

TEST HOLES IN SOUTHERN ARIZONA VALLEYS

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The alluvial valleys in the Basin and Range Lowlands province constitute about half the land area of southern Arizona. The troughlike depressions between the mountain blocks are partly filled with alluvial sediments. Most of the ground water of the southern part of the State occurs within the alluvial deposits. The extent and variety of natural resources within and below the alluvium can be determined only by careful analysis of geological and geophysical data and test drilling.

At present, records of about 80 test holes drilled for oil and gas exploration are on public record at the Arizona State Land Department. The records of these test holes are listed in table 5 and their distribution is shown on figure 10.

Most of the 80 exploratory test wells listed in table 5 are in the southeastern part of the State where there are known outcrops of Paleozoic and Mesozoic marine and brackish-water deposits in the adjacent mountains. These older sedimentary rocks have been penetrated at several locations. A test hole drilled to 4,210 feet in sec. 5, T. 22 S., R. 27 E., 20 miles north of Douglas, penetrated Cretaceous(?) sandstone and Paleozoic strata below the middle of the Naco group, and bottomed in granite. A hole drilled 8 miles west, in sec. 25, T. 21 S., R. 25 E., however, went to 5,040 feet and reportedly bottomed in Tertiary or Cretaceous volcanic rocks. Sedimentary and volcanic rocks of possible Cretaceous or Tertiary age were penetrated below the alluvium in several holes in the vicinity of Willcox. A hole near Sonoita Valley in sec. 34, T. 18 S., R. 18 E., about 40 miles southeast of Tucson, was drilled to a depth of 2,656 feet entirely in Cretaceous rocks. In a few places, as in the hole in sec. 13, T. 6 S., R. 24 E., about 10 miles northwest of Safford, sedimentary rocks of unidentified origin and age were penetrated (Knechtel, 1938).

Brackish-water deposits of Tertiary age crop out along the Colorado River north of Yuma and in the vicinity of Imperial Valley in California, and deposits lithologically similar were penetrated below the alluvium in several holes drilled near Yuma. Other test holes that penetrated the full thickness of alluvium have bottomed in intrusive, volcanic, or metamorphic rocks.

Most of the test holes listed have bottomed in alluvial deposits. The deepest test hole in Arizona, in sec. 36, T. 14 S., R. 30 E., about 30 miles south of San Simon, reportedly was drilled through 7,579 feet of conglomerate without encountering bedrock (Sabins, 1957b). Data from other holes drilled within the alluvium show that there is a considerable range in the thickness of alluvial deposits within comparatively short distances in a single valley. Information from water-well logs suggests that the alluvial deposits rest on a surface of moderately rugged relief that is not confined entirely to zones paralleling the mountain fronts. Preliminary aeromagnetic maps of areas near Willcox and north of Benson also suggest complex structural or topographic patterns below the valley fill that may be extensions of exposed features. The range in thickness is also markedly different in separate valleys (McKee, 1951). A study of well logs from western Pinal County, currently under way by the U. S. Geological Survey, may provide an analysis of the ground-water reserves in that area based on the stratigraphic makeup of the alluvial deposits. Two small-scale investigations based on the analysis of well cuttings from the Tucson area (Coulsen, 1950; Kidwai, 1957) have indicated that the alluvial deposits may be subdivided into subsurface stratigraphic units on the basis of their composition and

distribution. These subsurface stratigraphic studies will be useful in analyzing ground-water conditions and the geologic history of the area.

Exploration for ore reserves below alluvial cover has been active in recent years, although little detailed information has been released regarding these activities. The recently developed Pima Mine, about 20 miles southwest of Tucson, is in rocks lying below a cover of about 200 feet of alluvium. Its discovery was made by combining geophysical techniques and test drilling (Thurmond, Heinrichs, and Spaulding, 1954).

Although most of the listed test holes were located without geological or geophysical assistance and drilled without geological analysis of the materials penetrated, drillers' logs and a few sets of samples from well cuttings are available. At least locally, the information from these holes could be integrated with surface geology, aeromagnetic mapping, and water-well logs to provide a measure of understanding of the subsurface geology of the basins and the relationship to the mountain blocks. An analysis of these meager data will be helpful for the exploration for ground-water, mineral, and petroleum resources below the valleys of the region.

