy Basin Morrison Fm.	slightly calcareous gtz. overgrowths
2870	80-57A 2870	10	10	40	40				UVE	UVE								slightly calcareous
2880	80-57A 2880	60	60	40	40				IF			2R			OK			gtz. on clay matrix in ss., slightly calcareous, gtz. overgrowths
2890	80-57A 2890	10	10	40	40							2R						slightly calcareous
2900	80-57A 2900	10	10	40	40													



CHIP SAMPLE 106  
FORM

Location: 7A Sec. 31 T. 19N R. 12W Quadrangle (9.5') Antelope Lookout Map  
 Hole No: S-7A State: New Mexico Date: 3-11-81  
 Company: U.S.G.S. County: Mohave Geologist: Kirk / Landon  
 Lat/Long: \_\_\_\_\_ Sheet 12 of 12

Table 1. Descriptions of cuttings samples from Mariamp Lake -  
 Lake Valley Drilling Project, Hole No. 7A, New Mexico Sandstones  
 Estimated % of Lithologies

Depth to Top of Sample Interval	Sample Number	Sand %	Silt %	Shale %	Shale Color	Coal	Limestone	Grit	Sorting	Rounded	Foliation	Bedding	Ripple	Fossils	Sandstone Color	Form thin / massive	Comments
	2910																No Sample
	2920																No Sample
	2930																No Sample
	Core Port																