

Union Cont. - N.M. 54112. Edition 5
SW/4-NE/4 Sec 34-Twp 15N-R19E
Navajo, County No Permit 9-8

P-11

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County Navajo
Area Holbrook
Lease No. _____

Well Name Union Continental New Mexico & Arizona Land #1

Location SW NE Sec 34 Twp 15N Range 19E Footage 2160 FNL; 2115 FEL
Elev 6034 Gr 6047 KP/ Date 1-23-44 Abandon 3-17-44 Depth 3609
DF Spud Completed Total
Approx.

Contractor: _____ Cost \$ _____

Casing Size 10 3/4 Depth 336 Cement _____
Drilled by Rotary Cable Tool _____
Production Horizon _____
Initial Production D&A

		AMSTRAT	
REMARKS	Tops: Coconino	560 ?	0-
			630-
			1118
	Penn	3096	NALC 2545
			P. Res. zone 3525
	Redwall	3577	NONE
			Dev-Martin 3544 - does not sound l. Re Devonian lithology - except below 3577
	Granite	3607	Arkosel W. End - 3593
			Fresh Green 3607

110
(took 109 cores and two DST's: see file)
Elec. _____ Sample Log Am Strat - Have it
Logs None run Sample Descrip. X
Applic Plugging Completion _____ Sample Set 7-961, P-558
to Plug _____ Record _____ Report _____ Cores _____
Have description of 110 cores by Union.

Bond Co. _____
& No. _____
Bond Am't \$ _____ Canceled _____ Date _____ Organization Report _____
Filing Receipt _____ Dated _____ Well Book _____ Plat Book _____
Loc. Plat _____ Dedication _____

PERMIT NUMBER none Date Issued _____

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UNION-CONTINENTAL-NEW MEXICO-ARIZONA #1
Location: 2160' South & 2115' West of Northeast corner of Sec. 34-15N-19E G&SRB&M
Elevation: 6034' ground; 6047' Derrick floor; 6049' Kelly Bushing (All depths measured from Kelly Bushing)

Holbrook Area
Navajo County
Arizona

Spudded: January 23, 1944
Abandoned: March 17, 1944

Total Depth: 3609'

Casing: 10-3/4" Cemented at 336'

No electric log survey run

Top Granite 3607'

Rotary Rig

Took 109 CORES (see file)
Took 2 DSTs " "

L O G

Tops: Coconino 560
Penn 3096
Redwall 3577
GRANITE 3607

Interval	Lithologic Description
0 - 15	Conductor pipe.
15 - 20	Sandstone, red, fine-grained silty.
20 - 30	Sandstone as above with tan to buff, sandy clayey limestone
30 - 40	Limestone, tan to buff, sandy, clayey; streaks quite micromica- ceous
40 - 270	Sandstone, white with occasional slight tannish cast, medium- grain, hard to fairly friable.
270 - 290	Sandstone, as above, with streaks of buff sandstone.
290 - 330	Sandstone, white with occasional tannish streak, medium-grained, hard to fairly friable
330 - 520	Sandstone, as above, though slightly more friable and considera- bly more "floury" and finer grained.
520 - 560	Sandstone, red, tan, and reddish-tan, medium-grained, hard to slightly friable.
560 - 630	Drilled without returns.
630	Sample off bit; shale, red, clayey, sandy.
630 - 670	Sand, red, medium-grained, silty, with thin streaks of red shale.
670 - 680	Sand, as above, interbedded with red, fine, sandy shale; trace of gypsum.
680 - 690	Shale, red, fine, sandy, with thin streaks of red, silty sand.
690 - 700	Shale, red, fine, sandy, with considerable gypsum.
700 - 730	Anhydrite-white, milky, hard.
730 - 740	Interbedded anhydrite, white, milky, hard.
740 - 750	Anhydrite, white, milky, hard.
750 - 760	Interbedded anhydrite, as above, and red, fine, sandy shale.
760 - 780	Interbedded bright red, shaly sand; red, fine, sandy shale; and white anhydrite.
780 - 820	As above, with trace of clear crystal salt. Top of salt at 780'.
820 - 830	Anhydrite, white, milky with thin interbeds of reddish-brown, sandy shale and red, silty sand.
840 - 940	Interbedded red, silty sand; reddish-brown fine, sandy shale; and white milky anhydrite; trace of clear, crystal salt.
940 - 950	Anhydrite, white, milky, hard, with lesser amounts of reddish- brown fine, sandy shale, and red, silty sand.
950 - 990	Interbedded, red silty sand; reddish-brown, fine, sandy shale; and white, milky anhydrite.
990 - 1000	Anhydrite, white, milky, hard, with lesser amounts of reddish- brown sandy shale, and red, silty sand.
1000 - 1020	Interbedded reddish-brown, sandy shale; white, milky anhydrite; and red, silty sand.
1020 - 1030	Anhydrite, white, milky, hard, with thin interbeds of reddish- brown sandy shale.
1030 - 1040	Shale, brown, very sandy, with a minor amount of red, silty sand and anhydrite.
1040 - 1050	Anhydrite, white, milky, hard, with trace of brown, very sandy shale.
1050 - 1060	Shale, dark, gray-brown, limy, sandy; first marine streak.

No Permit

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UNION-CONTINENTAL-NEW MEXICO-ARIZONA #1
Sec. 34, Twp. 15 N., Rge. 19 E.

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- 1060 - 1070 Anhydrite, white, milky, hard, with a trace of gray and red shale.
- 1070 - 1080 Sand, brown to reddish-brown, very shaly, with a trace of anhydrite.
- 1080 - 1090 Shale, brown, very sandy, with thin interbeds of anhydrite and brown sand; trace of salt.
- 1090 - 1130 Sand, brown, very shaly, with lesser amounts of brown, sandy shale and anhydrite; occasional crystal of salt.
- 1130 - 1220 Interbedded brown, very shaly sand; brown, very sandy shale; and anhydrite; occasional streaks of crystal salt.
- 1220 - 1230 Anhydrite and gypsum; some of gypsum is very porous; minor streaks of brown sand and shale.
- 1230 - 1250 Shale, brown to reddish-brown, very sandy with minor amounts of brown silty sand and anhydrite.
- 1250 - 1280 Anhydrite, white, milky, becoming quite shaly in lower portion.
- 1280 - 1300 Shale, brown, fine, sandy, with trace of salt and anhydrite.
- 1300 - 1320 Anhydrite, white, milky, hard.
- 1320 - 1330 Interbedded anhydrite and brown, fine, sandy shale.
- 1330 - 1470 Sand, brown, shaly, with fewer interbeds of brown, fine, sandy shale and anhydrite; occasional crystal of salt.
- 1470 - 1560 Shale, brown to reddish-brown, sandy, with lesser amounts of brown, silty sand and anhydrite; trace of salt in lower portion.
- 1560 - 1570 Shale, gray-black to gray-brown, slightly limy; marine.
- 1570 - 1580 Sand, gray-brown, silty, dolomitic, with streak of black shale.
- 1580 - 1600 Interbedded brown, sandy shale; brown, silty sand; gray, slightly limy shale; and anhydrite.
- 1600 - 1670 Shale, brown to reddish-brown, fine, sandy, with fewer interbeds of brown, silty sand, gray, limy shale, and anhydrite; occasional crystal of salt.
- 1670 - 1680 Interbedded brown, fine, sandy shale; brown, silty sand; gray, slightly limy shale; with a trace of anhydrite.
- 1680 - 1690 Shale, gray to gray-black, limy, with interbeds of brown, sandy shale and silty sand and anhydrite; occasional inclusion of gray, shaly limestone.
- 1692 - 1793 Cored (See core description)
- 1790 - 1800 Shale, brown to reddish-brown, very sandy, with thin interbeds of brown silty sand.
- 1800 - 1830 Sand, brown, very shaly, with thin interbeds of brown, very sandy shale, minor amount of very porous anhydrite.
- 1830 - 1840 Interbedded brown, very shaly, fine-grained sand, and brown, sandy shale; trace of very porous anhydrite.
- 1840 - 1850 Anhydrite, white, milky, with minor amounts of brown sand and shale.
- 1850 - 1870 Sand, brown, very shaly, fine-grained, with considerable amount of brown, fine, sandy shale; occasional streaks of anhydrite.
- 1870 - 1880 Shale, brown, fine, sandy, with minor amount of brown, shaly sand and anhydrite.
- 1880 - 1970 Sand, brown to reddish-brown, very shaly, with thin streaks of brown, fine, sandy shale; trace of porous anhydrite and gray shale. From 1940' to 1970' there are occasional streaks of bright red, clayey, coarse-grained sand.
- 1970 - 1980 Shale, brown, fine, sandy, with streaks of brown, shaly sand and red clayey, coarse-grained sand.
- 1980 - 2030 Sand, brown to reddish-brown, very shaly, fine-grained, with fewer interbeds of brown, fine, sandy shale; occasional trace of anhydrite.
- 2030 - 2040 Sand, grayish-tan, silty, with some brown, shaly sand, and occasional inclusion of blue-gray, shaly limestone.
- 2040 - 2050 Shale, grayish-tan, limy, with some streaks of sand, as above; occasional inclusion of blue-gray, shaly limestone.
- 2050 - 2070 Sand, brown, silty, with lesser amounts of brown, fine, sandy shale.
- 2070 - 2080 Shale, brown to reddish-brown, fine, sandy, with thin streaks of sand as above.
- 2080 - 2170 Interbedded brown, silty, fine-grained sand, and brown, fine, sandy shale; occasional trace of anhydrite.

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UNION OIL COMPANY & CONTINENTAL OIL CO. NEW MEXICO-ARIZONA #1

NAVAJO COUNTY
Holbrook area

Location: 2160' south & 2115' west of northeast corner
of section 34, T. 15N., R. 19 E., GSRB&M
Elevation: 6034' ground; 6047' derrick floor; 6049' Kelly Bushing
(All depths measured from Kelly Bushing)

Spudded: January 23, 1944
Abandoned: March 17, 1944

Total Depth: 3609'

Casing: 10-3/4" cemented at 336'

No electric log survey run.

LOG

<u>Interval</u>	<u>Lithologic Description</u>
0-15	Conductor pipe.
15-20	Sandstone, red, fine-grained, silty.
20-30	Sandstone, as above, with tan to buff, sandy, clayey limestone.
30-40	Limestone, tan to buff, sandy, clayey; streaks quite micromicaceous.
40-270	Sandstone, white with occasional slight tannish cast, medium-grained, hard to fairly friable.
270-290	Sandstone, as above, with streaks of buff sandstone.
290-330	Sandstone, white with occasional tannish streak, medium-grained, hard to fairly friable.
330-520	Sandstone, as above, though slightly more friable and considerably more "floury" and finer grained.
520-560	Sandstone, red, tan, and reddish-tan, medium-grained, hard to slightly friable.
560-630	Drilled without returns.
630	Sample off bit; shale, red, clayey, sandy.
630-670	Sand, red, medium-grained, silty, with thin streaks of red shale.
670-680	Sand, as above, interbedded with red, fine, sandy shale; trace of gypsum.
680-690	Shale, red, fine, sandy, with thin streaks of red, silty sand.
690-700	Shale, red, fine, sandy, with considerably gypsum.
700-730	Anhydrite, white, milky, hard.
730-740	Interbedded anhydrite, as above, and red, fine, sandy shale.
740-750	Anhydrite, white, milky, hard.
750-760	Interbedded anhydrite, as above, and red, fine, sandy shale.
760-780	Interbedded bright red, shaly sand: red, fine, sandy shale; and white anhydrite.
780-820	As above, with trace of clear crystal salt. Top of salt at 780'.
820-830	Anhydrite, white, milky with thin interbeds of reddish-brown, sandy shale and red, silty sand.
830-840	Anhydrite, white, milky, hard, with trace of reddish-brown, sandy shale and red, silty sand.
840-940	Interbedded red, silty sand; reddish-brown, fine, sandy shale; and white milky anhydrite; trace of clear, crystal salt.
940-950	Anhydrite, white, milky, hard, with lesser amounts of reddish-brown fine, sandy shale, and red, silty sand.
950-990	Interbedded, red, silty sand; reddish-brown, fine, sandy shale; and white, milky anhydrite.
990-1000	Anhydrite, white, milky, hard, with lesser amounts of reddish-brown sandy shale, and red, silty sand.
1000-1020	Interbedded reddish-brown, sandy shale; white, milky anhydrite; and red, silty sand.
1020-1030	Anhydrite, white, silky, milky, hard, with thin interbeds of reddish-brown, sandy shale.
1030-1040	Shale, brown, very sandy, with a minor amount of red, silty sand and anhydrite.
1040-1050	Anhydrite, white, milky, hard, with trace of brown, very sandy shale.
1050-1060	Shale, dark, gray-brown, limy, sandy; first marine streak.
1060-1070	Anhydrite, white, milky, hard, with a trace of gray & red shale.
1070-1080	Sand, brown to reddish-brown, very shaly, with a trace of anhydrite.
1080-1090	Shale, brown, very sandy, with thin interbeds of anhydrite and brown sand; trace of salt.
1090-1130	Sand, brown, very shaly, with lesser amounts of brown, sandy shale and anhydrite; occasional crystal of salt.
1130-1220	Interbedded brown, very shaly sand; brown, very sandy shale; and anhydrite; occasional streaks of crystal salt.
1220-1230	Anhydrite and gypsum; some of gypsum is very porous; minor streaks of brown sand and shale.
1230-1250	Shale, brown to reddish-brown, very sandy with minor amounts of brown silty sand and anhydrite.
1250-1280	Anhydrite, white, milky, becoming quite shaly in lower portion.
1280-1300	Shale, brown, fine, sandy, with trace of salt and anhydrite.
1300-1320	Anhydrite, white, milky, hard.

- 1320-1330 Interbedded anhydrite and brown, fine, sandy shale
 1330-1470 Sand, brown, shaly, with fewer interbeds of brown, fine, sandy shale, and anhydrite; occasional crystal of salt.
 1470-1560 Shale, brown to reddish-brown, sandy, with lesser amounts of brown, silty sand and anhydrite, trace of salt in lower portion.
 1560-1570 Shale, gray-black to gray-brown, slightly limy; marine.
 1570-1580 Sand, gray-brown, silty, dolomitic, with streak of black shale.
 1580-1600 Interbedded brown, sandy shale; brown, silty sand; gray slightly limy shale; and anhydrite.
 1600-1670 Shale, brown to reddish-brown, fine, sandy, with fewer interbeds of brown, silty sand, gray, limy shale, and anhydrite; occasional crystal of salt.
 1670-1680 Interbedded brown, fine, sandy shale; brown, silty sand; gray, slightly limy shale; with a trace of anhydrite.
 1680-1690 Shale, gray to gray-black, limy, with interbeds of brown, sandy shale and silty sand and anhydrite; occasional inclusion of gray, shaly limestone.
 1692-1793 Cored (See core description)
 1793-1800 Shale, brown to reddish-brown, very sandy, with thin interbeds of brown silty sand.
 1800-1830 Sand, brown, very shaly, with thin interbeds of brown, very sandy shale; minor amount of very porous anhydrite.
 1830-1840 Interbedded brown, very shaly, fine-grained sand, and brown, sandy shale, trace of very porous anhydrite.
 1840-1850 Anhydrite, white, milky, with minor amounts of brown sand and shale.
 1850-1870 Sand, brown, very shaly, fine-grained, with considerable amount of brown fine, sandy shale; occasional streaks of anhydrite.
 1870-1880 Shale, brown, fine, sandy, with minor amount of brown, shaly sand, and anhydrite.
 1880-1970 Sand, brown to reddish-brown, very shaly, with thin streaks of brown, fine, sandy shale; trace of porous anhydrite and gray shale. From 1940' to 1970' there are occasional streaks of bright red, clayey, coarse-grained sand.
 1970-1980 Shale, brown, fine, sandy, with streaks of brown, shaly sand and red, clayey coarse-grained sand.
 1980-2030 Sand, brown to reddish-brown, very shaly, fine-grained, with fewer interbeds of brown, fine, sandy shale; occasional trace of anhydrite.
 2030-2040 Sand, grayish-tan, silty, with some brown, shaly sand, and occasional inclusion of blue-gray shaly limestone.
 2040-2050 Shale, grayish-tan, limy, with some streaks of sand, as above; occasional inclusions of blue-gray, shaly limestone.
 2050-2070 Sand, brown, silty, with lesser amounts of brown, fine, sandy shale.
 2070-2080 Shale, brown to reddish-brown, fine, sandy, with thin streaks of sand as above.
 2080-2170 Interbedded brown, silty, fine-grained sand, and brown, fine, sandy shale; occasional trace of anhydrite.
 2170-2300 Sand, brown, fine-grained, silty, and sand, red, medium to coarse-grained, clayey; occasional streaks of brown, sandy shale, gray shale, and porous anhydrite.
 2300-2350 Interbedded brown, fine-grained, silty sand, and brown, fine, sandy shale.
 2350-2460 Sand, brown, fine-grained silty, and sand, red, coarse-grained, clayey; occasional streak of brown, fine, sandy shale.
 2460-2510 Sand, brown and reddish-brown, shaly, with streaks of reddish-brown, probably dolomitic, fine, sandy shale; minor amounts of gray, slightly lime shale and anhydrite.
 2510-2550 Shale, red and brown, clayey, sandy, dolomitic; thin interbeds of brown, and reddish-brown, shaly sand; minor inclusions of gray shale and anhydrite.
 2550-2820 Shale, reddish to purplish-brown, limy dolomitic; considerable inclusions of purplish-gray, probably nodular, limestone and reddish-brown dolomite; minor amounts of reddish-brown, silty sand, gray, limy shale, and porous anhydrite.
 2820-3609 Cored (See core description)