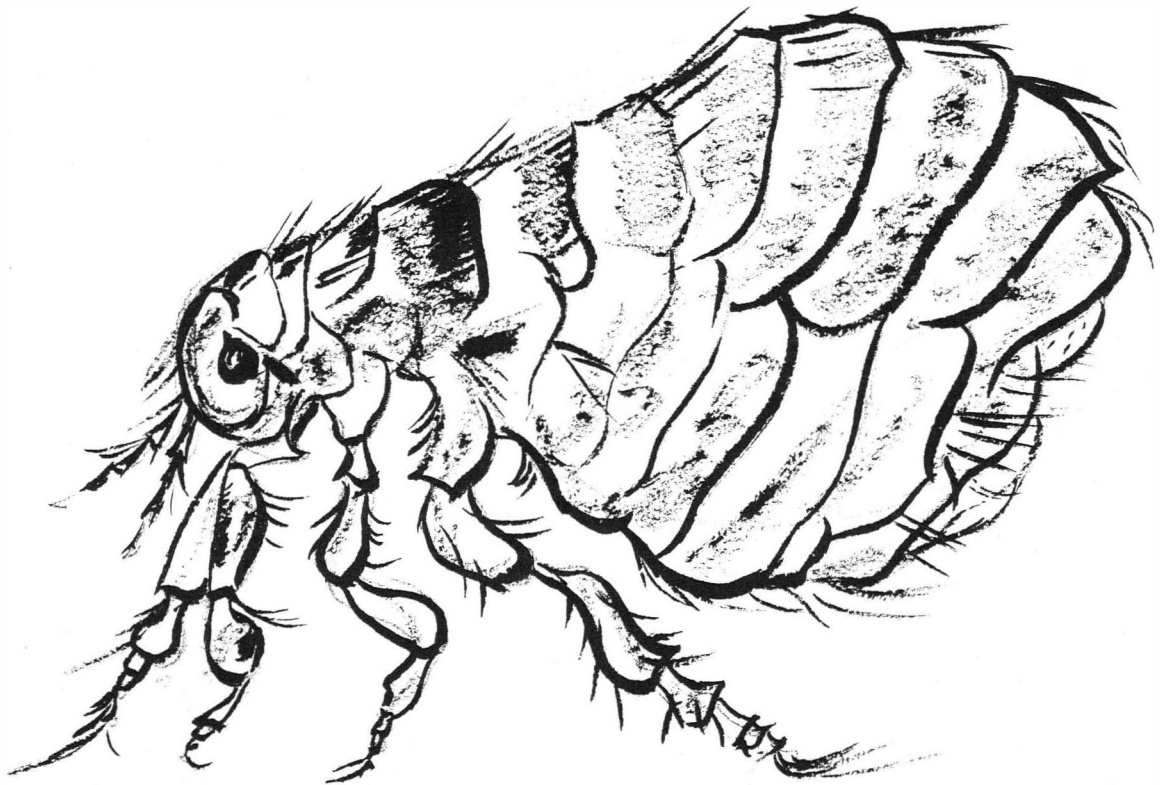


Table 5. Records of test holes drilled in southern Arizona as of August 1958
(After open-file list at the Arizona State Land Department)

