DATA ON WATER WELLS IN LUCERNE, JOHNSON, FRY, AND MEANS VALLEYS, SAN BERNARDINO COUNTY, CALIFORNIA.

By

F. S. Riley

Prepared in cooperation with the California Division of Water Resources

Open-file report
Not reviewed for conformance with stratigraphic nomenclature and editorial standards of the Geological Survey

Long Beach, California 1956
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PURPOSE AND SCOPE OF THE WORK AND REPORT

The data presented in this tabulation were collected by the United States Geological Survey in connection with an investigation of water wells and general hydrologic conditions throughout much of the desert region of southern California, which was begun in July 1953. The study has been financed in part by Federal funds for Arid Regions studies and in part by cooperation with the California Division of Water Resources.

The desert regions of California are characteristically regions of barren mountain ranges and isolated hills surrounding broad valleys or basins which are floored with alluvial debris derived from the surrounding highlands. These basins of unconsolidated alluvial materials generally contain ground water which has a wide range in chemical quality and which can be and has been developed for beneficial use.

The general objective of the investigation is to gather together and to tabulate, by areas, available hydrologic data for the desert basins in order to provide public agencies and the general public a basis for planning water utilization and development, and to furnish critical data for any subsequent ground-water investigation that might be undertaken.
Accordingly, the scope of the work carried on by the Geological Survey in each area has included: (1) very brief reconnaissance mapping of major geologic features to define the extent and general characteristics of the deposits that contain the ground-water bodies; (2) visiting and examining virtually all the water wells in the area, determining and recording their location in relation to geographic and cultural features and, wherever possible, to the public land net, and recording well depths and sizes, types and capacities of installed equipment, uses of the water, and other pertinent information available at the well site; (3) measuring the depth to the water surface below an established and described measuring point at or near the land surface; (4) selecting representative wells to be measured periodically in order to detect and record changes of water levels; (5) collecting and assembling available well records, including well logs, water-level measurements, and chemical analyses; and (6) presenting the collected data without evaluation or revision in tables 1A to 3A which identify the source from which the data were obtained.

Field work for the Lucerne, Johnson, Means, and Fry Valleys was carried on intermittently from February 1954 to April 1955.

The work has been carried on by the Geological Survey, United States Department of the Interior, under the general supervision of J. F. Poland, district geologist in charge of ground-water investigations in California, and under the immediate supervision of G. F. Worts, Jr., geologist in charge of the Long Beach area office.
ACKNOWLEDGMENTS

The writer wishes to express his appreciation for the cooperation given by the many ranchers, well owners, drillers, and other persons visited during the investigation, and for the assistance and information provided by several public agencies. Particular thanks are due Julian S. Gobar and Francis D. McDougal, well drillers in Lucerne Valley, who furnished many well logs and water-level data, devoted considerable time to assisting in the location and identification of wells, and provided much additional information. M. Copley, C. C. Moore, and F. M. Van Norman of Lucerne Valley, M. R. Peck of Gardena, and J. M. Scoggin of Adelanto also provided well logs and other information.

The California Division of Water Resources and the San Bernardino County Flood Control District provided access to all the pertinent information in their files, including numerous well logs, water-level records, and chemical analyses. The United States Department of Agriculture and the United States Bureau of Reclamation also provided some chemical analyses, water-level records, and other miscellaneous data. The cooperation and assistance given by these people and agencies contributed materially to the completeness of the data presented in this tabulation, and are most gratefully acknowledged.
LOCATION AND GENERAL FEATURES OF THE VALLEYS

Lucerne, Johnson, Fry, and Means Valleys occupy approximately 180 square miles along the north flank of the San Bernardino Mountains in the southwest part of San Bernardino County, Calif. (pl. 1). Access to the valleys is provided by a paved road leading east from U. S. Highways 91 and 66 near Hesperia, by State Highway 18 leading northeast from Victorville and southwest from Big Bear Lake, and by a paved road leading south from Barstow. Also, an improved dirt road from the Twentynine Palms area provides access to the valleys from the southeast. Although Lucerne Valley contains numerous paved roads, most of Johnson, Means, and Fry Valleys are accessible only by means of poorly graded dirt roads.

The entire area is divided topographically into four closed depressions or basins, namely: Lucerne, Johnson, Fry, and Means Valleys. Reconnaissance geologic mapping and the altitudes of water levels in wells suggest that Lucerne, Johnson and Fry, and Means Valleys make up three distinct structural and hydrologic units.

Plate 1 shows the four ground-water basins, the reconnaissance geology, and the locations of wells. One of the inset sketch maps on plate 1 shows the position of the area with respect to county and State boundaries and the other shows the area covered by plate 1 with respect to the available topographic maps. The general features of these valleys also were described by Thompson (1929).
Lucerne Valley

Lucerne Valley covers about 150 square miles and is the only one of the four valleys investigated that has been highly developed through irrigation well water from wells. Lucerne Lake (altitude about 2,819 feet) is a hard dry playa about 6 square miles in extent and is about 3 miles north of the town of Lucerne Valley, Calif. On the south, large coalescing alluvial fans extend northward from the San Bernardino Mountains, whereas around the remainder of the valley relatively small fans extend away from the Granite, Ord, and unnamed mountains. The sediments composing the fans are derived from the basement complex, which consists principally of granite, gneiss, schist, and recrystallized limestone and dolomite, and which forms the mountains. Several miles east of the town of Lucerne Valley, several distinct landslides form prominent features, extending out into the valley several miles (pl. 1).

A total of 459 wells, of which 85 are irrigation wells, were canvassed and are described in table 1A, part 1. Of the wells described 12 flowed or had a static water level above land-surface datum during 1954. All the flowing wells are southwest of the Helendale fault, which forms a barrier to the northward movement of ground water in this part of the valley. Water levels in other wells ranged from 4 to 285 feet below the land surface, the deeper levels in general being in wells higher up the alluvial slopes.
Water-level measurements made in wells indicate that the lowest water-level altitudes are in the area about 2 miles south of Lucerne Lake in the area of large withdrawals. Also, in this area of heavy pumping there are at least two water bodies, shallow and deep, the shallow body having a higher head than a deep body.

Most of the wells range in depth from about 100 to 300 feet and obtain their supplies largely from the central-valley alluvium, the extent of which is shown on plate 1. The logs of 95 wells, tapping these deposits and others shown on plate 1, are given in table 3A, part 1, and show the character of the materials penetrated. Yields of irrigation wells range from 800 to 2,000 gpm (gallons per minute) and have specific capacities ranging from 30 to 40 gpm per foot of drawdown.

Chemical analyses of waters from 76 wells in Lucerne Valley are shown in table 4A, part 1. In the areas south and northwest of Lucerne Lake the quality of the ground water is good for most purposes. The dissolved solids range from 200 to 500 ppm. However, in the area northeast of Lucerne Lake the water is of marginal to very poor quality. The dissolved solids range from 2,000 to 5,000 ppm, and the predominant constituents are sodium and chloride.
Johnson and Fry Valleys

Johnson and Fry Valleys, which are separated by the low alluvial fans coalescing from the north and south, lie in the same structural basin and contain approximately 20 square miles. The lowest point in Johnson Valley is Melville Lake, altitude about 2,700 feet, which covers about 2 square miles, and the lowest part of Fry Valley is Soggy Lake, altitude about 2,870 feet, which covers about half a square mile (pl. 1). These dry lakes or playas are accessible by means of relatively poor sandy desert roads.

A total of 14 wells, of which only well LN/4E-19E1 is used for irrigation, of about 40 acres, were canvassed in the two valleys and are described in table 1A, part 2. The depths to water range from about 8 feet below land surface in well LN/5E-5X1 on Melville Lake, where discharge of ground water occurs by evaporation, to 234.2 feet in well 3N/2E-2N1. In general ground water moves east from Fry Valley and north from the San Bernardino Mountains across the several faults, which act as ground-water barriers, to Melville Lake. Some ground water is discharged by transpiration of Mesquite on the west side of the lake.