Total Depth - 3609'

UNION-CONTINENTAL-NEW MEXICO-ARIZONA #1
 Sec. 34, Twp. 15 N., Rge. 19 E. - 3 -

2170 - 2300	Sand, brown, fine-grained, silty and sand, red, medium to coarse-grained, clayey; occasional streaks of brown, sandy shale, gray shale, and porous anhydrite.
2300 - 2350	Interbedded brown, fine-grained, silty sand, and brown, fine sandy shale.
2350 - 2460	Sand, brown, fine-grained, silty, and sand, red, coarse-grained, clayey; occasional streak of brown, fine, sandy shale.
2460 - 2510	Sand, brown and reddish-brown, shaly, with streaks of reddish-brown probably dolomitic, fine, sandy shale; minor amounts of gray, slightly limy shale and anhydrite.
2510 - 2550	Shale, red and brown, clayey, sandy, dolomitic; thin interbeds of brown, and reddish-brown, shaly sand; minor inclusions of gray shale and anhydrite.
2550 - 2820	Shale, reddish to purplish-brown, limy, dolomitic; considerable inclusions of purplish-gray, probably nodular, limestone and reddish-brown dolomite; minor amounts of reddish-brown, silty sand, gray, limy shale, and porous anhydrite.
2820 - 3609	<u>Cored</u> (See core description)
Total Depth:	3609'

C O R E D E S C R I P T I O N

<u>Core No.</u>	<u>Interval</u>	<u>Recovery</u>	<u>Lithologic Description</u>
1	1692-1702	9'	1½' Salt, clear, with light brown mottlings streaked and veined with brown, clayey shale. 1' Shale, gray to gray-black, with occasional thin, reddish-brown streaks; massive, dolomitic. 1½' Shale, reddish-brown, with thin streaks of gray, fine, sandy, massive; numerous streaks and pockets of salt. 1½' Chert, blue-gray to gray-black, hard, tight, dense. 6" Salt, clear, with light brown mottling 3" Shale, gray, very cherty, hard, dense with pockets of salt. 2'9" Shale, reddish-brown, with rare streaks of gray, fine, sandy; pockets and seams of salt and occasional gray chert inclusion.
2	1702-1712	10'	4½' Salt, clear, with gray mottling; veined with gray shale and gray chert. 5' Chert, blue-gray to gray-black, hard, tight, dense; occasional stringers of gray-black, dolomitic shale; pockets and vugs of crystal salt very common. 6" Shale, gray-brown, dolomitic or fine, sandy, micromicaceous; slight stain and slight odor.
3	1712-1722	4'	Shale, gray to gray-brown, dolomitic or fine, sandy, micromicaceous; a number of interbeds of blue-gray, hard, tight, dense chert; some stain and slight odor.
4	1722-1730	6'	Shale, as above, with interbeds of chert; numerous pockets and vugs of crystal salt in upper 3'.
5	1730-1734	3'	Chert, blue-black to gray-black, hard, tight, dense, with interbeds of tan and tannish-gray, tight, dense dolomite; slight odor and slight spotty stain.

UNION-CONTINENTAL-NEW MEXICO-ARIZONA #1
 Sec. 34, Twp. 15-N., Rge. 19-E.

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Core No.	Interval	Recovery	Lithologic Description
6	1734-1740	6'	Dolomite, tannish-brown, fine-grained, tight dense; abundant small inclusions of white-blue-white and blue-gray chert; fair odor; practically no porosity except for rare vuggy spots.
7	1740-1745	5'	Dolomite, as above, becoming quite limy in lower 2'; light brown stain in upper 3'; dark brown stain in lower 2'; good odor throughout; only slight porosity.
8	1745-1755	8'	Limestone, gray-brown, quite shaly and dolomitic in streaks; numerous white, blue-white and blue-gray chert inclusions; light to dark brown stain throughout; good odor; very slight porosity.
9	1755-1765	10'	Limestone, as above, though somewhat more shaly; good stain and good odor; very slight porosity.
10	1765-1775	10'	Limestone, tannish-gray to gray-brown, shale dolomitic, with occasional white, blue-white, and blue-gray chert inclusions; streaks are very dolomitic; good stain and good odor; very slight porosity.
11	1775-1785	10'	5½' Limestone, as above; good stain and good odor; practically no porosity. 4½' Shale, gray to blue-gray, very fine, sandy, and probably dolomitic; very little stain and meager odor; looked wet.
12	1785-1795	7'	3' Shale, as above, micromicaceous; no stain or odor; looked wet. 4' Shale, reddish-brown, quite sandy, and dolomitic; massive; occasional small white blue-white and blue-gray chert inclusions
13	2820-2830	10'	6' Shale, reddish to purplish-brown, limy dolomitic; occasional small pebbles; occasional slickensides; numerous inclusions of gray to white crystalline limestone. 1' Limestone, greenish-gray, gray, reddish brown, mottled; cherty, shaly; rare small pebbles. 3' Dolomite, reddish-brown, with streaks of gray; very shaly in streaks; very limy
14	2830-2840	10'	Limestone, reddish to purplish-brown, with streaks of gray; massive, hard, tight, dense; shaly in streaks; dolomitic; occasional cherty streaks.
15	2840-2850	10'	1' Limestone, as above. 9' Shale, reddish to purplish-brown, very limy; occasional slickensides.
16	2850-2855		No Recovery.
17	2855-2862	6"	Shale, as above.
18	2862-2870	6"	Shale, as above.

UNION-CONTINENTAL-NEW MEXICO-ARIZONA #1
 Sec. 34, Twp. 15-N., Rge. 19-E.

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Core No.	Interval	Recovery	Lithologic Description
19	2870-2873		No Recovery
20	2873-2878	5'	1½' Limestone, gray, hard, tight, dense, cherty. 6" Shale, reddish-brown, limy. 1½' Limestone, gray, shaly to cherty. 1½' Shale, gray-brown, limy; occasional small pebbles, becoming very clayey and crumbly in lower portion.
21	2878-2888	5'	4' Shale, gray-brown to bluish-brown, very clayey and crumbly; abundant small chert and lime stone pebbles. 1' Limestone, gray to gray-brown, cherty, shaly, occasional small pebbles.
22	2888-2898	10'	Limestone, reddish-brown, to gray-brown hard, tight, dense, dolomitic; occasional streaks reddish-brown limy shale; numerous veins and inclusions of gray to white crystalline limestone; occasional small pebbles in shaly streaks.
23	2898-2908	10'	3' Limestone, as above. 2' Shale, reddish-brown, with occasional streaks gray, limy; occasional small pebbles; occasional inclusion of gray to white crystalline limestone. 5' Limestone, reddish-brown, with occasional streak of gray, hard, tight, dense, shaly, dolomitic, with numerous gray to white inclusions of cherty to crystalline limestone.
24	2908-2918	8'	7½' Limestone, as above, with thin streaks of reddish-brown, limy shale. 6" Shale, reddish-brown to gray-brown, crumbly, clayey, limy.
25	2918-2928	2'	Shale, as above, quite pebbly, becoming more firm in lower 1'.
26	2928-2934	6'	Shale, reddish-brown, with occasional streaks of greenish-gray; very conglomeratic, clayey, crumbly, limy.
27	2934-2944	6'	Shale, reddish-brown, limy, dolomitic; numerous gray and greenish-gray, nodular chert and limestone inclusions; abundant small, scattered pebbles; occasional slickensides.
28	2944-2948	4'	3' Shale, as above, though more limy and dolomitic. 1' Dolomite, reddish-brown, fine, sandy, hard, tight, dense, massive; slightly limy.
29	2948-2958	10'	1' Dolomite, as above. 9' Dolomite, as above, with abundant inclusions and veinings of gray, cherty limestone; 6" zone of brecciated limestone and dolomite at 2955'; contains both rounded and angular pebbles.

UNION-CONTINENTAL-NEW MEXICO-ARIZONA #1
 Sec. 34, Twp. 15-N., Rge. 19-E.

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Core No.	Interval	Recovery	Lithologic Description
30	2958-2968	8½'	8'3" Dolomite, reddish-brown, fine, sandy; occasional shaly streak; massive, hard, tight, dense; occasional pebbles in shaly streaks; very minor small inclusions of gray, cherty limestone. 3" Shale, grayish and bluish-brown, mottled clayey, crumbly.
31	2968-2978	10'	6" Shale, as above, becoming more firm and less crumbly; slickensided. 9½" Shale, reddish-brown, massive, very limy and dolomitic in upper 4', becoming more clayey and extremely pebbly in lower 5'.
32	2978-2988	10'	3' Shale conglomerate, gray to bluish-brown clayey, crumbly; pebbles are chert and limestone. 7' Dolomite, reddish-brown, fine, sandy, quite limy, massive, hard, tight, dense; abundant veining and inclusions of white and gray, cherty limestone; occasional small scattered pebbles.
33	2988-2998	10'	1' Dolomite, as above. 9' Dolomite, reddish-brown, fine, sandy, quite limy, massive, hard, tight, dense, with interbeds of reddish-brown to gray-brown, fine-grained, quartzitic, dolomitic sandstone.
34	2998-3006	8'	4' Dolomite, as above 4' Shale, reddish-brown to gray-brown, limy, dolomitic; firm to becoming quite clayey and crumbly in lower portion; numerous small scattered pebbles; numerous slickensides.
35	3006-3015	9'	6' Shale, blue-gray, with brown mottling; clayey, crumbly, limy; numerous small scattered pebbles; occasional slickensides, becoming more firm and dolomitic in lower 1'. 1' Dolomite, reddish-brown, fine, sandy, limy, massive, hard, tight, dense, occasional gray, cherty limestone inclusion. 2' Shale, reddish-brown, limy, dolomitic; abundant inclusions of white and gray cherty limestone; occasional small scattered pebbles; occasional slickensides.
36	3015-3018	3'	Shale, gray-brown, limy, dolomitic; numerous small scattered pebbles; white to gray, cherty, nodular limestone inclusions; considerable slickensides.
37	3018-3028	9'	6' Shale, as above. 3' Dolomite, reddish-brown, granular, hard tight, dense, with numerous inclusions of white to gray, cherty, nodular limestone; also contains rounded chert and limestone pebbles.

UNION-CONTINENTAL-NEW MEXICO-ARIZONA #1
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Core No.	Interval	Recovery	Lithologic Description
38	3028-3030	9'	Shale, blue-gray, gray-brown and reddish-brown, clayey, and crumbly in upper 6', becoming firm, limy and dolomitic in lower 3'; occasional inclusions of white to gray, nodular limestone; very pebbly in upper 6'; occasional slickensides.
39	3038-3048	10'	Shale, as above; some clayey and crumbly; some firm, limy, and dolomitic.
40	3048-3058	7½'	3' Dolomite, reddish-brown, finely granular hard, tight, dense, massive; abundant inclusions of white to gray, cherty, nodular limestone. 3' Shale; reddish-brown, limy, dolomitic, clayey, firm to crumbly; numerous slickensides. 1½' Dolomite, reddish-brown, finely granular hard, tight, dense, massive; rare gray cherty, limestone inclusions.
41	3058-3068	9'	Dolomite, as above, though somewhat shaly in upper 6'.
42	3068-3078	7½'	Dolomite, as above.
43	3078-3088	10'	Dolomite, reddish-brown, granular, fine, sandy, hard, tight, dense, massive with thin interbeds of reddish-brown to gray brown, limy, dolomitic shale, and pinkish-red, fine-grained hard, tight, dense, sharp, quartzitic, dolomitic sandstone.
44	3088-3096	8'	2' Dolomite, gray-black, granular, very sandy, massive, hard, tight, dense; occasional white to gray limestone inclusions; shows considerable cross-bedding. 6' Sandstone, gray-white to gray-black with occasional greenish-gray streak; dolomitic, quartzitic, highly cross-bedded; numerous patches and zones of brecciated, cherty limestone.
45	3096-3106	10'	1' Limestone, gray, cherty, hard, dense, with thin interbeds of purplish-gray, dolomitic shale; gray, nodular chert in shale partings. 9' Shale, purplish-gray, clayey, dolomitic, slightly limy, with white to gray, nodular, cherty, limestone inclusions; some small limestone pebbles? ? Highly slickensided; lower 6" gray and bentonitic.
46	3106-3116	4'	Limestone, light gray, cherty, nearly non-vacillite; occasional brecciated zones; minor inclusions of red chert, minor dry, black, asphaltic residue along fractures.
47	3116-3126	10'	6" Limestone, gray, greenish-gray, purplish gray, cherty to semi-crystalline, hard, tight, dense; numerous veining and inclusions of red chert. 1' Shale, purplish-black; occasional pebbles; occasional gray-white, nodular cherty, limestone inclusion.

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Core No.	Interval	Recovery	Lithologic Description
47 (Continued)			<p>4½' Limestone, reddish to pinkish-brown, dolomitic, shaly, hard, tight, dense; numerous inclusions of gray, nodular, cherty limestone.</p> <p>3' Shale, purplish to reddish-brown, limy, in upper part to very clayey and crumbly in lower portion.</p> <p>1' Limestone, gray, cherty, nearly novaculite, hard, dense, with 2" bed of gray to bluish-gray, clayey, bentonitic, crumbly shale in middle.</p>
48	3126-3135	7'	Limestone, light gray, cherty, nearly novaculite, massive, hard, tight, dense, considerably fractured and brecciated; some red chert veining
49	3135-3144	9'	<p>8' Limestone, dark gray to black, shaly, hard, tight, dense; numerous gray-white nodular, cherty limestone inclusions; abundant small, red chert inclusions; slight odor; lycopod stems and compositas ?</p> <p>1' Shale, gray-brown, to reddish-brown, limy, and dolomitic to clayey; occasional gray, cherty, limestone inclusion.</p>
50	3144-3154	9'	<p>1' Shale, gray to gray-brown, dolomitic, with gray, nodular, cherty limestone inclusions; very pebbly; large sized chert and limestone pebbles.</p> <p>8' Limestone, gray to black, cherty to semi-crystalline; occasional thin streaks and interbeds of black to gray-brown, limy, dolomitic shale; a few lycopod and Crinoid stems.</p>
51	3154-3163	9'	Shale, gray, gray-brown, and reddish-brown, limy, dolomitic; numerous thin, white to gray, semi-crystalline to crystalline interbeds of fossiliferous limestone; entire core extremely fossiliferous; abundant Crinoid stems, Lycopods, Dialasma and Composita; occasional spotty stain in some of more porous limestone stringers.
52	3163-3170	7'	<p>2' Fossiliferous shale, as above.</p> <p>2½' Limestone, gray, cherty, nodular, hard, tight, dense; sparingly fossiliferous; slight spotty stain.</p> <p>2½' Shale, gray, gray-brown and reddish-brown, very limy and dolomitic; massive firm, hard; nearly a limestone or dolomite; occasional gray, nodular, cherty limestone inclusion; slight, very spotty stain; rare fossils.</p>
53	3170-3170	9'	Shale, as above.
54	3179-3189	9'	<p>3' Shale, as above, though mostly gray.</p> <p>6' Shale, gray to black, limy dolomitic; streaks quite carbonaceous.</p>
55	3189-3199	10'	Shale, as above, streaks very carbonaceous to lignitic; abundant carbonized wood; occasional large patches of pyrite.
56	3199-3209	10'	Shale, as above.