Name of well	Location	Altitude (feet)	Date drilled	Surface formation	Bottomed in	Total depth (feet)	Name of well	Location	Altitude (feet)	Date drilled	Surface formation	Bottomed in	Total depth (feet)
COCHISE COUNTY													
Allen, et al-Davis #1	25-21S-25E	4250	1953	Alluv.	Volcanics	5450	Waddell-Duncan-Murray #1	5-22S-27E	4225	1950	Alluv.	Granite	4210
Ari-Tex Oil Co. -Goins #1	4-24S-23E	4525	1944	Alluv.	"Naco" ?	1005	Willcox Oil & Gas #1	9-14S-25E	4175	1925	Alluv.	"Red Sand & Gravel"	2360
Arizona Oil & Gas Dev. State #1	36-14S-30E	3866	1954	Alluv.	Volcanics	7579	GRAHAM COUNTY						
Benedum Trees-Arzberger #1	19-15S-26E	4250	1931	Alluv.	"Red lime, sh & gravel"	3298	Alexander, A. C. #1	17-5S-24E	2730	1906	Alluv.	-	1400
Bowie Oil Syndicate State #1	16-13S-28E	3700	1925	Alluv.	-	4110	Ashurst Oil Co. #1	30-5S-24E	2730	1928	Alluv.	"Br. sh."	1247
Century Pet. - Colglazier #1	17-17S-19E	4250	1931	Alluv.	"Bl Shale"	1550	Bear Springs Oil-Allen #1 (s/a Pinal Oil Co. #1)	25-10S-28E	3600	1931	Alluv.	"Br. sand"	1555
Cochise Oil Co-Goldman #1	34-23S-27E	3960	1956	Alluv.	Alluv.	1000	Bear Springs Oil - Finn - Reed #1	28-11S-28E	3550	1928	"Bl clay"	"Br. sh."	670
Douglas Pet. -Evans #1	24-22S-27E	4275	1948	Alluv.	Alluv.	702	Gia Oil Syndicate #1	30-5S-24E	2730	1931	Alluv.	"Bl. sh."	2645
Duncan-Clayton #1	29-13S-22E	4953	1945	Alluv.	"Cgl"	1000	Hooker, et al #1	6-11S-23E	4400	1930	Alluv.	"Br sand"	1985
Duncan-Clayton #2	29-13S-22E	4890	1945	Alluv.	"Granite Wash"	1180	Idle Oil-Healy #1	6-8S-26E	2920	1913	Alluv.	-	1800
Duncan-State #1	33-13S-22E	4953	1955	Alluv.	Alluv.	1428	Underwriters Synd-Mack #1	13-6S-24E	2815	1928	Alluv.	"Red ss"	3767
Duncan-State #2	33-13S-22E	4953	1956	Alluv.	Unfinished	5207	Whitlock Oil Co. - Penrod #1	20-10S-29E	3475	1930	Alluv.	"Cgl"	521
Fitzwater-Thayer #1	31-13S-31E	3600	1947	Alluv.	Volcanics	4137	Whitlock Oil Co. - State #1	36-10S-28E	-	1927	Alluv.	"ss & Cgl"	1925
Francis Bros-Proctor #1	30-14S-24E	4185	1950	Alluv.	Volcanics	4605	MARICOPA COUNTY						
Funk Benevolent Corp. - Fee #1	27-13S-30E	3600	1939	Alluv.	Volcanics	6668	American Union Pet. Co. #1	5-1N-4E	1210	1931	Alluv.	"Sh & Dolomite"	600
Geronimo Oil-Bruning #1	6-14S-25E	4100	1931	Alluv.	Alluv.	770	Dixie Oil Co. - State #1	34-1N-5W	-	1947	Gila	Volcanics	3505
Geronimo Oil-Clark-Holliday #1	6-14S-25E	4100	1930	Alluv.	Sand	428	Glenn Oil Co. -State #1	2-3N-4E	1644	1948	Alluv.	Schist	4159
McCall-State #1	36-16S-24E	4250	1928	Alluv.	"Lime & sh"	1510	Newcom-Langley #1	30-2N-4E	1190	1938	Alluv.	Alluv.	1050
Owens-Bruno #1	27-23S-27E	3950	1948	Alluv.	Alluv.	630	Peoples Gas & Oil - Gardiner #1	2-1N-3E	1200	1945	Alluv.	"silica"?	3550
Owens-Four #1	32-23S-27E	3960	1948	Alluv.	Alluv.	475	Reaves Oil Co. - Fugua #1	34-1N-4W	-	1939	Alluv.	"Granite Wash"	4117
Portal Drilling Co. State #1	9-16S-31E	4350	1953	Alluv.	Volcanics	5353	Reaves-King #1	33-1N-4W	-	1940	Alluv.	-	1780
Ryan, et al #1	34-14S-30E	4100	1931	Alluv.	"Lime Cgl"	990	Robertson Oil Co. - Wittman #1	33-5N-3W	1625	1946	Alluv.	"Volcanics"	4365
Southwest Oil-Davis-Clark #1	5-21S-24E	4580	1956	Alluv.	Unfinished	5438	Robertson Oil Co. - Wittman #2	33-5N-3W	1620	1948	Alluv.	"Volcanics"	4975
L. A. Thomson-State #1	10-16S-31E	4310	1957	Alluv.	Unfinished	5438	Tannehill-Beardeley #1	25-4N-2W	-	1923	Alluv.	"sh, ss, ls"	3350
L. A. Thomson-State #2	2-24S-31E	4200	1958	Alluv.	Unfinished	2702	Tutweiler-Camelback #1	30-2N-4E	1215	1907	Alluv.	"Clay & ss"	2818
Waddell-Duncan-Lawson #1	4-14S-25E	4185	1950	Alluv.	Alluv.	6865	PIMA COUNTY						
Waddell-Duncan-McComb #1	23-13S-24E	4172	1949	Alluv.	Volcanics	6865	Anderson-Empire #2	22-19S-17E	4500	1951	Alluv.	Volcanics	1350