The logs of 3 wells, given in table 3A, part 2, show the general character of the materials tapped by wells.

Analyses of waters from four wells in Johnson and Fry Valleys and are shown in table 4A, part 2, indicate that the quality ranges from fairly good to fairly poor. The dissolved solids range from 527 ppm in well LN/4E-19E1 to more than 1,300 ppm in well LN/6E-19E3. Among the cations no single one predominates, but among the anions sulfate is predominant, ranging from 253 to 672 ppm. The water from well LN/5E-5X1, on Melville Lake, although not analyzed, tasted brackish.
Means Valley

Means Valley is the easternmost of the areas here considered and contains about 8 square miles. The lowest part of Means Valley is Means Lake, altitude about 2,590 feet, which covers an area of about 1 square mile. No reliable topographic maps are available for the area east of 116° 30' west longitude, so that part of the valley is not shown on plate 1. The valley is accessible by several poor roads, one of which leads in from the north (pl. 1).

Only two adjacent wells, for which there are no logs, were canvassed in Means Valley, and these are at the northwest edge of the playa (pl. 1). The water levels in these wells are 16 to 21 feet below the land surface. Discharge of ground water appears to occur by transpiration from a sparse growth of salt grass around the margin of the lake and possibly by evaporation from the playa. Underground discharge from Means Valley appears unlikely, but there may be some underground recharge from Johnson Valley from the southwest.

The quality of water from well 4N/4E-2X1 is poor, as might be expected around the margin of the discharging playa. The dissolved solids, as shown by the analysis in table 4A, part 2, were 1,410 ppm, of which sodium, bicarbonate, and chloride were predominant. Water of better quality might be found south of Means Lake in the direction of the probable principal source of recharge.
WELL-NUMBERING SYSTEM

The well-numbering system used in Lucerne, Johnson, Means, and Fry Valleys conforms to that used by the Geological Survey in California since 1940. It has been adopted as official by the California Division of Water Resources and by the California Water Pollution Control Board for use throughout the State.

Wells are assigned numbers according to their location in the rectangular system for the subdivision of public land. For example, in the number 4N/4W-2G2, which was assigned to the irrigation well of the Vita Food Corporation in Lucerne Valley, the part of the number preceding the bar indicates the township (T. 4 N.), the part between the bar and the hyphen is the range (R. 4 W.), the number between the hyphen and the letter indicates the section (sec. 2), and the letter indicates the 40-acre subdivision of the section as shown in the accompanying diagram.

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Within the 40-acre tract the wells are numbered serially as indicated by the final digit. Thus, well 4N/4W-2G2 is the second well to be listed in the SW\(_1\)NE\(_4\) sec. 2. The area lies in the northeast and northwest quadrants of the San Bernardino base and meridian lines.
For some wells the letter following the section number is designated X in place of one of the 16 letters designating the 40-acre tract. This symbol indicates that the well has been field located and is accurately plotted with respect to its position on the map, but that the control for the public land net is too poor to warrant assigning a more accurate location number.

For well numbers where a dash has been substituted for the letter designating the 40-acre tract, the dash indicates that the well is plotted from unverified location descriptions or from general locations to the nearest quarter section reported by Thompson (1929); the indicated sites of such wells were visited but no evidence of a well could be found.
REFERENCE CITED

Table 1A.- Descriptions of water wells in Lucerne, Johnson, Fry, and Means Valleys, San Bernardino County, California

Source of data: The source of the data on each line is indicated by the following symbols: GS observations and measurements made by the Geological Survey on the dates indicated during the present investigation, as well as current or undated information reported by owners, drillers, or others; SB San Bernardino County Flood Control District; WR State of California, Department of Public Works, Division of Water Resources; BR U. S. Bureau of Reclamation; DA U. S. Department of Agriculture; CEP data from owner's or driller's copy of report on pumping-plant test conducted by California Electric Power Company. No data were obtained from the files of the power company. O well owner or user; D well driller. A number in this column indicates that the data are from U. S. Geological Survey Water-Supply Paper 578, p. 619. The number is the well number used in that report.

Date of observation: Data for each well are presented in reverse chronological order, with the most recent information summarized on the top line, opposite the well number. Where only an approximate date is known the season is indicated by the abbreviations spr, sum, aut, win.

Year completed: Where successive dates appear the well was deepened, enlarged, or recased at the later date.

Altitude: The altitude given is the land-surface altitude at the well. Altitudes given to the nearest 5 feet were interpolated in the field from U. S. Geological Survey topographic maps having 20- or 50-foot contour intervals. Altitudes given to the nearest foot were determined by hand-leveling.

Depth: Depths of wells given in whole feet were reported by owners, drillers, or others; depths given in feet and tenths were measured below land surface by the Geological Survey.

Type well and diameter: Type of well construction is indicated by the following symbols: B bored, C cable tool, D dug, G gravel packed, R rotary. Well diameter is given in inches. For dug wells the largest surface dimension is given, except that for a dug well containing a casing that extends to land surface, the diameter of the casing is given.

Pump data: The type of pump is indicated as follows: C centrifugal, J jet, L lift or cylinder, N none, S submersible turbine, T turbine. The type of power is indicated as follows: D diesel engine, E electric motor of undetermined horsepower, G gasoline engine, H hand-operated, N none, W windmill; where a number appears in this column it indicates the rated horsepower of an electric motor. The yield or output of the pump, in gallons per minute, is usually based on tests performed by the California Electric Power Company and reported by the well owner or driller. Yield figures in parentheses are approximate measurements by the Geological Survey, using the trajectory method.
Use of well: Dm domestic, Ds destroyed or dry, I irrigation, In industrial, Ps poultry raising, Ps public supply, S stock, T test hole, Un unused.

Measuring point: The point from which water-level measurements by the Geological Survey are made is described as follows: Bel bottom of clamp, Bhc bottom of hole in casing, Bop bottom of overflow or discharge pipe, Bnc bottom of notch in casing, Bpb bottom edge of pump base, Hcc hole in casing cover, Hpb hole in pump base, Hph hole in lift-pump head, Ls land surface, Tap top of access pipe, Tbc top of board cover at crack or hole, Tcs top of concrete slab, Tph top of lift-pump head, Tt top of timber or steel beam under pump. The suffix letters N, S, E, or W indicate the side, north, south, east, or west, where measured. The distance of the measuring point above or below (-) land-surface datum is given in feet and tenths. All measurements by the Geological Survey are from the same measuring point unless otherwise indicated. Measurements by the San Bernardino County Flood Control District are also from the same measuring point unless otherwise indicated. In general, the measuring points used by the California Electric Power Company, drillers, and others are not known.

Water level: The water level is given in feet below or above (+) land-surface datum. Measured depths to water level are given in feet, tenths, and usually hundredths; reported or approximate depths to water level are given in whole feet. For flowing wells the indicated measuring point is the point of flow, and its height above land-surface datum thus is the minimum head. Water-level measurements by the California Electric Power Company, drillers, owners, and others, for which the measuring points are not known, are assumed to have been corrected to land surface and are given exactly as reported.

Specific capacity: The specific capacity of a well is its rate of yield per unit of drawdown of the water level in the well. It is determined by dividing the figure in the Yield column by the drawdown resulting from sustained pumping at that rate; the result is expressed in terms of gallons per minute per foot of drawdown. The yield and drawdown data are principally from tests performed by the California Electric Power Company and reported by well owners and drillers.