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Core No.	Interval	Recovery	Lithologic Description
57	3209-3216	5'	Shale, as above.
58	3216-3225	9'	Shale, as above.
59	3225-3231	6'	Shale, as above.
60	3231-3236	5'	Shale, as above, becoming gray-brown in lower 2'; abundant small chert and limestone pebbles.
61	3236-3246	10'	Shale, gray-brown, with occasional streaks of bluish-gray; crumbly in upper part to firm and dolomitic in lower portion; a few very small scattered pebbles.
62	3246-3256	10'	6½' Shale, reddish-brown, with occasional streaks of gray; firm, dolomitic, slightly limy.
			3½' Limestone breccia and conglomerate, gray to gray-brown; made up of rounded as well as angular chert and limestone fragments in matrix of gray limestone; fair spotty porosity and fair spotty yellow stain.
63	3256-3265	7'	5½' Limestone, as above; fair spotty porosity and fair spotty yellow stain.
			1½' Limestone, gray, with occasional streaks of gray-brown, shaly, dolomitic, tight, dense.
64	3265-3275	10'	Interbedded limestone as above, and gray and gray-brown, limy, dolomitic, firm shale; occasional carbonaceous material in shale streaks; rare, slight stain.
65	3275-3283	8'	2' Shale, gray, gray-black, gray-brown, and reddish-brown; occasional gray, nodular, limestone inclusions; occasional fossils in limy zones.
			4' Limestone, gray and reddish-brown, hard, tight, dense, dolomitic, with occasional gray, nodular, cherty limestone inclusions.
			2' Shale, reddish to purplish-brown, limy, dolomitic, massive, firm; occasional gray, nodular, cherty limestone inclusion.
66	3283-3290	6'	Shale, as above, becoming gray in lower 1'.
67	3290-3298	7½'	Shale, gray to black, with occasional streaks of brown; limy; numerous white to gray, nodular, cherty limestone inclusions; quite fossiliferous; abundant partially carbonized plant material.
68	3298-3308	10'	Shale, as above; indications of practically flat dips.
69	3308-3315	7'	1' Shale, as above; occasional small scattered pebbles.
			6' Shale, reddish-brown, with occasional streak of gray, limy.
70	3315-3325	10'	4' Shale, as above, with abundant small scattered limestone and chert pebbles.
			6' Limestone, gray, pinkish-gray and pinkish brown, hard, tight, dense, dolomitic.

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Core No.	Interval	Recovery	Lithologic Description
71	3325-3335	4'	2' <u>Limestone</u> , as above. 2' <u>Shale</u> , gray-brown, blue-gray; very clayey and crumbly; occasional small scattered pebbles.
72	3335-3345	10'	1½' <u>Limestone</u> , purplish-gray to reddish-gray, dolomitic, massive, hard, tight, dense; occasional small scattered pebbles. 8' <u>Shale</u> , reddish-brown, firm and limy to crumbly and clayey; occasional small scattered pebbles; highly slickensided. 6" <u>Limestone</u> , gray to greenish-gray, hard, tight, dense.
73	3345-3354	10'	Dolomite, gray-brown, reddish-brown and pinkish-brown, quite limy, fine, granular, hard, tight, dense; becoming very shaly in lower 1½'.
74	3354-3364	10'	3' <u>Shale</u> , reddish to purplish-brown, slightly limy and dolomitic; numerous good-sized limestone and chert pebbles; prominent unconformity at 3357' / basal pebbles resting on erosional scour and fill, limestone. 1' <u>Limestone</u> , gray, hard, tight, dense. 6' <u>Limestone</u> , reddish to pinkish-brown, very dolomitic, finely granular, massive, hard, tight, dense.
75	3364-3370	5'	<u>Limestone</u> , as above, with occasional shaly streak.
76	3370-3379	9'	<u>Limestone</u> , as above, with occasional streak of gray.
77	3379-3387	9½'	6" <u>Limestone</u> , as above. 1' <u>Limestone</u> , gray, cherty, hard, tight, dense. 2' <u>Limestone</u> , gray, gray-brown and reddish-brown, very shaly, pebbly and nodular. 4½' <u>Limestone</u> , gray and gray-brown, cherty, hard, tight, dense. 1½' <u>Shale</u> , gray-brown, and brown, limy, dolomitic; scattered limestone and chert pebbles.
78	3387-3397	6'	<u>Limestone</u> , gray, with occasional streak of gray-white and greenish-gray, cherty, crystalline. Tight and dense, with an occasional slightly porous streak; crinoid stems and corals; small bright red chert inclusions.
79	3397-3405	8'	<u>Shale</u> , gray, purplish-gray, black, and purplish-brown, very limy and dolomitic; hard, tight, dense limestone; numerous fossils; occasional small, bright red chert inclusions.
80	3405-3415	10'	4' <u>Dolomite</u> , gray, gray-brown and purplish-brown, limy, shaly, numerous gray, nodular, cherty limestone inclusions; occasional gray, micaceous shale streak. 6' <u>Dolomite</u> , reddish-brown, finely granular, limy, fine, sandy, hard, tight, dense, occasional thin micaceous shale partings.

Core No.	Interval	Recovery	Lithologic Description
81	3415-3425	10'	2' Dolomite, as above. 8' Limestone, gray to gray-black, massive, hard, tight, dense; occasional shaly and dolomitic streak; contains prominent calcite-filled, vertical fractures.
82	3425-3434	6'	Limestone, as above, though extremely fossiliferous; Crinoid stems and Brachiopods most common; occasional thin, semi-crystalline to crystalline streaks with fair porosity; numerous small bright orange-red chert inclusions
83	3434-3444	10'	6" Limestone, as above. 9½' Interbedded gray, purplish-gray shaly limestone and dolomite, and purplish-brown, limy and dolomitic shale, worm tracks in shale.
84	3444-3454	10'	1' Interbedded limestone, dolomite and shale as above. 3' Limestone, gray to white, crystalline, with occasional cherty streak; highly fossiliferous; spotty porosity. 4½' Limestone, gray to purplish-gray, shaly cherty, with occasional thin streaks, gray to white, crystalline limestone, highly fossiliferous. 1½' Dolomite, purplish-gray to purplish-brown, limy, fine, granular, hard, tight, dense.
85	3454-3464	10'	2' Dolomite, as above, with thin interbeds of purplish-brown, limy, dolomitic shale. 6½' Shale, purplish-brown, very limy and dolomitic; occasional nodules and interbeds of limestone and dolomite. 1½' Limestone, pinkish-gray to pinkish-brown, massive, dolomitic, hard, tight, dense.
86	3464-3474	10'	Interbedded reddish-brown, hard, tight, dense, limy, dolomite, and gray and greenish-gray, cherty to shaly limestone.
87	3474-3478	2'	Limestone, gray to purplish-gray, very cherty, hard, tight, dense.
88	3478-3488	10'	Limestone, gray, white, to purplish-gray, cherty to crystalline, with thin interbeds and seams of bluish-gray and purplish-gray, dolomitic shale and shaly dolomite; highly fossiliferous.
89	3488-3494	2'	Dolomite, bluish to purplish-gray, shaly; occasional nodular, gray, chert inclusion.
90	3494-3500	2'	Shale, bluish to purplish-gray, with occasional stringers of green; dolomitic; abundant inclusions of white to gray nodular chert; Spirifer replaced by red chert.
91	3500-3508	8'	Shale, as above, highly fossiliferous; some of fossils replaced with red chert.
92	3508-3514	6'	Shale, purplish-brown and bluish-gray, limy, dolomitic; occasional inclusions of gray and white, cherty limestone; numerous scattered pebbles; becoming ill-sorted and gritty in lower 3'.

Core No.	Interval	Recovery	Lithologic Description
93	3514-3521	7'	3' Shale, as above, becoming reddish-brown in lower 6"; pebbly, gritty, ill-sorted. 1½' Limestone breccia, reddish-brown to bluish-gray; occasional rounded chert pebble, but in the main made up of angular fragments of chert and limestone. 2½' Shale, purplish-gray with an occasional streak of green; dolomitic; abundant inclusions of white to gray nodular chert.
94	3521-3525	4'	Shale, as above.
95	3525-3535	6½'	5½' Shale, as above, becoming gritty and ill-sorted in lower 6". 1' Shale, purplish to purplish-brown, pebbly, gritty, ill-sorted.
96	3535-3545	7'	1' Shale, red to reddish-brown with occasional patches of green; clayey, slick, pebbly. 3" Limestone rubble, reddish-brown, gray, greenish-gray, dirty, shaly, pebbly, sandy, ill-sorted; abundant rounded imbedded quartz grains. 2'9" Grit, red, reddish-brown, with streaks of green; dirty shaly, ill-sorted, pebbly; made up mainly of rounded, frosted quartz grains; occasional cherty limestone inclusion. 3' Grit, as above, with more numerous gray and bright green, cherty, limestone inclusions and interbeds of green, clayey, slick, bentonitic? shale.
97	3545-3550	2½'	6" Grit, red to reddish-brown, with patches of bright green; dirty, shaly, pebbly, ill-sorted; made up mainly of rounded, frosted, quartz grains. 2' Looks like turquoise; occasional brown mottling; numerous imbedded, rounded, frosted quartz grains.
98	3550-3555	1½'	6" Shale, dull to bright green, clayey, slick, probably bentonitic. 9" Grit, reddish-brown, with occasional streak of green; dirty, shaly, pebbly, ill-sorted; mostly rounded, frosted quartz grains. 3" Dolomite, greenish-gray, sucrose, crystalline; occasional imbedded, rounded, frosted quartz grains.
99	3555-3560	5'	4'9" Dolomite, light purplish-gray, greenish-gray and green; crystalline, sucrose; thin, serrated, slick, red and green shale partings. 3" Shale, reddish-brown, dolomitic, hard.
100	3560-3567	7'	Shale, reddish-brown, pinkish-brown and green, very dolomitic, hard; occasional thin beds of dolomite; abundant imbedded, rounded, frosted quartz grains.
101	3567-3570	6"	Dolomite, gray, purplish-gray and greenish-gray, hard, tight, dense; abundant imbedded, rounded, frosted, quartz grains.
102	3570-3577	7'	1½' Shale, dark purplish-brown, with occasional blotches of green; silty, dirty, gritty ill-sorted, slick; looks metamorphosed; abundant inclusions of clear quartz grains.

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Core No.	Interval	Recovery	Lithologic Description
102 (Continued)			5½' Grit, red to reddish-brown, with occasional streaks and blotches of green; silty, dirty, ill-sorted; streaks quartzitic; scattered pea-sized pebbles; looks metamorphosed.
103	3577-3580	3'	Dolomite, pale green with mottlings of purple, bluish-gray and reddish-brown; crystalline, granular, hard, tight, dense; abundant imbedded, rounded and angular clear quartz grains.
104	3580-3583	3'	1½' Dolomite, as above. 1½' Dolomite, as above, though reddish-brown, purplish-gray and bluish-gray.
105	3583-3588	5'	Dolomite, reddish-brown, purplish-gray, pale green, very mottled; semi-crystalline to crystalline, hard, tight, dense, considerable inclusions of clear quartz.
106	3588-3593	5'	Dolomite, as above; scattered flakes of biotite.
107	3593-3598	5'	Arkose, reddish and purplish-brown, with occasional streaks gray and dark green gritty, dirty, silty, ill-sorted; slickensided and metamorphosed; made up mainly of granitic material; feldspars and mica common.
108	3598-3603	5'	Arkose, as above, grading into highly weathered granite.
109	3603-3607½	3'	2½' Granite, highly altered and weathered; reddish-brown and purplish-brown, and dark green chlorite? 6" Granite, pink to pinkish-white; no weathering; white clear crystal quartz pink feldspar and biotite.

TOP OF SOLID UNWEATHERED GRANITE -3607'

110 3607½-3609 1½' Granite, as above

Total Depth - 3609'

H I S T O R Y

Jan. 23, 1944 Spudded in well, drilled 13-3/8" hole.

Feb. 2, 1944 Lost circulation at 365', regained with cotton seed hulls. Lost circulation at 532', and drilled ahead to 630' without regaining. Alternated drilling with mud and then with water.

Started running 10-3.4" surface casing; stuck at 200'; pulled out casing.

Reamed hole with 15" reamer with good circulation. Apparently reamer cuttings filled crevices and cracks.

Ran 10-3/4" casing to 350' where it stuck. Pulled up 10-3/4" to 336' and cemented with no returns. Found top of cement at 200' in back of pipe. Cemented back of casing through 1" pipe.

Feb. 12, 1944 Drilled and cored ahead to 1793', no trouble with circulation.

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Feb. 12, 1944
(Continued) TEST NO. 1 H.F.T. 1709-1793'; open 20 minutes, light steady blow of air which slowly decreased and died at end of 18 minutes; recovered 35' of drilling mud in drill pipe.

Feb. 16, 1944 Lost circulation at 2210', regained with hulls. Lost circulation.

Feb. 20, 1944 Lost circulation at 2690', unable to regain. Cemented hole twice.

Feb. 25, 1944 On drilling out cement lost circulation at 2450', cemented at 2210', drilled ahead to 2490' and lost circulation. Cemented at 2450' and displaced cement to 2210'. Plugged at 450' and cemented 365-535'. Lost circulation at 2729' and 2801'. Regained with hulls.

Mar. 7 1944 Cored to 3290' with only slight loss of circulation.

TEST NO. 2 H.F.T. 3252-3290', open 30 minutes, faint blow of air for 9 minutes; recovered 18' of drilling mud in drill pipe.

Mar. 15, 1944 Cored ahead to 3609'. Plugged 1800-1900'.

TEST NO. 3 Bailing test. Effective depth 1800', bailed to slightly below 1600' when salt water started coming in just above plug. Impossible to bail any lower.

Mar. 17, 1944 Plugged with cement 575-650' and abandoned.

History compiled from telegraphic reports
by Harvey W. Lee, Exploration Dept.
Union Oil Company, Los Angeles
April 4, 1944.

Formation Tops from State Land Department Files.
Union-Continental-New Mexico-Arizona #1

560	Base? Coconino	3096-3577	Penna ?
560-630	No returns	3577-3598	Redwall ?
630-3096	Supai	3598	Granite

TD 3609'

UNION OIL COMPANY & CONTINENTAL OIL COMPANY

Holbrook Area
Navajo County
Arizona

New Mexico-Arizona #1
Location: 2160' south & 2115' west of northeast corner
of Section 34-15N/19E, Gila & Salt River B. & M.
Elevation: 6034' ground; 6047' derrick floor; 6049' Kelly Bushing
(All depths measured from Kelly Bushing)

Spudded: January 23, 1944
Abandoned: March 17, 1944

Total Depth: 3609' ✓

Casing: 10-3/4" cemented at 336'

No electric log survey run.

LOG

<u>Interval</u>	<u>Lithologic Description</u>
0-15	Conductor pipe.
15-20	Sandstone, red, fine-grained, silty.
20-30	Sandstone, as above, with tan to buff, sandy, clayey limestone.
30-40	Limestone, tan to buff, sandy, clayey; streaks quite micromicaceous.
40-270	Sandstone, white with occasional slight tannish cast, medium-grained, hard to fairly friable.
270-290	Sandstone, as above, with streaks of buff sandstone.
290-330	Sandstone, white with occasional tannish streak, medium-grained, hard to fairly friable.
330-520	Sandstone, as above, though slightly more friable and considerably more "floury" and finer grained.
520-560	Sandstone, red, tan, and reddish-tan, medium-grained, hard to slightly friable.
560-630	Drilled without returns.
630	Sample off bit; shale, red, clayey, sandy.
630-670	Sand, red, medium-grained, silty, with thin streaks of red shale.
670-680	Sand, as above, interbedded with red, fine, sandy shale; trace of gypsum.
680-690	Shale, red, fine, sandy, with thin streaks of red, silty sand.
690-700	Shale, red, fine, sandy, with considerable gypsum.
700-730	Anhydrite, white, milky, hard.
730-740	Interbedded anhydrite, as above, and red, fine, sandy shale.
740-750	Anhydrite, white, milky, hard.
750-760	Interbedded anhydrite, as above, and red, fine, sandy shale.
760-780	Interbedded bright red, shaly sand; red, fine, sandy shale; and white anhydrite.
780-820	As above, with trace of clear crystal salt. <u>Top of salt at 780'.</u>
820-830	Anhydrite, white, milky with thin interbeds of reddish-brown, sandy shale and red, silty sand.
830-840	Anhydrite, white, milky, hard, with trace of reddish-brown, sandy shale and red, silty sand.
840-940	Interbedded red, silty sand; reddish-brown, fine, sandy shale; and white milky anhydrite; trace of clear, crystal salt.
940-950	Anhydrite, white, milky, hard, with lesser amounts of reddish-brown, fine, sandy shale, and red, silty sand.
950-990	Interbedded, red, silty sand; reddish-brown, fine, sandy shale; and white, milky anhydrite.
990-1000	Anhydrite, white, milky, hard, with lesser amounts of reddish-brown, sandy shale, and red, silty sand.