Name of well	Location	Altitude (feet)	Date drilled	Surface formation	Bottomed in	Total depth (feet)	Name of well	Location	Altitude (feet)	Date drilled	Surface formation	Bottomed in	Total depth (feet)
Arizona Oil Expl.-Boyce #1 (s/a Hummel Ranch Well)	22-19S-17E	4450	1942	Alluv.	Volcanics	2991	<u>SANTA CRUZ COUNTY</u>						
M. T. Berry Mineral Dev. Proj. - Federal #1	27-11S-10E	1919	1953	Alluv.	Volcanics	3212	Jones et al - Larimore #1	9-20S-16E	-	1943	Alluv.	"shale"	3394
Cienega Basin Oil & Gas-State #1	33-18S-18E	4800	1952	Cretaceous	Cretaceous	560	Nogales Oil & Gas #1	6-21S-18E	4925	1921	Alluv.	"sh"	1115
Eloy Development Ass'n-State #1	6-12S-11E	1975	1949	Alluv.	"Red Clay"	4950	<u>YUMA COUNTY</u>						
Ted Jones-Juanita State #1	34-18S-18E	4860	1956	Cretaceous	Cretaceous	2656	Colorado Delta Oil Co.	South of Yuma		1921	Alluv.	Alluv.	730
<u>PINAL COUNTY</u>							Gila Valley Oil & Gas-Kamroth #1	15-8S-22W	173	1957	Alluv.	Unfinished	2006
Casa Grande Dev.-Laveen #1	25-6S-7E	1474	1945	Alluv.	Granite	4742	Gila Valley Oil & Gas Inc #1	15-8S-22W	174	1958	Alluv.	Unfinished	-
East Lantron-State #1	32-2S-10E	-	1949	Alluv.	Volcanics	1020	J. M. Hickey & Sons-Fed #1	35-10S-24W	160	1954	Alluv.	Alluv.	940
Hatchett, et al - McFarland #1	22-7S-8E	1500	1943	Alluv.	Alluv.	1260	Loftus Baird-Stoval #1	4-8S-13W	-	1928	Alluv.	"black mud"	2630
Hackberry Well	8-5S-14E	-	1905	-	-	700	Mitchell et al - Dunford #1	18-7S-12W	-	1943	Alluv.	"red lava"	2000
Robison, et al - Harbor #1	36-4S-3E	1195	1950	Alluv.	Granite (?)	3642	S. F. Sutton-Johnson #1	5-10N-14W	-	1946	Alluv.	-	400
Robison, Mason, Nickols-State #1	17-1S-8E	1535	1952	Alluv.	Granite	2836	M. P. Stewart et al, Fed #1	31-10S-23W	189	1954	Alluv.	Cgl.	3660
San Pedro Oil Co. - Smith #1	33-8S-17E	-	1930	Alluv.	"Lake beds"	1485	Yuma Basin Oil - Sinclair #1	32-8S-23W	-	1926	-	-	1815
Santa Maria Exploration-#1	25-8S-16E	2909	1948	Alluv.	Volcanics	2145	Yuma Valley Gas & Oil - Musgrove #1	11-11S-25W	90	1940	Alluv.	"sh, sand, gravel"	4868
Schoenheit-Moorhouse #1	25-4S-9E	1462	1945	Alluv.	Alluv.	415	Colorado Basin Associates - Newcomer-Pasquini #1	19-9S-23W	110	1955	Alluv.	Granite	3255
Western Oil Fields Inc. - Fed #1	31-5S-10E	1625	1955	Alluv.	"Diorite Breccia"	5142	Colorado Basin Associates - Federal #1	24-10S-24W	177	1955	Alluv.	Cgl.	6015

ABBREVIATIONS AND SYMBOLS USED: alluv., alluvium; bl., blue; br., brown; cgl., conglomerate; ls., limestone; sh., shale; ss., sandstone; #, number; " ", indicates direct quotation from driller's log.