Other data: Chemical analysis of water is given in table 4A, L driller's log of well is given in table 3A, W records of water levels are given in table 2A, B well reported to have penetrated bedrock (basement complex) at bottom, M well yields mineralized water that contains more than 1,000 ppm of dissolved solids as determined by analysis, or has a perceptibly brackish taste.
### Part 1. Lucerne Valley

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*a. Pumping. b. Nearby well being pumped.*
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c. Pumped recently.
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c. Pumped recently.
## Part 1. Lucerne Valley—Continued

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b. Nearby well being pumped.
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Pumped recently.
### Part 1. Lucerne Valley--Continued

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**a.** Pumping.
**b.** Nearby well being pumped.
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**Township 4 N., Range 1 W.---Continued**

d. Reported water level, date unknown.
### Part 1. Lucerne Valley—Continued

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- **Temp** measurement: (°F) | **Spec** capacity: (gpm) | **Other data**:

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- **L**
- **Dm**
- **L**
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- a. Pumping.
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**Table 1A**
### Part 1. Lucerne Valley--Continued

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*Part 1A Table 50*

c. Pumped recently.
d. Reported water level, date unknown.
## Part 1. Lucerne Valley--Continued

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- **c.** Pumped recently.
- **d.** Reported water level, date unknown.
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C. Pumped recently.
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C. Pumped recently.
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**Table 1A**
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Part 1. Lucerne Valley--Continued

Township 5 N., Range 1 E.--Continued
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- a. Pumping.
- b. Nearby well being pumped.
- c. Pumped recently.
### Part 1. Lucerne Valley--Continued

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**Township 5 N., Range 1 E.--Continued**

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*Table IV*

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* e. Reported to have been located near existing well 12C1.
## Part 1. Lucerne Valley—Continued

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### Township 5 N., Range 1 W.—Continued

- **14D1**: Depth 25 ft, Temp 0.0°F, Spec Cap 1.0, Other data.
- **15L1**: Depth 14 ft, Temp 0.0°F, Spec Cap 1.0, Other data.
- **22B1**: Depth 14 ft, Temp 1.0°F, Spec Cap 1.0, Other data.
- **22F1**: Depth 11 ft, Temp 1.0°F, Spec Cap 1.0, Other data.
- **25G1**: Depth 21 ft, Temp 1.0°F, Spec Cap 1.0, Other data.
## Part 1. Lucerne Valley—Continued

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**Township 6 N., Range 1 E.**

| GS 11-10-54 | 2965           | 134.5            | D 60 L N     | Dry          | 150          |

b. Nearby well being pumped.
c. Pumped recently.
f. Reported to have been located about 100 feet west of existing well 35 P2.
### Part 1. Lucerne Valley--Continued

<table>
<thead>
<tr>
<th>USGS well No.</th>
<th>Source of data</th>
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<th>Diameter (in)</th>
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### Table 7A

**Township 6 N., Range 1 W.--Continued**

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**Part 1. Lucerne Valley--Continued**
### Part 2. Johnson and Fry Valleys

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<td>16D1 GS 6-16-55 G. Stewart 1955 2895 200 C 10 N N Un Tc 0.8 101.65 2.5</td>
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<td>23G1 GS 5- 7-54 M. A. Donohue 1950 2850 154 C 10 L W Dm 71.8 C,L</td>
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<td>23N1 GS 5- 6-54 2865 244.0 12 N N Un TcW 1.0 102.89</td>
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Township 4 N., Range 4 E.

Table 7A

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<th>Date of observation</th>
<th>Owner or user</th>
<th>Year completed</th>
<th>Altitude (feet)</th>
<th>Depth (ft)</th>
<th>Diameter (in)</th>
<th>Type of well</th>
<th>Pump data</th>
<th>Use of well</th>
<th>Depth (ft)</th>
<th>Measuring point below land surface (feet)</th>
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Table 2A. Records of water levels in wells in Lucerne Valley, California.

(Measurements are by the San Bernardino County Flood Control District, except where otherwise indicated.)

Water levels are in feet below land-surface datum.

### LN/IE-6R1. Herman Oeller. Depth 120 feet; 93 feet before July 1953. Altitude about 2,895 feet.

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<th>Date</th>
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<td>July 1, 1951</td>
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<td>77.6</td>
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### LN/IE-7R1. Depth 1145 feet. Altitude about 2,945 feet.

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### LN/IE-8DI. Alice Barnett. Depth 130 feet. Altitude 2,903 feet.

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### LN/IE-12PI. Mary Coster. Depth 180 feet. Altitude 2,971 feet.

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- Nearby well being pumped.
- Measurement by United States Bureau of Reclamation.
### Table 2A

**LN/1W-9R1. A. Z. French. Depth 78 feet. Altitude about 2,975 feet.**

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<td>May 15, 1952</td>
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**LN/1W-11Q1. Frank Baker. Depth 85 feet. Altitude 2,933 feet.**

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<td>Feb. 1, 1954</td>
<td>b 51.77</td>
<td>Apr. 13</td>
<td>51.33</td>
</tr>
</tbody>
</table>

**LN/1W-12D1. Dr. Kenneth Smith. Depth 521 feet. Altitude about 2,890 feet.**

<table>
<thead>
<tr>
<th>Date</th>
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<th>Date</th>
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<td>May 7, 1935</td>
<td>65.3</td>
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<td>684.67</td>
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<td>Oct. 2, 1947</td>
<td>74.7</td>
<td>Aug. 15, 1949</td>
<td>82.5</td>
<td>July 30</td>
<td>817.4</td>
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<tr>
<td>Dec. 6, 1947</td>
<td>66.4</td>
<td>Oct. 23, 1952</td>
<td>92.0</td>
<td>Nov. 17</td>
<td>822.22</td>
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**LN/1W-12M1. Depth 86.0 feet. Altitude about 2,930 feet.**

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<tbody>
<tr>
<td>Feb. 19, 1954</td>
<td>d69.57</td>
<td>Sept. 23, 1954</td>
<td>d70.2d</td>
<td>Nov. 18, 1954</td>
<td>d70.8d</td>
</tr>
<tr>
<td>Apr. 13</td>
<td>d69.71</td>
<td>Oct. 29</td>
<td>70.47</td>
<td>Mar. 15, 1955</td>
<td>70.69</td>
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**5N/1E-661. D. R. Huffman. Depth 280(?) feet. Altitude about 2,970 feet.**

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<tr>
<td>Jan. 15, 1953</td>
<td>144.75</td>
<td>Nov. 10, 1953</td>
<td>152.75</td>
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<td>151.90</td>
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<tr>
<td>Feb. 17</td>
<td>144.45</td>
<td>May 12, 1954</td>
<td>157.70</td>
<td>June 15</td>
<td>d150.01</td>
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<tr>
<td>Apr. 13</td>
<td>143.90</td>
<td>Nov. 17</td>
<td>150.50</td>
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</table>

a. Pumping.
b. Pumped recently.
d. Measurement by driller.
e. Measurement by California Electric Power Company.

<table>
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<tr>
<th>Date</th>
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<th>Water level</th>
<th>Date</th>
<th>Water level</th>
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<tbody>
<tr>
<td>Nov. 15, 1952</td>
<td>90.43</td>
<td>Apr. 13, 1953</td>
<td>90.42</td>
<td>Nov. 10, 1954</td>
<td>97.24</td>
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<td>Feb. 17, 1953</td>
<td>90.08</td>
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<td>93.70</td>
<td>Nov. 17</td>
<td>97.30</td>
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<td>Mar. 16</td>
<td>91.50</td>
<td>May 12, 1954</td>
<td>94.30</td>
<td>Apr. 13, 1955</td>
<td>97.60</td>
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5N/1E-17C1. F. E. Giovanelli. Depth 100 feet. Altitude about 2,885 feet.

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<tbody>
<tr>
<td>May 12, 1952</td>
<td>63.31</td>
<td>Apr. 13, 1953</td>
<td>a66.10</td>
<td>Nov. 17, 1954</td>
<td>75.70</td>
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<tr>
<td>Dec. 1</td>
<td>65.20</td>
<td>Nov. 10</td>
<td>77.15</td>
<td>Nov. 24</td>
<td>d71.00</td>
</tr>
<tr>
<td>Feb. 16, 1953</td>
<td>(a)</td>
<td>May 12, 1954</td>
<td>74.30</td>
<td>Apr. 13, 1955</td>
<td>82.10</td>
</tr>
<tr>
<td>Mar. 16</td>
<td>a64.90</td>
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5N/1E-20E1. Harvey Laschansky. Depth 77 feet. Altitude about 2,855 feet.