Cocoma

Surface

No permit

- 1000-1020 Interbedded reddish-brown, sandy shale; white, milky anhydrite; and red, silty sand.
- 1020-1030 Anhydrite, white, milky, hard, with thin interbeds of reddish-brown, sandy shale.
- 1030-1040 Shale, brown, very sandy, with a minor amount of red, silty sand and anhydrite.
- 1040-1050 Anhydrite, white, milky, hard, with trace of brown, very sandy shale.
- 1050-1060 Shale, dark, gray-brown, limy, sandy; first marine streak.
- 1060-1070 Anhydrite, white, milky, hard, with a trace of gray and red shale.
- 1070-1080 Sand, brown to reddish-brown, very shaly, with a trace of anhydrite.
- 1080-1090 Shale, brown, very sandy, with thin interbeds of anhydrite and brown sand; trace of salt.
- 1090-1130 Sand, brown, very shaly, with lesser amounts of brown, sandy shale and anhydrite; occasional crystal of salt.
- 1130-1220 Interbedded brown, very shaly sand; brown, very sandy shale; and anhydrite; occasional streaks of crystal salt.
- 1220-1230 Anhydrite and gypsum; some of gypsum is very porous; minor streaks of brown sand and shale.
- 1230-1250 Shale, brown to reddish-brown, very sandy with minor amounts of brown silty sand and anhydrite.
- 1250-1280 Anhydrite, white, milky, becoming quite shaly in lower portion.
- 1280-1300 Shale, brown, fine, sandy, with trace of salt and anhydrite.
- 1300-1320 Anhydrite, white, milky, hard.
- 1320-1330 Interbedded anhydrite and brown, fine, sandy shale.
- 1330-1470 Sand, brown, shaly, with fewer interbeds of brown, fine, sandy shale, and anhydrite; occasional crystal of salt.
- 1470-1560 Shale, brown to reddish-brown, sandy, with lesser amounts of brown, silty sand and anhydrite; trace of salt in lower portion.
- 1560-1570 Shale, gray-black to gray-brown, slightly limy; marine.
- 1570-1580 Sand, gray-brown, silty, dolomitic, with streak of black shale.
- 1580-1600 Interbedded brown, sandy shale; brown, silty sand; gray, slightly limy shale; and anhydrite.
- 1600-1670 Shale, brown to reddish-brown, fine, sandy, with fewer interbeds of brown, silty sand, gray, limy shale, and anhydrite; occasional crystal of salt.
- 1670-1680 Interbedded brown, fine, sandy shale; brown, silty sand; gray, slightly limy shale; with a trace of anhydrite.
- 1680-1690 Shale, gray to gray-black, limy, with interbeds of brown, sandy shale and silty sand and anhydrite; occasional inclusion of gray, shaly limestone.
- 1692-1793 Cored (See core description)
- 1790-1800 Shale, brown to reddish-brown, very sandy, with thin interbeds of brown silty sand.
- 1800-1830 Sand, brown, very shaly, with thin interbeds of brown, very sandy shale; minor amount of very porous anhydrite.
- 1830-1840 Interbedded brown, very shaly, fine-grained sand, and brown, sandy shale; trace of very porous anhydrite.
- 1840-1850 Anhydrite, white, milky, with minor amounts of brown sand and shale.
- 1850-1870 Sand, brown, very shaly, fine-grained, with considerable amount of brown fine, sandy shale; occasional streaks of anhydrite.
- 1870-1880 Shale, brown, fine, sandy, with minor amount of brown, shaly sand and anhydrite.

1880-1970	Sand, brown to reddish-brown, very shaly, with thin streaks of brown, fine, sandy shale; trace of porous anhydrite and gray shale. From 1940' to 1970' there are occasional streaks of bright red, clayey, coarse-grained sand.
1970-1980	Shale, brown, fine, sandy, with streaks of brown, shaly sand and red, clayey, coarse-grained sand.
1980-2030	Sand, brown to reddish-brown, very shaly, fine-grained, with fewer interbeds of brown, fine, sandy shale; occasional trace of anhydrite.
2030-2040	Sand, grayish-tan, silty, with some brown, shaly sand, and occasional inclusion of blue-gray, shaly limestone.
2040-2050	Shale, grayish-tan, limy, with some streaks of sand, as above; occasional inclusion of blue-gray, shaly limestone.
2050-2070	Sand, brown, silty, with lesser amounts of brown, fine, sandy shale.
2070-2080	Shale, brown to reddish-brown, fine, sandy, with thin streaks of sand as above.
2080-2170	Interbedded brown, silty, fine-grained sand, and brown, fine, sandy shale; occasional trace of anhydrite.
2170-2300	Sand, brown, fine-grained, silty, and sand, red, medium to coarse-grained, clayey; occasional streaks of brown, sandy shale, gray shale, and porous anhydrite.
2300-2350	Interbedded brown, fine-grained, silty sand, and brown, fine, sandy shale.
2350-2460	Sand, brown, fine-grained, silty, and sand, red, coarse-grained, clayey; occasional streak of brown, fine, sandy shale.
2460-2510	Sand, brown and reddish-brown, shaly, with streaks of reddish-brown, probably dolomitic, fine, sandy shale; minor amounts of gray, slightly limy shale and anhydrite.
2510-2550	Shale, red and brown, clayey, sandy, dolomitic; thin interbeds of brown, and reddish-brown, shaly sand; minor inclusions of gray shale and anhydrite.
2550-2820	Shale, reddish to purplish-brown, limy, dolomitic; considerable inclusions of purplish-gray, probably nodular, limestone and reddish-brown dolomite; minor amounts of reddish-brown, silty sand, gray, limy shale, and porous anhydrite.
2820-3609	<u>Cored</u> (See core description)

Total Depth - 3609'

1/20 permit

UNION OIL COMPANY & CONTINENTAL OIL COMPANY
New Mexico-Arizona #1

Holbrook Area
Navajo County
Arizona

CORE DESCRIPTION

Recd. by Az. Ld. Dept.
4-10-44
from Union Oil Co.

Core No.	Interval	Recovery	Lithologic Description
1	1692-1702	9'	<ul style="list-style-type: none"> ✓ 1½' Salt, clear, with light brown mottling; streaked and veined with brown, clayey shale. 1' Shale, gray to gray-black, with occasional thin, reddish-brown streaks; massive, dolomitic. 1½' Shale, reddish-brown, with thin streaks of gray, fine, sandy, massive; numerous streaks and pockets of salt. 1½' Chert, blue-gray to gray-black, hard, tight, dense. ✓ 6" Salt, clear, with light brown mottling. 3" Shale, gray, very cherty, hard, dense, with pockets of salt. 2'9" Shale, reddish-brown, with rare streaks of gray, fine, sandy; pockets and seams of salt and occasional gray chert inclusion.
2	1702-1712	10'	<ul style="list-style-type: none"> ✓ 4½' Salt, clear, with gray mottling; veined with gray shale and gray chert. 5' Chert, blue-gray to gray-black, hard, tight, dense; occasional stringers of gray-black, dolomitic shale; pockets and vugs of crystal salt very common. 6" Shale, gray-brown, dolomitic or fine, sandy, micromicaceous; slight stain and slight odor.
3	1712-1722	4'	Shale, gray to gray-brown, dolomitic or fine, sandy, micromicaceous; a number of interbeds of blue-gray, hard, tight, dense chert; some stain and slight odor.
4	1722-1730	6'	Shale, as above, with interbeds of chert; numerous pockets and vugs of crystal salt in upper 3'.
5	1730-1734	3'	Chert, blue-black to gray-black, hard, tight, dense, with interbeds of tan and tannish-gray, tight, dense dolomite; slight odor and slight spotty stain.
6	1734-1740	6'	Dolomite, tannish-brown, fine-grained, tight, dense; abundant small inclusions of white, blue-white and blue-gray chert; fair stain and fair odor; practically no porosity except for rare vuggy spots.
7	1740-1745	5'	Dolomite, as above, becoming quite limy in lower 2'; light brown stain in upper 3'; dark brown stain in lower 2'; good odor throughout; only slight porosity.

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8	1745-1755	8'	<u>Limestone</u> , gray-brown, quite shaly and dolomitic in streaks; numerous white, blue-white and blue-gray chert inclusions; light to dark brown stain throughout; good odor; very slight porosity.
9	1755-1765	10'	<u>Limestone</u> , as above, though somewhat more shaly; good stain and good odor; very slight porosity.
10	1765-1775	10'	<u>Limestone</u> , tannish-gray to gray-brown, shaly, dolomitic, with occasional white, blue-white and blue-gray chert inclusions; streaks are very dolomitic; good stain and good odor; very slight porosity.
11	1775-1785	10'	$5\frac{1}{2}'$ <u>Limestone</u> , as above; good stain and good odor; practically no porosity. $4\frac{1}{2}'$ <u>Shale</u> , gray to blue-gray, very fine, sandy, and probably dolomitic; very little stain and meager odor; looked wet.
12	1785-1795	7'	3' <u>Shale</u> , as above, micromicaceous; no stain or odor; looked wet. 4' <u>Shale</u> , reddish-brown, quite sandy, and dolomitic; massive; occasional small white, blue-white and blue-gray chert inclusions.
13	2820-2830	10'	6' <u>Shale</u> , reddish to purplish-brown, limy, dolomitic; occasional small pebbles; occasional slickensides; numerous inclusions of gray to white crystalline limestone. 1' <u>Limestone</u> , greenish-gray, gray, reddish-brown, mottled; cherty, shaly; rare small pebbles. 3' <u>Dolomite</u> , reddish-brown, with streaks of gray; very shaly in streaks; very limy.
14	2830-2840	10'	<u>Limestone</u> , reddish to purplish-brown, with streaks of gray; massive, hard, tight, dense; shaly in streaks; dolomitic; occasional cherty streaks.
15	2840-2850	10'	1' <u>Limestone</u> , as above. 9' <u>Shale</u> , reddish to purplish-brown, very limy; occasional slickensides.
16	2850-2855		No recovery.
17	2855-2862	6"	<u>Shale</u> , as above.
18	2862-2870	6"	<u>Shale</u> , as above.
19	2870-2873		No recovery.
20	2873-2878	5'	$1\frac{1}{2}'$ <u>Limestone</u> , gray, hard, tight, dense, cherty. 6" <u>Shale</u> , reddish-brown, limy. $1\frac{1}{2}'$ <u>Limestone</u> , gray, shaly to cherty. $1\frac{1}{2}'$ <u>Shale</u> , gray-brown, limy; occasional small pebbles, becoming very clayey and crumbly in lower portion.

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21	2878-2888	5'	4' <u>Shale</u> , gray-brown to bluish-brown, very clayey and crumbly; abundant small chert and limestone pebbles. 1' <u>Limestone</u> , gray to gray-brown, cherty, shaly, occasional small pebbles.
22	2888-2898	10'	<u>Limestone</u> , reddish-brown, to gray-brown, hard, tight, dense, dolomitic; occasional streaks reddish-brown limy shale; numerous veins and inclusions of gray to white crystalline limestone; occasional small pebbles in shaly streaks.
23	2898-2908	10'	3' <u>Limestone</u> , as above. 2' <u>Shale</u> , reddish-brown, with occasional streaks gray, limy; occasional small pebbles; occasional inclusion of gray to white crystalline limestone. 5' <u>Limestone</u> , reddish-brown, with occasional streak of gray, hard, tight, dense, shaly, dolomitic, with numerous gray to white inclusions of cherty to crystalline limestone.
24	2908-2918	8'	7 1/2' <u>Limestone</u> , as above, with thin streaks of reddish-brown, limy shale. 6" <u>Shale</u> , reddish-brown to gray-brown, crumbly, clayey, limy.
25	2918-2928	2'	<u>Shale</u> , as above, quite pebbly, becoming more firm in lower 1'.
26	2928-2934	6'	<u>Shale</u> , reddish-brown, with occasional streaks of greenish-gray; very conglomeratic, clayey, crumbly, limy.
27	2934-2944	6'	<u>Shale</u> , reddish-brown, limy, dolomitic; numerous gray and greenish-gray, nodular, chert and limestone inclusions; abundant small, scattered pebbles; occasional slickensides.
28	2944-2948	4'	3' <u>Shale</u> , as above, though more limy and dolomitic. 1' <u>Dolomite</u> , reddish-brown, fine, sandy, hard, tight, dense, massive; slightly limy.
29	2948-2958	10'	1' <u>Dolomite</u> , as above. 9' <u>Dolomite</u> , as above, with abundant inclusions and veinings of gray, cherty limestone; 6" zone of brecciated limestone and dolomite at 2955'; contains both rounded and angular pebbles.
30	2958-2968	8 1/2'	8 1/2" <u>Dolomite</u> , reddish-brown, fine, sandy; occasional shaly streak; massive, hard, tight, dense; occasional pebbles in shaly streaks; very minor small inclusions of gray, cherty limestone. 3" <u>Shale</u> , grayish and bluish-brown, mottled, clayey, crumbly.

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31	2968-2978	10'	6" <u>Shale</u> , as above, becoming more firm and less crumbly; slickensided. 9 $\frac{1}{2}$ ' <u>Shale</u> , reddish-brown, massive, very limy and dolomitic in upper 4', becoming more clayey and extremely pebbly in lower 5'.
32	2978-2988	10'	3' <u>Shale conglomerate</u> , gray to bluish-brown, clayey, crumbly; pebbles are chert and limestone. 7' <u>Dolomite</u> , reddish-brown, fine, sandy, quite limy, massive, hard, tight, dense; abundant veining and inclusions of white and gray, cherty limestone; occasional small scattered pebbles.
33	2988-2998	10'	1' <u>Dolomite</u> , as above. 9' <u>Dolomite</u> , reddish-brown, fine, sandy, quite limy, massive, hard, tight, dense, with interbeds of reddish-brown to gray-brown, fine-grained, quartzitic, dolomitic sandstone.
34	2998-3006	8'	4' <u>Dolomite</u> , as above. 4' <u>Shale</u> , reddish-brown to gray-brown, limy, dolomitic; firm to becoming quite clayey and crumbly in lower portion; numerous small scattered pebbles; numerous slickensides.
35	3006-3015	9'	6' <u>Shale</u> , blue-gray, with brown mottling; clayey, crumbly, limy; numerous small scattered pebbles; occasional slickensides, becoming more firm and dolomitic in lower 1'. 1' <u>Dolomite</u> , reddish-brown, fine, sandy, limy, massive, hard, tight, dense; occasional gray, cherty limestone inclusion. 2' <u>Shale</u> , reddish-brown, limy, dolomitic; abundant inclusions of white and gray cherty limestone; occasional small scattered pebbles; occasional slickensides.
36	3015-3018	3'	<u>Shale</u> , gray-brown, limy, dolomitic; numerous small scattered pebbles; white to gray, cherty, nodular limestone inclusions; considerable slickensides.
37	3018-3028	9'	6' <u>Shale</u> , as above. 3' <u>Dolomite</u> , reddish-brown, granular, hard, tight, dense, with numerous inclusions of white to gray, cherty, nodular limestone; also contains rounded chert and limestone pebbles.
38	3028-3038	9'	<u>Shale</u> , blue-gray, gray-brown and reddish-brown, clayey, and crumbly in upper 6', becoming firm, limy and dolomitic in lower 3'; occasional inclusions of white to gray, nodular limestone; very pebbly in upper 6'; occasional slickensides.
39	³⁰ 3038-3048	10'	<u>Shale</u> , as above; some clayey and crumbly; some firm, limy, and dolomitic.