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<td>33.05</td>
<td>Mar. 16, 1953</td>
<td>a37.50</td>
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<tr>
<td>Oct. 23</td>
<td>41.0</td>
<td>Apr. 13</td>
<td>a37.22</td>
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<td>a49.00</td>
</tr>
<tr>
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<td>35.70</td>
<td>Nov. 10</td>
<td>a38.70</td>
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<tr>
<td>Feb. 16, 1953</td>
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<td>46.87</td>
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5N/1E-33F2. James Sherman. Depth 108 feet. Altitude about 2,885 feet.

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<tr>
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<td>60.39</td>
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<td>75.00</td>
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<td>d70.91</td>
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<tr>
<td>Feb. 16, 1953</td>
<td>60.81</td>
<td>Mar. 27, 1954</td>
<td>d64.18</td>
<td>Mar. 11, 1955</td>
<td>d67.90</td>
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<tr>
<td>Mar. 16</td>
<td>60.50</td>
<td>May 12</td>
<td>67.20</td>
<td>Apr. 13</td>
<td>69.19</td>
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5N/1W-1F1. Cole. Depth 150 feet. Altitude about 2,920 feet.

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<th>Date</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Jan. 15, 1953</td>
<td>93.30</td>
<td>Apr. 13, 1953</td>
<td>a115.47</td>
<td>Nov. 30, 1954</td>
<td>d97.77</td>
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<tr>
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<td>94.17</td>
<td>Nov. 10</td>
<td>98.30</td>
<td>Apr. 13, 1955</td>
<td>103.10</td>
</tr>
<tr>
<td>Mar. 16</td>
<td>92.90</td>
<td>Nov. 17, 1954</td>
<td>96.75</td>
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<tr>
<td>Apr. 13</td>
<td>91.80</td>
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</table>

a. Pumping  
Table 2A

517/l111. J. D. Morse. Depth 131/2 feet. Altitude about 2,905 feet.

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<th>Water level</th>
<th>Date</th>
<th>Water level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nov. 6, 1950</td>
<td>74.9</td>
<td>Apr. 13, 1953</td>
<td>80.35</td>
<td>Nov. 10, 1954</td>
<td>85.53</td>
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<tr>
<td>Jan. 15, 1953</td>
<td>79.05</td>
<td>Aug. 8</td>
<td>88.0</td>
<td>Nov. 17</td>
<td>85.15</td>
</tr>
<tr>
<td>Feb. 5</td>
<td>79.0</td>
<td>Nov. 10</td>
<td>82.80</td>
<td>Apr. 13, 1955</td>
<td>86.15</td>
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5N/1W-12Bl. Depth 100 feet. Altitude about 2,890 feet.

<table>
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<th>Date</th>
<th>Water level</th>
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<tbody>
<tr>
<td>Jan. 15, 1953</td>
<td>65.16</td>
<td>Apr. 13, 1953</td>
<td>65.57</td>
<td>Nov. 8, 1954</td>
<td>71.78</td>
</tr>
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<td>Feb. 16</td>
<td>65.17</td>
<td>Nov. 10</td>
<td>76.25</td>
<td>Nov. 17</td>
<td>73.25</td>
</tr>
<tr>
<td>Mar. 16</td>
<td>65.22</td>
<td>May 12, 1954</td>
<td>70.95</td>
<td>Apr. 13, 1955</td>
<td>76.48</td>
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5N/1W-35Q1. Depth 300 feet. Altitude about 2,855 feet.

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<th>Water level</th>
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<th>Water level</th>
<th>Date</th>
<th>Water level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mar. 9, 1954</td>
<td>34.13</td>
<td>Nov. 8, 1954</td>
<td>32.25</td>
<td>Nov. 30, 1954</td>
<td>35.58</td>
</tr>
<tr>
<td>Apr. 17</td>
<td>34.10</td>
<td>Nov. 18</td>
<td>36.71</td>
<td>Mar. 14, 1955</td>
<td>34.99</td>
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<tr>
<td>Sept. 23</td>
<td>34.29</td>
<td></td>
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6N/1W-22Pl. Depth 350 feet. Altitude about 3,059 feet.

<table>
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<th>Date</th>
<th>Water level</th>
<th>Date</th>
<th>Water level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feb. 17</td>
<td>173.52</td>
<td>May 12, 1954</td>
<td>156.75</td>
<td>Apr. 13, 1955</td>
<td>178.8</td>
</tr>
<tr>
<td>Mar. 16</td>
<td>162.60</td>
<td>Nov. 17</td>
<td>155.8</td>
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</tbody>
</table>

a. Pumping.
b. Nearby well being pumped.
d. Measurement by California Electric Power Company.
Table 3A.- Drillers' logs of water wells

Note: The term kaolin (also spelled "koalin," "kaoline," "kalein," "kalene," etc.) is used by most drillers in Lucerne Valley to describe a hard, white, clayey lime, commonly containing worm-like solution channels that may cause the material to be moderately water bearing.

Part 1.- Lucerne Valley


<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kaolin and clay</td>
<td>68</td>
<td>68</td>
</tr>
<tr>
<td>Sandstone</td>
<td>32</td>
<td>100</td>
</tr>
</tbody>
</table>

LM/2E-2ML. George W. Prince, Jr. Altitude about 2,920 feet. Drilled by C. Steela in July 1952. 10-inch casing 0 to 140 feet, perforated 96-140 feet, uncased hole 140-212 feet.

Sandy top soil                                | 1                | 1             |
Hard kaolin                                  | 3                | 4             |
Hard light-colored clay                      | 14               | 18            |
Sand and gravel                              | 3                | 21            |
Hard packed brown clay                       | 75               | 96            |
Cemented clay, gravel and coarse sand        | 5                | 101           |
Water-bearing granulated kaolin and gravel   | 3                | 104           |
Rock-like ledge of gypsum, talc or kaolin (very white and would not mix with water.) | 12               | 116           |
Light gray adobe clay                        | 12               | 128           |
Cemented sand, gravel and some clay          | 13               | 141           |
Clay carrying some sand and gravel           | 19               | 160           |
Sandstone, very hard and abrasive            | 12               | 172           |
Soft clay, reddish brown gravel and sand, some water | 3      | 175           |
Hard gray sandstone                          | 21               | 196           |
Coarse sand and gravel, some large gravel, water-bearing | 16               | 212           |

(Water level rose from 101 feet to 88 feet in this stratum.)
Table 3A


<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil</td>
<td>22</td>
<td>22</td>
</tr>
<tr>
<td>Kaliene and sub-soil</td>
<td>4</td>
<td>26</td>
</tr>
<tr>
<td>Adobe and clay</td>
<td>14</td>
<td>40</td>
</tr>
<tr>
<td>Hard kaliene</td>
<td>7</td>
<td>17</td>
</tr>
<tr>
<td>Adobe clay</td>
<td>28</td>
<td>75</td>
</tr>
<tr>
<td>Water-bearing kaliene and gravel</td>
<td>15</td>
<td>90</td>
</tr>
<tr>
<td>Adobe clay</td>
<td>14</td>
<td>104</td>
</tr>
<tr>
<td>Water-bearing kaliene and gravel</td>
<td>13</td>
<td>117</td>
</tr>
<tr>
<td>Adobe clay</td>
<td>19</td>
<td>136</td>
</tr>
<tr>
<td>Water-bearing kaliene and gravel</td>
<td>16</td>
<td>152</td>
</tr>
<tr>
<td>Adobe clay</td>
<td>18</td>
<td>170</td>
</tr>
<tr>
<td>Water-bearing gravel</td>
<td>10</td>
<td>180</td>
</tr>
<tr>
<td>Cement rock</td>
<td>14</td>
<td>194</td>
</tr>
<tr>
<td>Water-bearing gravel and sand</td>
<td>6</td>
<td>200</td>
</tr>
<tr>
<td>Cement rock</td>
<td>7</td>
<td>207</td>
</tr>
<tr>
<td>Water sand and gravel</td>
<td>19</td>
<td>226</td>
</tr>
<tr>
<td>Clay</td>
<td>29</td>
<td>255</td>
</tr>
<tr>
<td>Water sand and gravel, big rock</td>
<td>37</td>
<td>292</td>
</tr>
<tr>
<td>Hard kaliene</td>
<td>11</td>
<td>303</td>
</tr>
</tbody>
</table>


| Top soil                                      | \( \frac{1}{2} \) | \( \frac{1}{2} \) |
| White kaliene                                 | \( \frac{1}{2} \) | 6              |
| Dry sand                                      | 76               | 82             |
| Water sand                                    | 9                | 91             |
| Streaks of shale, kaliene, and sand           | 91               | 182            |
| Red and black rock and shale                  | 53               | 235            |
| Rock, indication of water                     | 15               | 250            |
| Decomposed granite (dioritic gneiss bedrock)  | 27               | 277            |
### Table 3A


<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Hard white kaiien</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>Clay</td>
<td>37</td>
<td>45</td>
</tr>
<tr>
<td>Water sand, dry</td>
<td>27</td>
<td>72</td>
</tr>
<tr>
<td>Red bed, wet</td>
<td>20</td>
<td>92</td>
</tr>
<tr>
<td>Sand, with water</td>
<td>10</td>
<td>102</td>
</tr>
<tr>
<td>Red bed and rock</td>
<td>20</td>
<td>122</td>
</tr>
<tr>
<td>Water sand</td>
<td>10</td>
<td>132</td>
</tr>
<tr>
<td>Red bed, wet</td>
<td>20</td>
<td>152</td>
</tr>
<tr>
<td>White granite</td>
<td>5</td>
<td>157</td>
</tr>
<tr>
<td>Big rock and water</td>
<td>15</td>
<td>172</td>
</tr>
<tr>
<td>Water sand</td>
<td>23</td>
<td>195</td>
</tr>
</tbody>
</table>


| Top soil                         | 2                | 2            |
| Gray clay and kaolin             | 33               | 35           |
| Cement                          | 2                | 37           |
| Kaolin                          | 15               | 52           |
| Sandstone                       | 80               | 132          |
| Brown clay                      | 56               | 188          |
| Gravel with cement              | 157              | 345          |
| Clay                            | 5                | 350          |
| Gravel and sand, too fine to perforate | 6          | 356          |
| Clay                            | 4                | 360          |


<p>| Sandy top soil                   | 2/3              | 2 1/3        |
| Hard pan or kaoline             | 1 1/2            | 4            |
| Adobe clay                      | 38               | 42           |
| White sticky clay               | 17               | 39           |
| Water-bearing sand and gravel   | 6                | 65           |
| Brown clay                      | 20               | 85           |
| Water-bearing coarse sand and gravel | 3          | 88           |
| Brown clay                      | 13               | 101          |
| Cemented formation carrying sand and gravel, very hard | 19 | 120 |</p>
<table>
<thead>
<tr>
<th>Material</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cement, kaolin</td>
<td>84</td>
</tr>
<tr>
<td>Sandy gravel</td>
<td>99</td>
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<tr>
<td>Sandy formation</td>
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<tr>
<td>Intermittent layers of kaolin and sand</td>
<td>3</td>
</tr>
<tr>
<td>Coarse sand</td>
<td>9</td>
</tr>
<tr>
<td>Dry gravel</td>
<td>28</td>
</tr>
<tr>
<td>Coarse sand</td>
<td>30</td>
</tr>
<tr>
<td>Clay</td>
<td>45</td>
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<tr>
<td>Sandy clay</td>
<td>47</td>
</tr>
<tr>
<td>Water gravel</td>
<td>98</td>
</tr>
<tr>
<td>Quick sand</td>
<td>115</td>
</tr>
<tr>
<td>Water sand</td>
<td>117</td>
</tr>
<tr>
<td>Water gravel</td>
<td>119</td>
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</table>

<table>
<thead>
<tr>
<th>Material</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sand</td>
<td>3</td>
</tr>
<tr>
<td>Kaline and sand</td>
<td>9</td>
</tr>
<tr>
<td>Coarse sand</td>
<td>27</td>
</tr>
<tr>
<td>Strata of gravel</td>
<td>32</td>
</tr>
<tr>
<td>Coarse sand</td>
<td>49</td>
</tr>
<tr>
<td>Clay</td>
<td>51</td>
</tr>
<tr>
<td>Water gravel</td>
<td>101</td>
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<tr>
<td>Fine sand</td>
<td>103</td>
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<td>Water gravel</td>
<td>112</td>
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<tr>
<td>Clay</td>
<td>114</td>
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Table 3A.


<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sandy soil</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Hard clay</td>
<td>7</td>
<td>10</td>
</tr>
<tr>
<td>Coarse sand, gravel and cobblestones</td>
<td>9</td>
<td>19</td>
</tr>
<tr>
<td>Hard brown clay</td>
<td>53</td>
<td>72</td>
</tr>
<tr>
<td>Large granite ledge</td>
<td>4</td>
<td>76</td>
</tr>
<tr>
<td>Light gray clay</td>
<td>28</td>
<td>104</td>
</tr>
<tr>
<td>Water-bearing sand and gravel</td>
<td>5</td>
<td>109</td>
</tr>
<tr>
<td>Brown clay, some sand</td>
<td>42</td>
<td>151</td>
</tr>
<tr>
<td>Granulated kaolin, water-bearing coarse sand and gravel</td>
<td>7</td>
<td>153</td>
</tr>
<tr>
<td>Hard clay</td>
<td>6</td>
<td>164</td>
</tr>
</tbody>
</table>

**LN/1E-9NL. Locil E. Miller. Altitude about 2,970 feet. Drilled by F. D. McDougall in October 1953. 12-inch casing, perforated 140-149, 185-191, 207-220, 227-243, 245-249, 252-257, 316-320, 336-349 feet.**

<p>| Soil                                                                      | 18               | 18           |
| Brown sandy clay with hard clay ribs                                     | 26               | 14           |
| Layer of dry gravel                                                      | 3                | 17           |
| Sticky gray clay                                                         | 6                | 53           |
| Sandy brown clay with hard clay ribs                                     | 11               | 14           |
| Sandy gray clay                                                          | 18               | 82           |
| Rocky brown clay                                                         | 11               | 93           |
| Dry gravel                                                               | 2                | 95           |
| Brown sandy clay                                                         | 11               | 106          |
| Light brown sandy clay                                                   | 12               | 118          |
| Cement reef                                                              | 1                | 119          |
| Brown clay                                                               | 21               | 140          |
| Cement roofs, bearing water                                              | 9                | 149          |
| Water sand                                                               | 5                | 154          |
| Sticky brown clay                                                        | 2                | 156          |
| Sandy brown clay and brown shale                                        | 10               | 166          |
| Kaoline and white clay                                                   | 4                | 170          |
| Brown sandy clay                                                         | 10               | 180          |
| Kaoline and white clay                                                   | 4                | 184          |
| Water sand                                                               | 6                | 190          |
| Sandy brown clay                                                         | 10               | 200          |
| Sticky brown clay with brown shale ribs                                  | 8                | 208          |
| Water sand, gravel                                                       | 13               | 221          |
| Fine brown sand                                                          | 5                | 226          |
| Brown sandy clay                                                         | 2                | 228          |
| Hard brown sand with some 1-inch gravel, seemed to bore water            | 18               | 246          |
| Water sand and gravel up to 3 1/2 inches                                 | 4                | 250          |</p>
<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sticky brown clay</td>
<td>3</td>
<td>253</td>
</tr>
<tr>
<td>Water sand and gravel up to 3 inches</td>
<td>5</td>
<td>258</td>
</tr>
<tr>
<td>Sticky brown clay</td>
<td>34</td>
<td>292</td>
</tr>
<tr>
<td>Hard brown shale</td>
<td>1</td>
<td>293</td>
</tr>
<tr>
<td>Sticky brown clay</td>
<td>24</td>
<td>317</td>
</tr>
<tr>
<td>Water sand and gravel to (\frac{1}{2}) inch</td>
<td>4</td>
<td>321</td>
</tr>
<tr>
<td>Sticky brown clay</td>
<td>16</td>
<td>337</td>
</tr>
<tr>
<td>Water sand and gravel to 3 inches</td>
<td>11</td>
<td>348</td>
</tr>
<tr>
<td>Sandy clay with brown sandstone reefs</td>
<td>20</td>
<td>368</td>
</tr>
</tbody>
</table>