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40	3048-3058	7½'	3' <u>Dolomite</u> , reddish-brown, finely granular, hard, tight, dense, massive; abundant inclusions of white to gray, cherty, nodular limestone. 3' <u>Shale</u> , reddish-brown, limy, dolomitic, clayey, firm to crumbly; numerous slickensides. 1½' <u>Dolomite</u> , reddish-brown, finely granular, hard, tight, dense, massive; rare gray, cherty, limestone inclusions.
41	3058-3068	9'	<u>Dolomite</u> , as above, though somewhat shaly in upper 6'.
42	3068-3078	7½'	<u>Dolomite</u> , as above.
43	3078-3088	10'	<u>Dolomite</u> , reddish-brown, granular, fine, sandy, hard, tight, dense, massive, with thin interbeds of reddish-brown to gray-brown, limy, dolomitic shale, and pinkish-red, fine-grained, hard, tight, dense, sharp, quartzitic, dolomitic sandstone.
44	3088-3096	8'	2' <u>Dolomite</u> , gray-black, granular, very sandy, massive, hard, tight, dense; occasional white to gray limestone inclusions; shows considerable cross-bedding. 6' <u>Sandstone</u> , gray-white to gray-black, with occasional greenish-gray streak; dolomitic, quartzitic, highly cross-bedded; numerous patches and zones of brecciated, cherty limestone.
45	3096-3106	10'	1' <u>Limestone</u> , gray, cherty, hard, dense, with thin interbeds of purplish-gray, dolomitic shale; gray, nodular chert in shale partings. 9' <u>Shale</u> , purplish-gray, clayey, dolomitic, slightly limy, with white to gray, nodular, cherty, limestone inclusions; some small limestone pebbles?? Highly slickensided; lower 6" gray and bentonitic.
46	3106-3116	4'	<u>Limestone</u> , light gray, cherty, nearly novaculite; occasional brecciated zones; minor inclusions of red chert; minor dry, black, asphaltic residue along fractures.
47	3116-3126	10'	6" <u>Limestone</u> , gray, greenish-gray, purplish-gray, cherty to semi-crystalline, hard, tight, dense; numerous veining and inclusions of red chert. 1' <u>Shale</u> , purplish-black; occasional pebbles; occasional gray-white, nodular, cherty, limestone inclusion. 4½' <u>Limestone</u> , reddish to pinkish-brown, dolomitic, shaly, hard, tight, dense; numerous inclusions of gray, nodular, cherty limestone. 3' <u>Shale</u> , purplish to reddish-brown, limy in upper part to very clayey and crumbly in lower portion. 1' <u>Limestone</u> , gray, cherty, nearly novaculite, hard, dense, with 2" bed of gray to bluish-gray, clayey, bentonitic, crumbly shale in middle.

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48	3126-3135	7'	<u>Limestone</u> , light gray, cherty, nearly novaculite, massive, hard, tight, dense; considerably fractured and brecciated; some red chert veining.
49	3135-3144	9'	8' <u>Limestone</u> , dark gray to black, shaly, hard, tight, dense; numerous gray-white, nodular, cherty limestone inclusions; abundant small, red chert inclusions; slight odor; Lycopod stems and Compositas?? 1' <u>Shale</u> , gray-brown, to reddish-brown, limy, and dolomitic to clayey; occasional gray, cherty, limestone inclusion.
50	3144-3154	9'	1' <u>Shale</u> , gray to gray-brown, dolomitic, with gray, nodular, cherty limestone inclusions; very pebbly; large sized chert and limestone pebbles. 8' <u>Limestone</u> , gray to black, cherty to semi-crystalline; occasional thin streaks and interbeds of black to gray-brown, limy, dolomitic shale; a few Lycopod and Crinoid stems.
51	3154-3163	9'	<u>Shale</u> , gray, gray-brown, and reddish-brown, limy, dolomitic; numerous thin, white to gray, semi-crystalline to crystalline interbeds of fossiliferous limestone; entire core extremely fossiliferous; abundant Crinoid stems, Lycopods, Dialasma and Composita; occasional spotty stain in some of more porous limestone stringers. (Page 8)
52	3163-3170	7'	2' <u>Fossiliferous shale</u> , as above. 2 1/2' <u>Limestone</u> , gray, cherty, nodular, hard, tight, dense; sparingly fossiliferous; slight spotty stain. 2 1/2' <u>Shale</u> , gray, gray-brown and reddish-brown, very limy and dolomitic; massive, firm, hard; nearly a limestone or dolomite; occasional gray, nodular, cherty limestone inclusion; slight, very spotty stain; rare fossils.
53	3170-3179	9'	<u>Shale</u> , as above.
54	3179-3189	9'	3' <u>Shale</u> , as above, though mostly gray. 6' <u>Shale</u> , gray to black, limy, dolomitic; streaks quite carbonaceous.
55	3189-3199	10'	<u>Shale</u> , as above, streaks very carbonaceous to lignitic; abundant carbonized wood; occasional large patches of pyrite.
56	3199-3209	10'	<u>Shale</u> , as above.
57	3209-3216	5'	<u>Shale</u> , as above.
58	3216-3225	9'	<u>Shale</u> , as above.

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59	3225-3231	6'	<u>Shale</u> , as above.
60	3231-3236	5'	<u>Shale</u> , as above, becoming gray-brown in lower 2'; abundant small chert and limestone pebbles.
61	3236-3246	10'	<u>Shale</u> , gray-brown, with occasional streaks of bluish-gray; crumbly in upper part to firm and dolomitic in lower portion; a few very small scattered pebbles.
62	3246-3256	10'	$6\frac{1}{2}'$ <u>Shale</u> , reddish-brown, with occasional streaks of gray; firm, dolomitic, slightly limy. $3\frac{1}{2}'$ <u>Limestone breccia and conglomerate</u> , gray to gray-brown; made up of rounded as well as angular chert and limestone fragments in matrix of gray limestone; fair spotty porosity and fair spotty yellow stain.
63	3256-3265	7'	$5\frac{1}{2}'$ <u>Limestone</u> , as above; fair spotty porosity and fair spotty yellow stain. $1\frac{1}{2}'$ <u>Limestone</u> , gray, with occasional streak of gray-brown, shaly, dolomitic, tight, dense.
64	3265-3276	10'	Interbedded <u>limestone</u> as above, and gray and gray-brown, limy, dolomitic, firm <u>shale</u> ; occasional carbonaceous material in shale streaks; rare, slight stain.
65	3275-3283	8'	2' <u>Shale</u> , gray, gray-black, gray-brown, and reddish-brown; occasional gray, nodular, limestone inclusions; occasional fossils in limy zones. 4' <u>Limestone</u> , gray and reddish-brown, hard, tight, dense, dolomitic, with occasional gray, nodular, cherty limestone inclusions. 2' <u>Shale</u> , reddish to purplish-brown, limy, dolomitic, massive, firm; occasional gray, nodular, cherty limestone inclusion.
66	3283-3290	6'	<u>Shale</u> , as above, becoming gray in lower 1'.
67	3290-3298	$7\frac{1}{2}'$	<u>Shale</u> , gray to black, with occasional streaks of brown; limy; numerous white to gray, nodular, cherty limestone inclusions; quite fossiliferous; abundant partially carbonized plant material.
68	3298-3308	10'	<u>Shale</u> , as above; indications of practically flat dips.
69	3308-3315	7'	1' <u>Shale</u> , as above; occasional small scattered pebbles. 6' <u>Shale</u> , reddish-brown, with occasional streak of gray, limy.
70	3315-3325	10'	4' <u>Shale</u> , as above, with abundant small scattered limestone and chert pebbles. 6' <u>Limestone</u> , gray, pinkish-gray and pinkish-brown, hard, tight, dense, dolomitic.

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71	3326-3335	4'	2' <u>Limestone</u> , as above. 2' <u>Shale</u> , gray-brown, blue-gray; very clayey and crumbly; occasional small scattered pebbles.
72	3335-3345	10'	1½' <u>Limestone</u> , purplish-gray to reddish-gray, dolomitic, massive, hard, tight, dense; occasional small scattered pebbles. 8' <u>Shale</u> , reddish-brown, firm and limy, to crumbly and clayey; occasional small scattered pebbles; highly slickensided. 6" <u>Limestone</u> , gray to greenish-gray, hard, tight, dense.
73	3345-3354	10'	<u>Dolomite</u> , gray-brown, reddish-brown and pinkish-brown, quite limy, fine, granular, hard, tight, dense; becoming very shaly in lower 1½'.
74	3354-3364	10'	3' <u>Shale</u> , reddish to purplish-brown, slightly limy and dolomitic; numerous good-sized limestone and chert pebbles; prominent unconformity at 3357'; basal pebbles resting on erosional scour and fill, limestone. 1' <u>Limestone</u> , gray, hard, tight, dense. 6' <u>Limestone</u> , reddish to pinkish-brown, very dolomitic, finely granular, massive, hard, tight, dense.
75	3364-3370	5'	<u>Limestone</u> , as above, with occasional shaly streak.
76	3370-3379	9'	<u>Limestone</u> , as above, with occasional streak of gray.
77	3379-3387	9½'	6" <u>Limestone</u> , as above. 1' <u>Limestone</u> , gray, cherty, hard, tight, dense. 2' <u>Limestone</u> , gray, gray-brown and reddish-brown, very shaly, pebbly and nodular. 4½' <u>Limestone</u> , gray and gray-brown, cherty, hard, tight, dense. 1½' <u>Shale</u> , gray-brown, and brown, limy, dolomitic; scattered limestone and chert pebbles.
78	3387-3397	6'	<u>Limestone</u> , gray, with occasional streak of gray-white and greenish-gray, cherty to crystalline. Tight and dense, with an occasional slightly porous streak; Crinoid stems and corals; small bright red chert inclusions.
79	3397-3405	8'	<u>Shale</u> , gray, purplish-gray, black, and purplish-brown, very limy and dolomitic; occasional thin beds of purplish-gray, hard, tight, dense limestone; numerous fossils; occasional small, bright red chert inclusions.
80	3405-3415	10'	4' <u>Dolomite</u> , gray, gray-brown and purplish-brown, limy, shaly; numerous gray, nodular, cherty limestone inclusions; occasional gray, micaceous shale streaks. 6' <u>Dolomite</u> , reddish-brown, finely granular, limy, fine, sandy, hard, tight, dense; occasional thin micaceous shale partings.

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81	3415-3425	10'	2' <u>Dolomite</u> , as above. 8' <u>Limestone</u> , gray to gray-black, massive, hard, tight, dense; occasional shaly and dolomitic streak; contains prominent calcite-filled, vertical fractures.
82	3425-3434	6'	<u>Limestone</u> , as above, though extremely fossiliferous; Crinoid stems and Brachiopods most common; occasional thin, semi-crystalline to crystalline streaks with fair porosity; numerous small bright orange-red chert inclusions.
83	3434-3444	10'	6' <u>Limestone</u> , as above. 9 1/2' <u>Interbedded gray, purplish-gray, shaly limestone and dolomite, and purplish-brown, limy and dolomitic shale</u> ; worm tracks in shale.
84	3444-3454	10'	1' <u>Interbedded limestone, dolomite and shale</u> , as above. 3' <u>Limestone, gray to white, crystalline, with occasional cherty streak; highly fossiliferous; spotty porosity.</u> 4 1/2' <u>Limestone, gray to purplish-gray, shaly, cherty, with occasional thin streaks of gray to white, crystalline limestone; highly fossiliferous.</u> 1 1/2' <u>Dolomite, purplish-gray to purplish-brown, limy, fine, granular, hard, tight, dense.</u>
85	3454-3464	10'	2' <u>Dolomite</u> , as above, with thin interbeds of purplish-brown, limy, dolomitic shale. 6 1/2' <u>Shale, purplish-brown, very limy and dolomitic; occasional nodules and interbeds of limestone and dolomite.</u> 1 1/2' <u>Limestone, pinkish-gray to pinkish-brown, massive, dolomitic, hard, tight, dense.</u>
86	3464-3474	10'	<u>Interbedded reddish-brown, hard, tight, dense, limy, dolomite, and gray and greenish-gray, cherty to shaly limestone.</u>
87	3474-3478	2'	<u>Limestone, gray to purplish-gray, very cherty, hard, tight, dense.</u>
88	3478-3488	10'	<u>Limestone, gray, white, to purplish-gray, cherty to crystalline, with thin interbeds and seams of bluish-gray and purplish-gray, dolomitic shale and shaly dolomite; highly fossiliferous.</u>
89	3488-3494	2'	<u>Dolomite, bluish to purplish-gray, shaly; occasional nodular, gray, chert inclusion.</u>
90	3494-3500	2'	<u>Shale, bluish to purplish-gray, with occasional stringers of green; dolomitic; abundant inclusions of white to gray nodular chert; Spirifer replaced by red chert.</u>

Notes

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91	3500-3508	8'	<u>Shale</u> , as above; highly fossiliferous; some of fossils replaced with red chert.
92	3508-3514	6'	<u>Shale</u> , purplish-brown and bluish-gray, limy, dolomitic; occasional inclusions of gray and white, cherty limestone; numerous scattered pebbles; becoming ill-sorted and gritty in lower 3'.
93	3514-3521	7'	3' <u>Shale</u> , as above, becoming reddish-brown in lower 6"; pebbly, gritty, ill-sorted. 1½' <u>Limestone breccia</u> , reddish-brown to bluish-gray; occasional rounded chert pebble, but in the main made up of angular fragments of chert and limestone. 2½' <u>Shale</u> , purplish-gray with an occasional streak of green; dolomitic; abundant inclusions of white to gray nodular chert.
94	3521-3525	4'	<u>Shale</u> , as above.
95	3525-3535	6½'	5½' <u>Shale</u> , as above, becoming gritty and ill-sorted in lower 6". 1' <u>Shale</u> , purplish to purplish-brown, pebbly, gritty, ill-sorted.
96	3535-3545	7'	1' <u>Shale</u> , red to reddish-brown with occasional patches of green; clayey, slick, pebbly. 3" <u>Limestone rubble</u> , reddish-brown, gray, greenish-gray, dirty, shaly, pebbly, sandy, ill-sorted; abundant rounded imbedded quartz grains. 2'9" <u>Grit</u> , red, reddish-brown, with streaks of green; dirty, shaly, ill-sorted, pebbly; made up mainly of rounded, frosted quartz grains; occasional cherty limestone inclusion. 3' <u>Grit</u> , as above, with more numerous gray and bright green, cherty, limestone inclusions and interbeds of green, clayey, slick, bentonitic ? shale.
97	3545-3550	2½'	6" <u>Grit</u> , red to reddish-brown, with patches of bright green; dirty, shaly, pebbly, ill-sorted; made up mainly of rounded, frosted, quartz grains. 2' Looks like turquoise; occasional brown mottling; numerous imbedded, rounded, frosted quartz grains.
98	3550-3555	1½'	6" <u>Shale</u> , dull to bright green, clayey, slick, probably bentonitic. 9" <u>Grit</u> , reddish-brown, with occasional streak of green; dirty, shaly, pebbly, ill-sorted; mostly rounded, frosted quartz grains. 3" <u>Dolomite</u> , greenish-gray, sucrose, crystalline; occasional imbedded, rounded, frosted quartz grains.

13

No. 2

No permit

14

*Near
Redwood*

PER

99	3555-3560	5'	4'9" <u>Dolomite</u> , light purplish-gray, greenish-gray and green; crystalline, sucrose; thin, serrated, slick, red and green shale partings. 3" <u>Shale</u> , reddish-brown, dolomitic, hard.
100	3560-3567	7'	<u>Shale</u> , reddish-brown, pinkish-brown and green; very dolomitic, hard; occasional thin beds of dolomite; abundant imbedded, rounded, frosted quartz grains.
101	3567-3570	6"	<u>Dolomite</u> , gray, purplish-gray, and greenish-gray, hard, tight, dense; abundant imbedded, rounded, frosted, quartz grains.
102	3570-3577	7'	1 1/2' <u>Shale</u> , dark purplish-brown, with occasional blotches of green; silty, dirty, gritty, ill-sorted, slick; looks metamorphosed; abundant inclusions of clear quartz grains. 5 1/2' <u>Grit</u> , red to reddish-brown, with occasional streaks and blotches of green; silty, dirty, ill-sorted; streaks quartzitic; scattered pea-sized pebbles; looks metamorphosed.
103	3577-3580	3'	<u>Dolomite</u> , pale green with mottlings of purple, bluish-gray and reddish-brown; crystalline, granular, hard, tight, dense; abundant imbedded, rounded and angular clear quartz grains.
104	3580-3583	3'	1 1/2' <u>Dolomite</u> , as above. 1 1/2' <u>Dolomite</u> , as above, though reddish-brown, purplish-gray and bluish-gray.
105	3583-3588	5'	<u>Dolomite</u> , reddish-brown, purplish-gray, pale green, very mottled; semi-crystalline to crystalline, hard, tight, dense; considerable inclusions of clear quartz.
106	3588-3593	5'	<u>Dolomite</u> , as above; scattered flakes of biotite.
107	3593-3598	5'	<u>Arkose</u> , reddish and purplish-brown, with occasional streaks gray and dark green; gritty, dirty, silty, ill-sorted; slickensided and metamorphosed; made up mainly of granitic material; feldspars and mica common.
108	3598-3603	5'	<u>Arkose</u> , as above, grading into highly weathered granite.
109	3603-3607 1/2	3'	2 1/2' <u>Granite</u> , highly altered and weathered; reddish-brown and purplish-brown, and dark green chlorite? 6" <u>Granite</u> , pink to pinkish-white; no weathering; white, clear crystal quartz, pink feldspar and biotite.
			TOP OF SOLID UNWEATHERED GRANITE = 3607'
110	3607 1/2-3609	1 1/2'	<u>Granite</u> , as above.

TOTAL DEPTH = 3609'

No permit

UNION OIL COMPANY & CONTINENTAL OIL COMPANY
New Mexico-Arizona #1

Holbrook Area
Navajo County
Arizona

HISTORY

15.

Jan. 23, 1944 Spudded in well, drilled 13-3/8" hole.

Feb. 2, 1944 Lost circulation at 365', regained with cotton seed hulls. Lost circulation at 532' and drilled ahead to 630' without regaining. Alternated drilling with mud and then with water.

Started running 10-3/4" surface casing; stuck at 200'; pulled out casing.

Reamed hole with 15" reamer with good circulation. Apparently reamer cuttings filled crevices and cracks.

Ran 10-3/4" casing to 350' where it stuck. Pulled up 10-3/4" to 336' and cemented with no returns. Found top of cement at 200' in back of pipe. Cemented back of casing through 1" pipe.

Feb. 12, 1944 Drilled and cored ahead to 1793', no trouble with circulation.

TEST NO. 1 H.F.T. 1709-1793', open 20 minutes, light steady blow of air which slowly decreased and died at end of 18 minutes; recovered 35' of drilling mud in drill pipe.

Feb. 16, 1944 Lost circulation at 2210', regained with hulls. Lost circulation

Feb. 20, 1944 Lost circulation at 2690', unable to regain. Cemented hole twice.

Feb. 25, 1944 On drilling out cement lost circulation at 2450', cemented at 2210', drilled ahead to 2490' and lost circulation. Cemented at 2450' and displaced cement to 2210'. Plugged at 450' and cemented 365-535'. Lost circulation at 2729' and 2801'. Regained with hulls.

Mar. 7, 1944 Cored to 3290' with only slight loss of circulation.

TEST NO. 2 H.F.T. 3252-3290', open 30 minutes, faint blow of air for 9 minutes; recovered 18' of drilling mud in drill pipe.

Mar. 15, 1944 Cored ahead to 3609'. Plugged 1800-1900'.

TEST NO. 3 Bailing test. Effective depth 1800', bailed to slightly below 1600' when salt water started coming in just above plug. Impossible to bail any lower.

Mar. 17, 1944 Plugged with cement 575-650' and abandoned.

History compiled from telegraphic reports
by Harvey W. Lee, Exploration Department,
Union Oil Company, Los Angeles
April 4, 1944

1/28 permit

16

FORM O. & G. 1
18

ARIZONA STATE LAND DEPARTMENT
Sundry Notices and Reports on Wells

Lease or
Permit No.....

Notice of intention to drill.....
 Notice of intention to change plans.....
 Notice of date for test of water shut-off.....
 Report on result of test of water shut-off.....
 Notice of intention to re-drill or repair well.....
 Notice of intention to shoot.....
 Subsequent record of shooting.....
 Record of perforating casing.....
 Notice of intention to pull or otherwise alter casing.....
 Notice of intention to abandon well March 14, 1944.....
 Subsequent report of abandonment.....
 Supplementary well history 10 3/4" casing cemented at 3536'
 9" hole drilled to 3609'. In granite at total depth. Cement
 plug placed from 1800' to 1900'. Cement plug placed from
 575' to 650'. Steel cap screwed into top of surface casing
 and well abandoned.

(Indicate above by check mark nature of report, notice or other data)

Following is a (Notice of intention to do work) on land under (permit) described as follows:
(Report of work done) (lease)

Well No. 1 New Mexico * Arizona Land Company (Called New Mexico - Arizona # 1)
Section 34 Township 15 North Range 19 East

The well is located 2160' feet (S) of the NE Corner and 2115' feet
(E) of the NE Corner
(W) of the NE Corner

Section 34, T. 15 N., R. 19 E.
The elevation of the derrick floor above sea level is 6047' feet

DETAILS OF PLAN OF WORK

(State names of an expected depth to objective sands; show sizes, weights, and lengths of proposed casings; indicate mudding jobs, cementing points, and all other proposed work.)

10 3/4", 40.5 lb. casing set at 336'. It is impossible to predict expected depths to objective sands.

Approved March 29, 1944
Date

J. C. Williams
Arizona State Land Department

Company Union Oil Company of California
By *R. H. Ruess*

Geologist
Title
Address Box 301, Holbrook, Ariz.

Address.....
NOTE:—Reports on this form to be submitted in triplicate to the Commissioner for approval.

the permit

HISTORY

- Jan. 23, 1944 Spudded in well, drilled 13-3/8" hole.
- Feb. 2, 1944 Lost circulation at 365', regained with cotton seed hulls. Lost circulation at 532' and drilled ahead to 630' without regaining. Alternated drilling with mud and then with water.
- Started running 10-3/4" surface casing; stuck at 200'; pulled out casing.
- Raised hole with 15" reamer with good circulation. Apparently reamer cuttings filled crevices and cracks.
- Ran 10-3/4" casing to 350' where it stuck. Pulled up 10-3/4" to 336' and cemented with no returns. Found top of cement at 200' in back of pipe. Cemented back of casing through 1" pipe.
- Feb. 12, 1944 Drilled and cored ahead to 1793', no trouble with circulation.
- TEST NO. 1 K.F.T. 1709-1793', open 20 minutes, light steady blow of air which slowly decreased and died at end of 15 minutes; recovered 35' of drilling mud in drill pipe.
- Feb. 16, 1944 Lost circulation at 2210', regained with hulls. Lost circulation.
- Feb. 20, 1944 Lost circulation at 2690', unable to regain. Cemented hole twice.
- Feb. 25, 1944 On drilling out cement lost circulation at 2450', cemented at 2210', drilled ahead to 2490' and lost circulation. Cemented at 2450' and displaced cement to 2210'. Plugged at 450' and cemented 365-535'. Lost circulation at 2729' and 2801'. Regained with hulls.
- Mar. 7, 1944 Cored to 3290' with only slight loss of circulation.
- TEST NO. 2 K.F.T. 3252-3290', open 30 minutes, faint blow of air for 9 minutes; recovered 18' of drilling mud in dr. pipe.
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- TEST NO. 3 Hailing test. Effective depth 1800', bailed to slightly below 1800' when salt water started coming in just above plug. Impossible to bail any lower.
- Mar. 17, 1944 Plugged with cement 575-650' and abandoned.

History compiled from telegraphic reports by Harvey W. Lee, Exploration Dept., Union Oil Co., Los Angeles, Calif. April 4, 1944.

No permit

UNION OIL COMPANY & CONTINENTAL OIL COMPANY
 Location: New Mexico-Arizona #1
 2160' south & 2115' west of northeast corner
 of section 34-15N/19E, Gila & Salt River S. & M.
 Elevation: 6034' ground; 6047' derrick floor; 6049' Kelly Bushing
 (All depths measured from Kelly bushing)
 Drilled: January 23, 1944
 Abandoned: March 17, 1944
 Casing: 10-3/4" cemented at 336'
 Holbrook Area
 Navajo County
 Arizona
 Total Depth: 3609'
 No electric log survey run.

LOG

<u>Interval</u>	<u>Lithologic Description</u>
0-15	Conductor pipe.
15-20	Sandstone, red, fine-grained, silty.
20-30	Sandstone, as above, with tan to buff, sandy, clayey limestone.
30-40	Limestone, tan to buff, sandy, clayey; streaks quite micromicaceous.
40-270	Sandstone, white with occasional slight tannish cast, medium-grained, hard to fairly friable.
270-290	Sandstone, as above, with streaks of buff sandstone.
290-330	Sandstone, white with occasional tannish streak, medium-grained, hard to fairly friable.
330-520	Sandstone, as above, though slightly more friable and considerably more "floury" and finer grained.
520-560	Sandstone, red, tan, and reddish-tan, medium-grained, hard to slightly friable.
560-630	Drilled without returns.
630	Sample off bit; shale, red, clayey, sandy.
630-670	Sand, red, medium-grained, silty, with thin streaks of red shale.
670-680	Sand, as above, interbedded with red, fine, sandy shale; trace of gypsum.
680-690	Shale, red, fine, sandy, with thin streaks of red, silty sand.
690-700	Shale, red, fine, sandy, with considerably gypsum.
700-730	Anhydrite, white, milky, hard.
730-740	Interbedded anhydrite, as above, and red, fine, sandy shale.
740-750	Anhydrite, white, milky, hard.
750-760	Interbedded anhydrite, as above, and red, fine, sandy shale.
760-780	Interbedded bright red, shaly sand; red, fine, sandy shale; and white anhydrite.
780-820	As above, with trace of clear crystal salt. Top of salt at 780'.
820-830	Anhydrite, white, milky with thin interbeds of reddish-brown, sandy shale and red, silty sand.
830-840	Anhydrite, white, milky, hard, with trace of reddish-brown, sandy shale and red, silty sand.
840-940	Interbedded red, silty sand; reddish-brown, fine, sandy shale; and white milky anhydrite; trace of clear, crystal salt.
940-950	Anhydrite, white, milky, hard, with lesser amounts of reddish-brown, fine, sandy shale, and red, silty sand.

See permit

- 950-990 Interbedded, red, silty sand; reddish-brown, fine, sandy shale; and white, milky anhydrite.
- 990-1000 Anhydrite, white, milky, hard, with lesser amounts of reddish-brown, sandy shale, and red, silty sand.
- 1000-1020 Interbedded reddish-brown, sandy shale; white, milky anhydrite; and red, silty sand.
- 1020-1030 Anhydrite, white, milky, hard, with thin interbeds of reddish-brown, sandy shale.
- 1030-1040 Shale, brown, very sandy, with a minor amount of red, silty sand and anhydrite.
- 1040-1050 Anhydrite, white, milky, hard, with trace of brown, very sandy shale.
- 1050-1060 Shale, dark, gray-brown, limy, sandy; first marine streak.
- 1060-1070 Anhydrite, white, milky, hard, with a trace of gray & red shale.
- 1070-1080 Sand, brown to reddish-brown, very shaly, with a trace of anhydrite.
- 1080-1090 Shale, brown, very sandy, with thin interbeds of anhydrite and brown sand; trace of salt.
- 1090-1130 Sand, brown, very shaly, with lesser amounts of brown, sandy shale and anhydrite; occasional crystal of salt.
- 1130-1220 Interbedded brown, very shaly sand; brown, very sandy shale; and anhydrite; occasional streaks of crystal salt.
- 1220-1230 Anhydrite and gypsum; some of gypsum is very porous; minor streaks of brown sand and shale.
- 1230-1250 Shale, brown to reddish-brown, very sandy with minor amounts of brown silty sand and anhydrite.
- 1250-1280 Anhydrite, white, milky, becoming quite shaly in lower portion.
- 1280-1300 Shale, brown, fine, sandy, with trace of salt and anhydrite.
- 1300-1320 Anhydrite, white, milky, hard.
- 1320-1330 Interbedded anhydrite and brown, fine, sandy shale.
- 1330-1470 Sand, brown, shaly, with fewer interbeds of brown, fine, sandy shale, and anhydrite; occasional crystal of salt.
- 1470-1560 Shale, brown to reddish-brown, sandy, with lesser amounts of brown, silty sand and anhydrite, trace of salt in lower portion.
- 1560-1570 Shale, gray-black to gray-brown, slightly limy; marine.
- 1570-1580 Sand, gray-brown, silty, dolomitic, with streak of black shale.
- 1580-1600 Interbedded brown, sandy shale; brown, silty sand; gray, slightly limy shale; and anhydrite.
- 1600-1670 Shale, brown to reddish-brown, fine, sandy, with fewer interbeds of brown, silty sand, gray, limy shale, and anhydrite; occasional crystal of salt.
- 1670-1680 Interbedded brown, fine, sandy shale; brown, silty sand; gray, slightly limy shale; with a trace of anhydrite.
- 1680-1690 Shale, gray to gray-black, limy, with interbeds of brown, sandy shale and silty sand and anhydrite; occasional inclusion of gray, shaly limestone.
- 1698-1793 Cored (See core description)
- 1793-1800 Shale, brown to reddish-brown, very sandy, with thin interbeds of brown silty sand.
- 1800-1830 Sand, brown, very shaly, with thin interbeds of brown, very sandy shale; minor amount of very porous anhydrite.
- 1830-1840 Interbedded brown, very shaly, fine-grained sand, and brown, sandy shale, trace of very porous anhydrite.

- 1840-1850 Anhydrite, white, milky, with minor amounts of brown sand and shale.
- 1850-1870 Sand, brown, very shaly, fine-grained, with considerable amount of brown fine, sandy shale; occasional streaks of anhydrite.
- 1870-1880 Shale, brown, fine, sandy, with minor amount of brown, shaly sand, and anhydrite.
- 1880-1970 Sand, brown to reddish-brown, very shaly, with thin streaks of brown, fine, sandy shale; trace of porous anhydrite and gray shale. From 1940' to 1970' there are occasional streaks of bright red, clayey, coarse-grained sand.
- 1970-1980 Shale, brown, fine, sandy, with streaks of brown, shaly sand and red, clayey, coarse-grained sand.
- 1980-2030 Sand, brown to reddish-brown, very shaly, fine-grained, with fewer interbeds of brown, fine, sandy shale; occasional trace of anhydrite.
- 2030-2040 Sand, grayish-tan, silty, with some brown, shaly sand, and occasional inclusion of blue-gray shaly limestone.
- 2040-2050 Shale, grayish-tan, limy, with some streaks of sand, as above; occasional inclusion of blue-gray, shaly limestone.
- 2050-2070 Sand, brown, silty, with lesser amounts of brown, fine, sandy shale.
- 2070-2080 Shale, brown to reddish-brown, fine, sandy, with thin streaks of sand as above.
- 2080-2170 Interbedded brown, silty, fine-grained sand, and brown, fine, sandy shale; occasional trace of anhydrite.
- 2170-2300 Sand, brown, fine-grained, silty, and sand, red, medium to coarse-grained, clayey; occasional streaks of brown, sandy shale, gray shale, and porous anhydrite.
- 2300-2350 Interbedded brown, fine-grained, silty sand, and brown, fine, sandy shale.
- 2350-2460 Sand, brown, fine-grained, silty, and sand, red, coarse-grained, clayey; occasional streak of brown, fine, sandy shale.
- 2460-2510 Sand, brown and reddish-brown, shaly, with streaks of reddish-brown, probably dolomitic, fine, sandy shale; minor amounts of gray, slightly limy shale and anhydrite.
- 2510-2550 Shale, red and brown, clayey, sandy, dolomitic; thin interbeds of brown, and reddish-brown, shaly sand; minor inclusions of gray shale and anhydrite.
- 2550-2580 Shale, reddish to purplish-brown, limy, dolomitic; considerable inclusions of purplish-gray, probably nodular, limestone and reddish-brown dolomite; minor amount of reddish-brown, silty sand, gray, limy shale, and porous anhydrite.
- 2580-3609 Cored (See core description)

Total Depth - 3609'