**LN/IE-10G2. J. A. Barr.** Altitude about 2,960 feet. Drilled by J. S. Gobat in June 1938. 12-inch casing 0-423 feet, uncased hole 423-609 feet.

<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sandy loam</td>
<td>------------------</td>
<td>12</td>
</tr>
<tr>
<td>Gray cement</td>
<td>------------------</td>
<td>29</td>
</tr>
<tr>
<td>Hard cement</td>
<td>------------------</td>
<td>9</td>
</tr>
<tr>
<td>Sandy clay</td>
<td>------------------</td>
<td>17</td>
</tr>
<tr>
<td>Cement</td>
<td>------------------</td>
<td>6</td>
</tr>
<tr>
<td>Sandy clay</td>
<td>------------------</td>
<td>9</td>
</tr>
<tr>
<td>Cement</td>
<td>------------------</td>
<td>9</td>
</tr>
<tr>
<td>Sandy clay</td>
<td>------------------</td>
<td>6</td>
</tr>
<tr>
<td>Cement</td>
<td>------------------</td>
<td>5</td>
</tr>
<tr>
<td>Sandy clay</td>
<td>------------------</td>
<td>18</td>
</tr>
<tr>
<td>Cement</td>
<td>------------------</td>
<td>10</td>
</tr>
<tr>
<td>Kaolin</td>
<td>------------------</td>
<td>17</td>
</tr>
<tr>
<td>Cement</td>
<td>------------------</td>
<td>24</td>
</tr>
<tr>
<td>Sandstone</td>
<td>------------------</td>
<td>12</td>
</tr>
<tr>
<td>Hard clay</td>
<td>------------------</td>
<td>89</td>
</tr>
<tr>
<td>Gravel</td>
<td>------------------</td>
<td>2</td>
</tr>
<tr>
<td>Sandy clay</td>
<td>------------------</td>
<td>18</td>
</tr>
<tr>
<td>Hard clay</td>
<td>------------------</td>
<td>5</td>
</tr>
<tr>
<td>Sandy clay</td>
<td>------------------</td>
<td>23</td>
</tr>
<tr>
<td>Hard sandy clay</td>
<td>------------------</td>
<td>6</td>
</tr>
<tr>
<td>Sandy clay</td>
<td>------------------</td>
<td>14</td>
</tr>
<tr>
<td>Clay</td>
<td>------------------</td>
<td>2</td>
</tr>
<tr>
<td>Hard cement</td>
<td>------------------</td>
<td>7</td>
</tr>
<tr>
<td>Sandy clay</td>
<td>------------------</td>
<td>21</td>
</tr>
<tr>
<td>Clay, tough and hard</td>
<td>------------------</td>
<td>11</td>
</tr>
<tr>
<td>Sandy clay, kind of a red decomposed granite soil</td>
<td>------------------</td>
<td>228</td>
</tr>
</tbody>
</table>
Table 3A

**LN/1E-11Cl. Lenichok.** Altitude about 2,935 feet. Drilled by J. S. Gobar in June 1923. 12-inch casing 0-9 feet, uncased hole 9-112 feet.

<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kaolin</td>
<td>84</td>
<td>84</td>
</tr>
<tr>
<td>Cemented gravel and sand</td>
<td>28</td>
<td>112</td>
</tr>
</tbody>
</table>

**LN/1E-11D1. U. Range.** Altitude about 2,942 feet. Drilled by J. S. Gobar in November 1930. 12-inch casing 0-24 feet, uncased hole 24-126 feet.

<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sandy loam</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Kaolin and cement</td>
<td>92</td>
<td>95</td>
</tr>
<tr>
<td>Sandstone</td>
<td>31</td>
<td>126</td>
</tr>
</tbody>
</table>

**LN/1E-17ML.** Altitude about 2,975 feet. Drilled by J. S. Gobar for Carl Jackley in May 1926. 12-inch casing 0-10 feet, uncased hole 10-130 feet.

<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>White clay with cement</td>
<td>128</td>
<td>128</td>
</tr>
<tr>
<td>Gravel</td>
<td>2</td>
<td>130</td>
</tr>
</tbody>
</table>

**LN/1E-18CI.** Jesse Lucia. Altitude about 2,990 feet. Drilled by J. S. Gobar in June 1924. 12-inch uncased hole.

<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loose gravel</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Cement gravel</td>
<td>110</td>
<td>125</td>
</tr>
<tr>
<td>Kaolin with fine gravel</td>
<td>35</td>
<td>160</td>
</tr>
</tbody>
</table>

**LN/1E-18LI.** Altitude about 3,005 feet. Drilled by J. S. Gobar for Matthews in July 1923. 12-inch casing 0-8 feet, uncased hole 8-160 feet.

<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gravel and sand</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Hard sandy clay</td>
<td>20</td>
<td>40</td>
</tr>
<tr>
<td>White cement</td>
<td>55</td>
<td>95</td>
</tr>
<tr>
<td>Sandstone or cement</td>
<td>42</td>
<td>137</td>
</tr>
<tr>
<td>White gravelly clay</td>
<td>23</td>
<td>160</td>
</tr>
</tbody>
</table>
Table 3A

UN/3S-23C1. Altitude about 3,060 feet. Drilled by J. S. Gobar for M. L. Wallor in April 1935. 6-inch uncased hole.

<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gravel and sand</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Kaolin</td>
<td>32</td>
<td>42</td>
</tr>
<tr>
<td>Cement</td>
<td>6</td>
<td>48</td>
</tr>
<tr>
<td>Kaolin</td>
<td>54</td>
<td>102</td>
</tr>
<tr>
<td>Cemented gravel</td>
<td>20</td>
<td>122</td>
</tr>
<tr>
<td>Sandstone</td>
<td>56</td>
<td>178</td>
</tr>
<tr>
<td>Cement</td>
<td>6</td>
<td>181</td>
</tr>
<tr>
<td>Sandstone</td>
<td>66</td>
<td>250</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top soil</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Rock ledges</td>
<td>55</td>
<td>58</td>
</tr>
<tr>
<td>Rotten rock and ledge rock</td>
<td>87</td>
<td>145</td>
</tr>
<tr>
<td>Gray granite</td>
<td>5</td>
<td>150</td>
</tr>
<tr>
<td>Rotten rock, seamy ledges of granite</td>
<td>20</td>
<td>170</td>
</tr>
<tr>
<td>Black rock</td>
<td>10</td>
<td>180</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rocks and sand, cemented below 80 feet</td>
<td>110</td>
<td>110</td>
</tr>
<tr>
<td>Silt and sand, caliche</td>
<td>40</td>
<td>150</td>
</tr>
<tr>
<td>Blue clay</td>
<td>20</td>
<td>170</td>
</tr>
<tr>
<td>White clay and caliche</td>
<td>5</td>
<td>175</td>
</tr>
<tr>
<td>Yellow clay</td>
<td>5</td>
<td>180</td>
</tr>
<tr>
<td>Fine sand, white, first water</td>
<td>5</td>
<td>185</td>
</tr>
<tr>
<td>White clay and caliche</td>
<td>25</td>
<td>210</td>
</tr>
<tr>
<td>Cavern, tools dropped 6 feet</td>
<td>6</td>
<td>216</td>
</tr>
<tr>
<td>White clay and caliche</td>
<td>44</td>
<td>260</td>
</tr>
</tbody>
</table>

UN/1W-1E1. J. E. Perkins. Altitude about 2,865 feet. Drilled by J. S. Gobar in January 1951. 8-inch casing 0-10 feet, uncased hole 10-60 feet.