1/20 permit

CORE DESCRIPTION

<u>Core No.</u>	<u>Interval</u>	<u>Recovery</u>	<u>Lithologic Description</u>
1	1692-1702	9'	<p>1 1/2' <u>Salt</u>, clear, with light brown mottling; streaked and veined with brown, clayey shale.</p> <p>1' <u>Shale</u>, gray to gray-black, with occasional thin, reddish-brown streaks; massive, dolomite.</p> <p>1 1/2' <u>Shale</u>, reddish-brown, with thin streaks of gray, fine, sandy, massive; numerous streaks and pockets of salt.</p> <p>1 1/2' <u>Chert</u>, blue-gray to gray-black, hard, tight, dense.</p> <p>6" <u>Salt</u>, clear, with light brown mottling.</p> <p>3" <u>Shale</u>, gray, very cherty, hard, dense, with pockets of salt.</p> <p>2' 9" <u>Shale</u>, reddish-brown, with rare streaks of gray, fine, sandy; pockets and seams of salt and occasional gray chert inclusion.</p>
2	1702-1712	10'	<p>4 1/2' <u>Salt</u>, clear, with gray mottling; veined with gray shale and gray chert.</p> <p>5' <u>Chert</u>, blue-gray to gray-black, hard, tight, dense; occasional stringers of gray-black, dolomitic shale; pockets and vugs of crystal salt very common.</p> <p>6" <u>Shale</u>, gray-brown, dolomitic or fine, sandy, micro-micaceous; slight stain and slight odor.</p>
3	1712-1722	4'	<p><u>Shale</u>, gray to gray-brown, dolomitic or fine, sandy, micro-micaceous; a number of interbeds of blue-gray, hard, tight, dense chert; some stain and slight odor.</p>
4	1722-1730	6'	<p><u>Shale</u>, as above, with interbeds of chert; numerous pockets and vugs of crystal salt in upper 3'.</p>
5	1730-1734	3'	<p><u>Chert</u>, blue-black to gray-black, hard, tight, dense, with interbeds of tan and tannish-gray, tight, dense dolomite; slight odor and slight spotty stain.</p>
6	1734-1740	6'	<p><u>Dolomite</u>, tannish-brown, fine-grained, tight, dense; abundant small inclusions of white, blue-white and blue-gray chert; fair stain and fair odor; practically no porosity except for rare vuggy spots.</p>
7	1740-1745	5'	<p><u>Dolomite</u>, as above, becoming quite laxy in lower 2'; light brown stain in upper 3'; dark brown stain in lower 2'; good odor throughout; only slight porosity.</p>

Chaperment

8	1745-1755	8'	<u>Limestone</u> , gray-brown, quite shaly and dolomitic in streaks; numerous white, blue-white and blue-gray chert inclusions; light to dark brown stain throughout; good odor; very slight porosity.
9	1755-1765	10'	<u>Limestone</u> , as above, though somewhat more shaly; good stain and good odor; very slight porosity.
10	1765-1775	10'	<u>Limestone</u> , tanish-gray to gray-brown, shaly, dolomitic, with occasional white, blue-white and blue-gray chert inclusions; streaks are very dolomitic; good stain and good odor; very slight porosity.
11	1775-1785	10'	5 1/2' <u>Limestone</u> , as above; good stain and good odor; practically no porosity. 4 1/2' <u>Shale</u> , gray to blue-gray, very fine, sandy, and probably dolomitic; very little stain and meager odor; locked wet.
12	1785-1795	7'	3' <u>Shale</u> , as above, micromicaceous; no stain or odor; locked wet. 4' <u>Shale</u> , reddish-brown, quite sandy, and dolomitic; massive; occasional small white, blue-white and blue-gray chert inclusions.
13	2830-2830	10'	6' <u>Shale</u> , reddish to purplish-brown, limy, dolomitic; occasional small pebbles; occasional slickensides; numerous inclusions of gray to white crystalline limestone. 1' <u>Limestone</u> , greenish-gray, reddish-brown, mottled; cherty, shaly; rare small pebbles. 3' <u>Dolomite</u> , reddish-brown, with streaks of gray; very shaly in streaks; very limy.
14	2830-2840	10'	<u>Limestone</u> , reddish to purplish-brown, with streaks of gray; massive, hard, tight, dense; shaly in streaks; dolomitic; occasional cherty streaks.
15	2840-2850	10'	1' <u>Limestone</u> , as above. 9' <u>Shale</u> , reddish to purplish-brown, very limy, occasional slickensides.
16	2850-2855		No recovery
17	2855-2862	6'	<u>Shale</u> , as above.
18	2862-2870	6'	<u>Shale</u> , as above.
19	2870-2873		No recovery.

20	2873-2878	5'	1 1/2' <u>Limestone</u> , gray, hard, tight, dense, cherty. 6" <u>Shale</u> , reddish-brown, limy. 1 1/2' <u>Limestone</u> , gray, shaly to cherty. 1 1/2' <u>Shale</u> , gray-brown, limy; occasional small pebbles, becoming very clayey and crumbly in lower portion.
21	2878-2888	5'	4' <u>Shale</u> , gray-brown to bluish-brown, very clayey and crumbly; abundant small chert and limestone pebbles. 1' <u>Limestone</u> , gray to gray-brown, cherty, shaly occasional small pebbles.
22	2888-2898	10'	<u>Limestone</u> , reddish-brown, to gray-brown, hard, tight, dense, dolomitic; occasional streaks reddish-brown limy shale; numerous veins and inclusions of gray to white crystalline limestone; occasional small pebbles in shaly streaks.
23	2898-2908	10'	3' <u>Limestone</u> , as above. 2' <u>Shale</u> , reddish-brown, with occasional streaks gray, limy; occasional small pebbles; occasional inclusion of gray to white crystalline limestone. 5' <u>Limestone</u> , reddish-brown, with occasional streak of gray, hard, tight, dense, shaly, dolomitic, with numerous gray to white inclusions of cherty to crystalline limestone.
24	2908-2918	8'	7 1/2' <u>Limestone</u> , as above, with thin streaks of reddish-brown, limy shale, 6" <u>Shale</u> , reddish-brown to gray-brown, crumbly, clayey, limy.
25	2918-2928	2'	<u>Shale</u> , as above, quite pebbly, becoming more firm in lower 1'.
26	2928-2934	6'	<u>Shale</u> , reddish-brown, with occasional streaks of greenish-gray; very conglomeratic, clayey crumbly, limy.
27	2934-2944	6'	<u>Shale</u> , reddish-brown, limy, dolomitic; numerous gray and greenish-gray, nodular, chert and limestone inclusions; abundant small, scattered pebbles; occasional slickensides.
28	2944-2948	4'	3' <u>Shale</u> , as above, though more limy and dolomitic 1' <u>Dolomite</u> , reddish-brown; fine, sandy, hard, tight, dense, massive; slightly limy.
29	2948-2958	10'	1' <u>Dolomite</u> , as above. 9' <u>Dolomite</u> , as above, with abundant inclusions and veinings of gray, cherty limestone; 6"

the permit

zone of brecciated limestone and dolomite at 2955'; contains both rounded and angular pebbles.

30	2958-2968	8 1/2'	6' 3"	Dolomite, reddish-brown, fine, sandy; occasional shaly streak; massive, hard, tight, dense; occasional pebbles in shaly streaks; very minor small inclusions of gray, cherty limestone.
			3"	Shale, grayish and bluish-brown, mottled, clayey, crumbly.
31	2968-2978	10'	6"	Shale, as above, becoming more firm and less crumbly; slickensided.
			9 1/2'	Shale, reddish-brown, massive, very limy and dolomitic in upper 4', becoming more clayey and extremely pebbly in lower 5'.
32	2978-2988	10'	3'	Shale, conglomeratic, gray to bluish-brown, clayey, crumbly; pebbles are chert and limestone.
			7'	Dolomite, reddish-brown, fine, sandy, quite limy, massive, hard, tight, dense; abundant veining and inclusions of white and gray, cherty limestone; occasional small scattered pebbles.
33	2988-2998	10'	1'	Dolomite, as above.
			9'	Dolomite, reddish-brown, fine, sandy, quite limy, massive, hard, tight, dense, with interbeds of reddish-brown to gray-brown, fine-grained, quartzitic, dolomitic sandstone.
34	2998-3006	8'	4'	Dolomite, as above.
			4'	Shale, reddish-brown to gray-brown, limy, dolomitic; firm to becoming quite clayey and crumbly in lower portion; numerous small scattered pebbles; numerous slickensides.
35	3006-3015	9'	6'	Shale, blue-gray, with brown mottling; clayey, crumbly, limy; numerous small scattered pebbles; occasional slickensides, becoming more firm and dolomitic in lower 2'.
			1'	Dolomite, reddish-brown, fine, sandy, limy, massive, hard, tight, dense; occasional gray, cherty limestone inclusion.
			2'	Shale, reddish-brown, limy, dolomitic; abundant inclusions of white and gray cherty limestone; occasional small scattered pebbles; occasional slickensides.
36	3015-3018	3'		Shale, gray-brown, limy, dolomitic; numerous small scattered pebbles; white to gray, cherty, nodular limestone inclusions; considerable slickensides.

- 37 3016-3028 9' 6' Shale, as above.
3' Dolomite, reddish-brown, granular, hard, tight, dense, with numerous inclusions of white to gray, cherty, nodular limestone; also contains rounded chert and limestone pebbles.
- 38 3028-3038 9' Shale, blue-gray-brown and reddish-brown, clayey, and crumbly in upper 6', becoming firm, limy, and dolomitic in lower 3'; occasional inclusions of white to gray, nodular limestone; very pebbly in upper 6'; occasional slickensides.
- 39 3038-3048 10' Shale, as above; some clayey and crumbly; some firm, limy, and dolomitic.
- 40 3048-3058 7½' 3' Dolomite, reddish-brown, finely granular, hard, tight, dense, massive; abundant inclusions of white to gray, cherty, nodular limestone.
3' Shale, reddish-brown, limy, dolomitic, clayey, firm to crumbly; numerous slickensides.
1½' Dolomite, reddish-brown, finely granular, hard, tight, dense, massive; rare gray, cherty, limestone inclusions.
- 41 3058-3068 9' Dolomite, as above, though somewhat shaly in upper 6'.
- 42 3068-3078 7½' Dolomite, as above.
- 43 3078-3088 10' Dolomite, reddish-brown, granular, fine, sandy, hard, tight, dense, massive, with thin interbeds of reddish-brown to gray-brown, limy, dolomitic shale, and pinkish-red, fine-grained, hard, tight, dense, sharp, quartzitic, dolomitic sandstone.
- 44 3088-3096 8' 2' Dolomite, gray-black, granular, very sandy, massive, hard, tight, dense; occasional white to gray limestone inclusions; shows considerable cross-bedding.
6' Sandstone, gray-white to gray-black, with occasional greenish-gray streak; dolomitic quartzitic, highly cross-bedded; numerous patches & zones of brecciated, cherty limestone.
- 45 3096-3106 10' 1' Limestone, gray, cherty, hard, dense, with thin interbeds of purplish-gray, dolomitic shale; gray, nodular chert in shale partings.
9' Shale, purplish-gray, clayey, dolomitic, slightly limy, with white to gray, nodular, cherty, limestone inclusions; some small limestone pebbles? Highly slickensided; lower 6" gray and bentonitic.

- 46 3106-3116 4' Limestone, light gray, cherty, nearly novaculite; occasional brecciated zones; minor inclusions of red chert; minor dry, black, asphaltic residues along fractures.
- 47 3116-3126 10' 6' Limestone, gray, greenish-gray, purplish-gray, cherty to semi-crystalline, hard, tight, dense; numerous veining and inclusions of red chert.
1' Shale, purplish-black; occasional pebbles; occasional gray-white, nodular, cherty, limestone inclusion.
4 1/2' Limestone, reddish to pinkish-brown, dolomitic, shaly, hard, tight, dense; numerous inclusions of gray, nodular, cherty limestone.
3' Shale, purplish to reddish-brown, limy in upper part to very clayey and crumbly in lower portion.
1' Limestone, gray, cherty, nearly novaculite, hard, dense, with 2" bed of gray to bluish-gray, clayey, bentonitic, crumbly shale in middle.
- 48 3126-3135 7' Limestone, light gray, cherty, nearly novaculite, massive, hard, tight, dense; considerably fractured and brecciated; some red chert veining.
- 49 3135-3144 9' 8' Limestone, dark gray to black, shaly, hard, tight, dense; numerous gray-white, nodular, cherty limestone inclusions; abundant small, red chert inclusions; slight odor; Lycopod stems and Compositae?
1' Shale, gray-brown, to reddish-brown, limy, and dolomitic to clayey; occasional gray, cherty, limestone inclusion.
- 50 3144-3154 9' 1' Shale, gray to gray-brown, dolomitic, with gray, nodular, cherty limestone inclusions; very pebbly; large sized chert and limestone pebbles.
8' Limestone, gray to black, cherty to semi-crystalline; occasional thin streaks and interbeds of black to gray-brown, limy, dolomitic shale; a few Lycopod and Grinnoid stems.
- 51 3154-3163 9' Shale, gray, gray-brown, and reddish-brown, limy, dolomitic; numerous thin, white to gray, semi-crystalline to crystalline interbeds of fossiliferous limestone; entire core extremely fossiliferous; abundant Grinnoid stems, Lycopods, Dialaena and Compositae; occasional spotty stain in some of more porous limestone stringers.
- 52 3163-3170 7' 2' Fossiliferous shale, as above.
2 1/2' Limestone, gray, cherty, nodular, hard, tight, dense; sparingly fossiliferous; slight spotty stain.
2 1/2' Shale, gray, gray-brown and reddish-brown, very

limy and dolomitic; massive, firm hard; nearly a limestone or dolomite; occasional gray, nodular, cherty limestone inclusion; slight, very spotty stain; rare fossils.

53	3170-3179	9'	Shale, as above.
54	3179-3189	9'	3' Shale, as above, though mostly gray. 6' Shale, gray to black, limy, dolomitic; streaks quite carbonaceous.
55	3189-3199	10'	Shale, as above, streaks very carbonaceous to lignitic; abundant carbonized wood; occasional large patches of pyrite.
56	3199-3209	10'	Shale, as above.
57	3209-3216	5'	Shale, as above.
58	3216-3225	9'	Shale, as above.
59	3225-3231	6'	Shale, as above.
60	3231-3236	5'	Shale, as above, becoming gray-brown in lower 2'; abundant small chert and limestone pebbles.
61	3236-3246	10'	Shale, gray-brown, with occasional streaks of bluish-gray; crumbly in upper part to firm and dolomitic in lower portion; a few very small scattered pebbles.
62	3246-3256	10'	6 1/2' Shale, reddish-brown, with occasional streaks of gray; firm, dolomitic, slightly limy. 3 1/2' Limestone breccia and conglomerate, gray to gray-brown; made up of rounded as well as angular chert and limestone fragments in matrix of gray limestone; fair spotty porosity and fair spotty yellow stain.
63	3256-3265	7'	5 1/2' Limestone, as above; fair spotty porosity and fair spotty yellow stain. 1 1/2' Limestone, gray, with occasional streak of gray-brown, shaly, dolomitic, tight, dense.
64	3265-3274	10'	Interbedded limestone as above, and gray and gray-brown, limy, dolomitic, firm shale; occasional carbonaceous material in shale streaks; rare, slight stain.
65	3275-3283	8'	2' Shale, gray, gray-black, gray-brown, and reddish-brown; occasional gray, nodular, limestone inclusions; occasional fossils in limy zones.