<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top soil, silt</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Hard tough clay</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Kaolin</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>Brown clay</td>
<td>13</td>
<td>23</td>
</tr>
<tr>
<td>Kaolin</td>
<td>5</td>
<td>28</td>
</tr>
<tr>
<td>Sandstone</td>
<td>17</td>
<td>45</td>
</tr>
<tr>
<td>Kaolin</td>
<td>15</td>
<td>60</td>
</tr>
</tbody>
</table>
Table 3A


<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>White clay</td>
<td>65</td>
<td>65</td>
</tr>
<tr>
<td>White clay with hard cement layers</td>
<td>22</td>
<td>87</td>
</tr>
<tr>
<td>White clay with gravel</td>
<td>12</td>
<td>99</td>
</tr>
<tr>
<td>Hard clay</td>
<td>21</td>
<td>120</td>
</tr>
<tr>
<td>Hard clay and packed sand</td>
<td>12</td>
<td>132</td>
</tr>
<tr>
<td>Cemented sand</td>
<td>17</td>
<td>149</td>
</tr>
<tr>
<td>Hard clay</td>
<td>8</td>
<td>157</td>
</tr>
<tr>
<td>Brown sticky clay with a little gravel</td>
<td>73</td>
<td>230</td>
</tr>
<tr>
<td>Clay</td>
<td>22</td>
<td>252</td>
</tr>
<tr>
<td>Gravel, sand, and clay</td>
<td>26</td>
<td>278</td>
</tr>
<tr>
<td>Sand and clay</td>
<td>16</td>
<td>294</td>
</tr>
<tr>
<td>Gravel</td>
<td>8</td>
<td>302</td>
</tr>
<tr>
<td>Sand and clay</td>
<td>16</td>
<td>318</td>
</tr>
<tr>
<td>Gravel (stones 3 inches in diameter at 3(\frac{1}{4}) feet)</td>
<td>73</td>
<td>378</td>
</tr>
<tr>
<td>Sand and gravel</td>
<td>54</td>
<td>432</td>
</tr>
<tr>
<td>Gravel and boulders</td>
<td>19</td>
<td>451</td>
</tr>
<tr>
<td>Clay</td>
<td>4</td>
<td>455</td>
</tr>
<tr>
<td>Gravel</td>
<td>12</td>
<td>467</td>
</tr>
<tr>
<td>Clay</td>
<td>5</td>
<td>472</td>
</tr>
<tr>
<td>Gravel</td>
<td>23</td>
<td>495</td>
</tr>
<tr>
<td>Cement</td>
<td>11</td>
<td>506</td>
</tr>
<tr>
<td>Cemented clay, gravel, and sand</td>
<td>14</td>
<td>522</td>
</tr>
<tr>
<td>Gravel</td>
<td>5</td>
<td>557</td>
</tr>
<tr>
<td>Clay</td>
<td>16</td>
<td>573</td>
</tr>
<tr>
<td>Gravel and boulders</td>
<td>17</td>
<td>590</td>
</tr>
<tr>
<td>Cement</td>
<td>10</td>
<td>600</td>
</tr>
<tr>
<td>Hard clay</td>
<td>12</td>
<td>612</td>
</tr>
<tr>
<td>Boulders</td>
<td>4</td>
<td>616</td>
</tr>
<tr>
<td>Gravel in clay</td>
<td>11</td>
<td>627</td>
</tr>
<tr>
<td>Clay</td>
<td>13</td>
<td>640</td>
</tr>
<tr>
<td>Gravel</td>
<td>8</td>
<td>648</td>
</tr>
<tr>
<td>Clay</td>
<td>3</td>
<td>651</td>
</tr>
<tr>
<td>Sand and gravel</td>
<td>11</td>
<td>662</td>
</tr>
<tr>
<td>Clay</td>
<td>10</td>
<td>672</td>
</tr>
<tr>
<td>Sand and clay</td>
<td>13</td>
<td>685</td>
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<tr>
<td>Clay</td>
<td>20</td>
<td>705</td>
</tr>
<tr>
<td>Sand</td>
<td>7</td>
<td>712</td>
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<tr>
<td>Clay</td>
<td>15</td>
<td>727</td>
</tr>
<tr>
<td>Red hard clay</td>
<td>14</td>
<td>770</td>
</tr>
<tr>
<td>Cemented sand</td>
<td>6</td>
<td>776</td>
</tr>
<tr>
<td>Granite, probably bedrock</td>
<td>2</td>
<td>778</td>
</tr>
<tr>
<td>Material</td>
<td>Thickness (feet)</td>
<td>Depth (feet)</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>Silt top soil</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Clay</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Kaolin</td>
<td>18</td>
<td>23</td>
</tr>
<tr>
<td>Brown clay</td>
<td>7</td>
<td>30</td>
</tr>
<tr>
<td>Cement</td>
<td>1.4</td>
<td>1.4</td>
</tr>
<tr>
<td>Kaolin</td>
<td>7</td>
<td>51</td>
</tr>
<tr>
<td>Cement</td>
<td>9</td>
<td>60</td>
</tr>
<tr>
<td>Sticky brown clay</td>
<td>6</td>
<td>66</td>
</tr>
<tr>
<td>Sandstone</td>
<td>4</td>
<td>70</td>
</tr>
<tr>
<td>Kaolin</td>
<td>5</td>
<td>75</td>
</tr>
<tr>
<td>White clay</td>
<td>7</td>
<td>82</td>
</tr>
<tr>
<td>Kaolin</td>
<td>4</td>
<td>86</td>
</tr>
<tr>
<td>Sandstone</td>
<td>8</td>
<td>94</td>
</tr>
<tr>
<td>Tough gray clay</td>
<td>4</td>
<td>98</td>
</tr>
<tr>
<td>Light brown clay</td>
<td>22</td>
<td>120</td>
</tr>
<tr>
<td>Tough green clay</td>
<td>55</td>
<td>175</td>
</tr>
<tr>
<td>Brown clay with small rocks in it</td>
<td>19</td>
<td>194</td>
</tr>
<tr>
<td>Hard brown clay with some sand in it</td>
<td>38</td>
<td>232</td>
</tr>
<tr>
<td>Sandy brown clay</td>
<td>32</td>
<td>264</td>
</tr>
<tr>
<td>Brown water gravel</td>
<td>24</td>
<td>288</td>
</tr>
<tr>
<td>Clay</td>
<td>20</td>
<td>308</td>
</tr>
<tr>
<td>Gravel</td>
<td>10</td>
<td>318</td>
</tr>
<tr>
<td>Decomposed granite, sand, some water</td>
<td>12</td>
<td>330</td>
</tr>
<tr>
<td>Gravel</td>
<td>18</td>
<td>348</td>
</tr>
<tr>
<td>Decomposed granite, sand</td>
<td>6</td>
<td>354</td>
</tr>
<tr>
<td>Gravel</td>
<td>6</td>
<td>360</td>
</tr>
<tr>
<td>Hard cement</td>
<td>12</td>
<td>372</td>
</tr>
<tr>
<td>Gravel</td>
<td>10</td>
<td>382</td>
</tr>
<tr>
<td>Clay</td>
<td>12</td>
<td>394</td>
</tr>
<tr>
<td>Cemented gravel</td>
<td>10</td>
<td>404</td>
</tr>
</tbody>
</table>