The permit

		4'	<u>Limestone</u> , gray and reddish-brown, hard, tight, dense, dolomitic, with occasional gray, nodular, cherty limestone inclusions.
		2'	<u>Shale</u> , reddish to purplish-brown, liny, dolomitic, massive, firm; occasional gray, nodular, cherty limestone inclusion.
66	3285-3290	6'	<u>Shale</u> , as above, becoming gray in lower 1'.
67	3290-3295	7 1/2'	<u>Shale</u> , gray to black, with occasional streaks of brown; liny; numerous white to gray, nodular, cherty limestone inclusions; quite fossiliferous; abundant partially carbonized plant material.
68	3295-3308	10'	<u>Shale</u> , as above; indications of practically flat dips.
69	3308-3315	7'	1' <u>Shale</u> , as above; occasional small scattered pebbles. 6' <u>Shale</u> , reddish-brown, with occasional streak of gray, liny.
70	3315-3325	10'	4' <u>Shale</u> , as above, with abundant small scattered limestone and chert pebbles. 6' <u>Limestone</u> , gray, pinkish-gray and pinkish-brown, hard, tight, dense, dolomitic.
71	3325-3335	4'	2' <u>Limestone</u> , as above. 2' <u>Shale</u> , gray-brown, blue-gray; very clayey and crumbly; occasional small scattered pebbles.
72	3335-3345	10'	1 1/2' <u>Limestone</u> , purplish-gray to reddish-gray, dolomitic, massive, hard, tight, dense; occasional small scattered pebbles. 6' <u>Shale</u> , reddish-brown, firm and liny, to crumbly and clayey; occasional small scattered pebbles; highly slickensided. 6' <u>Limestone</u> , gray to greenish-gray, hard, tight, dense.
73	3345-3354	10'	<u>Dolomite</u> , gray-brown, reddish-brown and pinkish-brown, quite liny, fine, granular, hard, tight, dense; becoming very shaly in lower 1 1/2'.
74	3354-3364	10'	3' <u>Shale</u> , reddish to purplish-brown, slightly liny and dolomitic; numerous good-sized limestone and chert pebbles; prominent unconformity at 3357'; basal pebbles resting on erosional scour and fill, limestone. 1' <u>Limestone</u> , gray, hard, tight, dense. 6' <u>Limestone</u> , reddish to pinkish-brown, very dolomitic, finely granular, massive, hard, tight, dense.

75	3364-3370	5'	<u>Limestone</u> , as above, with occasional shaly streak.
76	3370-3379	9'	<u>Limestone</u> , as above, with occasional streak of gray.
77	3379-3387	9 $\frac{1}{2}$ '	6" <u>Limestone</u> , as above. 1' <u>Limestone</u> , gray, cherty, hard, tight, dense. 2' <u>Limestone</u> , gray, gray-brown and reddish-brown, very shaly, pebbly and nodular. 4 $\frac{1}{2}$ ' <u>Limestone</u> , gray and gray-brown, cherty, hard, tight, dense. 1 $\frac{1}{2}$ ' <u>Shale</u> , gray-brown, and brown, limy, dolomitic; scattered limestone and chert pebbles.
78	3387-3397	6'	<u>Limestone</u> , gray, with occasional streak of gray-white and greenish-gray, cherty to crystalline. Tight and dense, with an occasional slightly porous streak; Grinoid stems and corals; small bright red chert inclusions.
79	3397-3405	8'	<u>Shale</u> , gray, purplish-gray, black, and purplish-brown, very limy and dolomitic; occasional thin beds of purplish-gray, hard, tight, dense limestone; numerous fossils; occasional small, bright red chert inclusions.
80	3405-3415	10'	4' <u>Dolomite</u> , gray, gray-brown and purplish-brown, limy, shaly; numerous gray, nodular, cherty limestone inclusions; occasional gray, micaceous shale streaks. 6' <u>Dolomite</u> , reddish-brown, finely granular, limy, fine, sandy, hard, tight, dense; occasional thin micaceous shale partings.
81	3415-3425	10'	2' <u>Dolomite</u> , as above. 8' <u>Limestone</u> , gray, to gray-black, massive, hard, tight, dense; occasional shaly and dolomitic streak; contains prominent calcite-filled, vertical fractures.
82	3425-3434	6'	<u>Limestone</u> , as above, though extremely fossiliferous; Grinoid stems and Brachiopods most common; occasional thin, semi-crystalline to crystalline streaks with fair porosity; numerous small bright orange-red chert inclusions.
83	3434-3444	10'	6" <u>Limestone</u> , as above. 9 $\frac{1}{2}$ ' <u>Interbedded gray, purplish-gray, shaly limestone and dolomite, and purplish-brown, limy and dolomitic shale</u> ; worm tracks in shale.

84	3444-3454	10'	<p>1' <u>Interbedded limestone, dolomite and shale, as above.</u></p> <p>3' <u>Limestone, gray to white, crystalline, with occasional cherty streak; highly fossiliferous; spotty porosity.</u></p> <p>4 1/2' <u>Limestone, gray to purplish-gray, shaly, cherty, with occasional thin streaks of gray to white, crystalline limestone; highly fossiliferous.</u></p> <p>1 1/2' <u>Dolomite, purplish-gray to purplish-brown, limy, fine, granular, hard, tight, dense.</u></p>
85	3454-3464	10'	<p>2' <u>Dolomite, as above, with thin interbeds of purplish-brown, limy, dolomitic shale.</u></p> <p>6 1/2' <u>Shale, purplish-brown, very limy and dolomitic; occasional nodules and interbeds of limestone and dolomite.</u></p> <p>1 1/2' <u>Limestone, pinkish-gray to pinkish-brown, massive, dolomitic, hard, tight, dense.</u></p>
86	3464-3474	10'	<u>Interbedded reddish-brown, hard, tight, dense, limy, dolomite, and gray and greenish-gray, cherty to shaly limestone.</u>
87	3474-3478	2'	<u>Limestone, gray to purplish-gray, very cherty, hard, tight, dense.</u>
88	3478-3488	10'	<u>Limestone, gray, white, to purplish-gray, cherty to crystalline, with thin interbeds and seams of bluish-gray and purplish-gray, dolomitic shale and shaly dolomite; highly fossiliferous.</u>
89	3488-3494	2'	<u>Dolomite, bluish to purplish-gray, shaly; occasional nodular, gray, chert inclusion.</u>
90	3494-3500	2'	<u>Shale, bluish to purplish-gray, with occasional stringers of green; dolomitic; abundant inclusions of white to gray nodular chert; spirifer replaced by red chert.</u>
91	3500-3508	8'	<u>Shale, as above, highly fossiliferous; some of fossils replaced with red chert.</u>
92	3508-3514	6'	<u>Shale, purplish-brown and bluish-gray, limy, dolomitic; occasional inclusions of gray and white, cherty limestone; numerous scattered pebbles; becoming ill-sorted and gritty in lower 3'.</u>
93	3514-3521	7'	<p>3' <u>Shale, as above, becoming reddish-brown in lower 6'; pebbly, gritty, ill-sorted.</u></p> <p>1 1/2' <u>Limestone breccia, reddish-brown to bluish-gray; occasional rounded chert pebble, but in the main made up of angular fragments of chert and limestone.</u></p>

- 2 1/2' Shale, purplish-gray with an occasional streak of green; dolomitic; abundant inclusions of white to gray nodular chert.
- 94 3521-3525 4' Shale, as above.
- 95 3525-3535 6 1/2' 5 1/2' Shale, as above, becoming gritty and ill-sorted in lower 6".
1' Shale, purplish to purplish-brown, pebbly, gritty, ill-sorted.
- 96 3535-3545 7' 1' Shale, red to reddish-brown with occasional patches of green; clayey, slick, pebbly.
3" Limestone rubble, reddish-brown, gray, greenish-gray, dirty, shaly, pebbly, sandy, ill-sorted; abundant rounded imbedded quartz grains.
2' 9" Grit, red, reddish-brown, with streaks of green; dirty, shaly, ill-sorted, pebbly; made up mainly of rounded, frosted quartz grains; occasional cherty limestone inclusion.
3' Grit, as above, with more numerous gray and bright green, cherty, limestone inclusions and interbeds of green, clayey, slick, bentonitic ? shale.
- 97 3545-3550 2 1/2' 6" Grit, red to reddish-brown, with patches of bright green; dirty, shaly, pebbly, ill-sorted; made up mainly of rounded, frosted, quartz grains.
2' Looks like turnip; occasional brown mottling; numerous imbedded, rounded, frosted quartz grains.
- 98 3550-3555 1 1/2' 6" Shale, dull to bright green, clayey, slick, probably bentonitic.
9" Grit, reddish-brown, with occasional streak of green; dirty, shaly, pebbly, ill-sorted; mostly rounded, frosted quartz grains.
3" Dolomite, greenish-gray, sugary, crystalline; occasional imbedded, rounded, frosted quartz grains.
- 99 3555-3560 5' 4' 9" Dolomite, light purplish-gray, greenish-gray and green; crystalline, sugary; thin, serrated, slick, red and green shale partings.
3" Shale, reddish-brown, dolomitic, hard.
- 100 3560-3567 7' Shale, reddish-brown, pinkish-brown and green; very dolomitic, hard; occasional thin beds of dolomite; abundant imbedded, rounded, frosted quartz grains.
- 101 3567-3570 6" Dolomite, gray, purplish-gray, and greenish-gray, hard, tight, dense; abundant imbedded, rounded, frosted, quartz grains.

102	3570-3577	7'	<p>1 1/2' <u>Shale</u>, dark purplish-brown, with occasional blotches of green; silty, dirty, gritty, ill-sorted, slick; looks metamorphosed; abundant inclusions of clear quartz grains.</p> <p>5 1/2' <u>Silt</u>, red to reddish-brown, with occasional streaks and blotches of green; silty, dirty, ill-sorted; streaks quartzitic; scattered pebbles; looks metamorphosed.</p>
103	3577-3580	3'	<u>Dolomite</u> , pale green with mottlings of purple, bluish-gray and reddish-brown; crystalline, granular, hard, tight, dense; abundant imbedded, rounded and angular clear quartz grains.
104	3580-3583	3'	<p>1 1/2' <u>Dolomite</u>, as above.</p> <p>1 1/2' <u>Dolomite</u>, as above, though reddish-brown, purplish-gray and bluish-gray.</p>
105	3583-3588	5'	<u>Dolomite</u> , reddish-brown, purplish-gray, pale green, very mottled; semi-crystalline to crystalline, hard, tight, dense; considerable inclusions of clear quartz.
106	3588-3593	5'	<u>Dolomite</u> , as above; scattered flakes of biotite.
107	3593-3598	5'	<u>Arkose</u> , reddish and purplish-brown, with occasional streaks gray and dark green; gritty, dirty, silty, ill-sorted; slickensided and metamorphosed; made up mainly of granitic material; feldspars and mica common.
108	3598-3603	5'	<u>Arkose</u> , as above, grading into highly weathered granite.
109	3603-3607 1/2	3'	<p>2 1/2' <u>Granite</u>, highly altered and weathered; reddish-brown and purplish-brown, and dark green chlorite?</p> <p>6" <u>Granite</u>, pink to pinkish-white; no weathering; white, clear crystal quartz, pink feldspar and biotite.</p>
			TOP OF SOLID UNWEATHERED GRANITE = 3607'
110	3607 1/2-3609	1 1/2'	<u>Granite</u> , as above.

HOLBROOK AREA- Navajo County, Arizona

21

(Notes received by E. J. Bartosh from
October 23, 1946)

	Union Oil & Continental Aztec #1	Union Oil & Continental New Mexico Arizona #1
Start in Coconino	0	Top?
Base of Coconino & Top of Supai)	760	In Supai at 630'
Top of Salt	1290	Top? 1st Salt 780'
Base of Salt & Top of Rico-Hermosa	2260	
Top Redwall (Miss.)	3550	
Top Devonian	3670	Top Unweathered Granite at 3607'
Total Depth	3850	T.D.: 3609'

Note: Object was Pennsylvanian rocks which were absent.

Examination tips from State Land Department Files

Alumina - Continental - New Mexico Arizona #1.

560

Basal? Coconino

560-620

No returns

630-3096

Supai

3096-3577

Penna?

3577-3598

Redwall?

3598

Granite

TD 3609'

No permit

February 20, 1959

Gulf Oil Corporation
P. O. Box 3313
Durango, Colorado

Attention: Otto E. Brown, Zone Manager,
Exploration Department

Dear Mr. Brown:

We wish to acknowledge receipt of your letter directed to Mr. Phillip W. Johnson in which you have requested the loan of the samples and core chips from the Union Continental-New Mexico Arizona Land Co., #1 well, located in Section 34, Township 18 North, Range 19 East, Navajo County, Arizona.

Our records show that this Department does not have a set of these samples which may be loaned out to interested persons. However, there should be on file at the Museum of Northern Arizona, Flagstaff, Arizona a set of these samples. Arrangements can be made to study the samples there, but no facilities other than a space to study is provided. The collections at the Museum are not loaned out.

Two other sources of information would be the New Mexico Bureau of Mines, Socorro, New Mexico and the Colorado School of Mines at Golden, Colorado. We do not know just what their policy is concerning the loaning out of samples.

We are inclosing a copy of the log on the above well which we hope will be of benefit to you.

Very truly yours,

STATE LAND COMMISSIONER

By: Frederick C. Ryan,
Supervisor,
Oil and Gas Conservation

FCR:mb
Encl.

the permit #9-8



PETROLEUM AND ITS PRODUCTS

GULF OIL CORPORATION

3455 MAIN AVENUE

P. O. BOX 3313 DURANGO, COLORADO

DENVER PRODUCTION
DIVISION

February 19, 1959

EXPLORATION DEPARTMENT
OTTO E. BROWN
ZONE MANAGER

Mr. Phillip W. Johnson
State Land Department
Phoenix, Arizona

Re: Union - Continental
#1 New Mexico-Arizona Land & Cattle Co.
Sec. 34-15N-19E, Navajo Cty., Arizona

Dear Mr. Johnson:

I am writing in regard to samples and core chips from the #1 New Mexico-Arizona Land & Cattle Company well drilled by Union and Continental Oil in 1944. If there is a set of samples from this well in the loan library at the State Land Department, I would like to borrow or rent them for examination.

If samples from this well are not on file with the State Land Department, would you inform me if they are available for loan from the Arizona Bureau of Mines or from the Museum of Northern Arizona at Flagstaff, Arizona.

Any information concerning the above-mentioned well that you might furnish will be very much appreciated.

Very truly yours,

GULF OIL CORPORATION

OTTO E. BROWN

ADG:ir

Permit #9-8

22



CONTINENTAL OIL COMPANY

Denver 2, Colorado
May 19, 1949

Mr. L. A. Heindl
State Land Department
State of Arizona
Phoenix, Arizona

RECEIVED
MAY 23 1949
STATE LAND DEPT.
OF ARIZONA

Dear Mr. Heindl:

We wish to acknowledge your letter dated May 12th, addressed to Mr. Paul F. Catterson, regarding samples of a well drilled in 1927 in Navajo County, Arizona.

We have checked our complete file and are unable to locate any samples or even a sample log of this well. It has been suggested by our geological department that these samples might be found in the files of the geological department of the Colorado School of Mines at Golden, Colorado or at the University of Colorado in Boulder.

We very much appreciate the two copies of a list of exploratory deep wells drilled in Arizona, as well as a list of the samples available.

Yours very truly,

K. W. Brill
K. W. Brill
Superintendent
Rocky Mountain Division
Land Department

the permit

23

April 22, 1944

Mr. Harvey W. Lee, Chief Scout
Union Oil Company of California
Union Oil Building
Los Angeles, California

Dear Mr. Lee:

Thank you for the log and core record of the Union-
Continental Astec #1 and New Mexico-Arizona #1,
which were recently abandoned by your company.
We appreciate your cooperation in supplying us
with these copies.

Very truly yours,

O. C. Williams
State Land Commissioner

bg

40 permit

UNION OIL COMPANY OF CALIFORNIA

UNION OIL BUILDING
LOS ANGELES 14, CALIFORNIA

EXPLORATION DEPARTMENT

RECEIVED

APR 10 1944

STATE LAND DEPT.
OF ARIZONA

April 7, 1944

Mr. O. C. Williams
State Land Commission
Phoenix, Arizona

Dear Sir:

Mr. Russell Burns, who was in charge of our recent drilling operations in the Holbrook Area, Navajo County, Arizona, has requested that I send you the log and core record of the Union-Continental Aztec #1 and New Mexico-Arizona #1, which were recently abandoned.

Yours very truly,

Harvey W. Lee
Chief Scout

HNL: fgh

the permit

UNION OIL COMPANY OF CALIFORNIA

UNION OIL BUILDING
LOS ANGELES, CALIFORNIA

EXPLORATION DEPARTMENT

Box 301, Holbrook, Ariz.
March 27, 1944

Mr. O. C. Williams
State Land Commissioner
Phoenix, Arizona

RECEIVED

MAR 28 1944

STATE LAND DEPT.
OF ARIZONA

Dear Mr. Williams:

Enclosed are the forms on the two wells. I have requested the Los Angeles office to send you copies of the logs of the two wells as soon as they are completed. These should be along before too long.

Sincerely,

R. W. Burns

R. W. Burns

the permit