**Table 3A**

<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silt</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Loam</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Kaolin</td>
<td>32</td>
<td>36</td>
</tr>
<tr>
<td>Sandstone</td>
<td>27</td>
<td>63</td>
</tr>
<tr>
<td>Brown sandy clay</td>
<td>57</td>
<td>120</td>
</tr>
<tr>
<td>White clay</td>
<td>6</td>
<td>126</td>
</tr>
<tr>
<td>Sandstone</td>
<td>4</td>
<td>130</td>
</tr>
<tr>
<td>Brown clay, some sand</td>
<td>14</td>
<td>151</td>
</tr>
<tr>
<td>Cement</td>
<td>2</td>
<td>154</td>
</tr>
<tr>
<td>White clay</td>
<td>3</td>
<td>159</td>
</tr>
<tr>
<td>Tough gray clay</td>
<td>29</td>
<td>188</td>
</tr>
<tr>
<td>Sandy brown clay</td>
<td>32</td>
<td>220</td>
</tr>
</tbody>
</table>

**Table 3B**
<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (foot)</th>
<th>Depth (foot)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decomposed granitic clay with cement reefs</td>
<td>60</td>
<td>280</td>
</tr>
<tr>
<td>Gravel</td>
<td>4</td>
<td>284</td>
</tr>
<tr>
<td>Cement</td>
<td>18</td>
<td>302</td>
</tr>
<tr>
<td>Gravel, cemented</td>
<td>28</td>
<td>330</td>
</tr>
<tr>
<td>Decomposed granitic rocks</td>
<td>20</td>
<td>350</td>
</tr>
<tr>
<td>Gravel</td>
<td>5</td>
<td>355</td>
</tr>
<tr>
<td>Cement</td>
<td>13</td>
<td>368</td>
</tr>
<tr>
<td>Gravel, good</td>
<td>10</td>
<td>378</td>
</tr>
<tr>
<td>Decomposed granitic, sand</td>
<td>10</td>
<td>388</td>
</tr>
</tbody>
</table>

## Table 3A. Paul Messor. Altitude about 2,865 feet. Drilled by J. S. Gobar in May 1952. 1½-inch casing, perforated 36-4½6 feet.

<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (foot)</th>
<th>Depth (foot)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top soil</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Tough brown clay</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Kaolin</td>
<td>21</td>
<td>25</td>
</tr>
<tr>
<td>Gray clay</td>
<td>2</td>
<td>27</td>
</tr>
<tr>
<td>Light brown clay with sandstone</td>
<td>63</td>
<td>90</td>
</tr>
<tr>
<td>Sandy brown clay</td>
<td>9</td>
<td>99</td>
</tr>
<tr>
<td>Tough brown clay</td>
<td>11</td>
<td>110</td>
</tr>
<tr>
<td>Brown sandy clay</td>
<td>14</td>
<td>124</td>
</tr>
<tr>
<td>Brown sandstone</td>
<td>12</td>
<td>136</td>
</tr>
<tr>
<td>Brown sandy clay</td>
<td>16</td>
<td>152</td>
</tr>
<tr>
<td>Gray clay</td>
<td>8</td>
<td>160</td>
</tr>
<tr>
<td>Brown sticky clay</td>
<td>8</td>
<td>168</td>
</tr>
<tr>
<td>Kaolin</td>
<td>4</td>
<td>172</td>
</tr>
<tr>
<td>Brown sticky clay</td>
<td>4</td>
<td>176</td>
</tr>
<tr>
<td>White clay</td>
<td>6</td>
<td>182</td>
</tr>
<tr>
<td>Green clay</td>
<td>4</td>
<td>186</td>
</tr>
<tr>
<td>Brown sticky clay</td>
<td>24</td>
<td>210</td>
</tr>
<tr>
<td>Brown sandy clay</td>
<td>8</td>
<td>218</td>
</tr>
<tr>
<td>Decomposed granitic sand and clay</td>
<td>14</td>
<td>258</td>
</tr>
<tr>
<td>Cement and gravel</td>
<td>6</td>
<td>264</td>
</tr>
<tr>
<td>Decomposed granitic sand and clay</td>
<td>30</td>
<td>294</td>
</tr>
<tr>
<td>Coarse decomposed granitic sand</td>
<td>6</td>
<td>300</td>
</tr>
<tr>
<td>Sandy clay</td>
<td>20</td>
<td>320</td>
</tr>
<tr>
<td>Gray gravel</td>
<td>4</td>
<td>324</td>
</tr>
<tr>
<td>Decomposed granitic sand and clay</td>
<td>26</td>
<td>350</td>
</tr>
<tr>
<td>Gray gravel</td>
<td>6</td>
<td>356</td>
</tr>
<tr>
<td>Decomposed granitic sand</td>
<td>20</td>
<td>376</td>
</tr>
<tr>
<td>Gray gravel</td>
<td>8</td>
<td>384</td>
</tr>
<tr>
<td>Decomposed granitic sand</td>
<td>28</td>
<td>412</td>
</tr>
<tr>
<td>Good gravel</td>
<td>4</td>
<td>416</td>
</tr>
<tr>
<td>Decomposed granitic sand</td>
<td>14</td>
<td>430</td>
</tr>
<tr>
<td>Sandy clay</td>
<td>12</td>
<td>442</td>
</tr>
<tr>
<td>Gravel</td>
<td>5</td>
<td>447</td>
</tr>
<tr>
<td>Sandy clay</td>
<td>5</td>
<td>452</td>
</tr>
<tr>
<td>Gravel</td>
<td>16</td>
<td>468</td>
</tr>
<tr>
<td>Clay</td>
<td>6</td>
<td>474</td>
</tr>
</tbody>
</table>
### UN/LW-1P3
Paul Messer. Altitude about 2,875 feet. Drilled by J. S. Gober in May 1952. 8-inch casing, perforated 50-75 feet.

<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top soil, silt</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Kaolin</td>
<td>12</td>
<td>20</td>
</tr>
<tr>
<td>Cement</td>
<td>4</td>
<td>24</td>
</tr>
<tr>
<td>Kaolin</td>
<td>11</td>
<td>35</td>
</tr>
<tr>
<td>Sandstone</td>
<td>42</td>
<td>77</td>
</tr>
</tbody>
</table>

### UN/LW-2G2
Vita Food Corporation. Altitude about 2,860 feet. Drilled by J. S. Gobar in 1947 to 2147 feet, deepened to 450 feet in August 1952. 16-inch casing 0-104 feet, 12-inch casing 104-450 feet, perforated 110-6145 feet.

<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top soil, silt</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Kaolin and clay</td>
<td>57</td>
<td>60</td>
</tr>
<tr>
<td>Kaolin</td>
<td>24</td>
<td>84</td>
</tr>
<tr>
<td>Gray clay</td>
<td>58</td>
<td>112</td>
</tr>
<tr>
<td>Cement</td>
<td>5</td>
<td>117</td>
</tr>
<tr>
<td>Brown clay</td>
<td>57</td>
<td>204</td>
</tr>
<tr>
<td>Very sticky clay</td>
<td>12</td>
<td>216</td>
</tr>
<tr>
<td>Very sticky gray clay</td>
<td>10</td>
<td>226</td>
</tr>
<tr>
<td>Gray clay with grit</td>
<td>12</td>
<td>238</td>
</tr>
<tr>
<td>Mixed clay, caving</td>
<td>9</td>
<td>247</td>
</tr>
<tr>
<td>Brown clay</td>
<td>9</td>
<td>256</td>
</tr>
<tr>
<td>Cemented sand</td>
<td>9</td>
<td>265</td>
</tr>
<tr>
<td>Brown sandy clay</td>
<td>24</td>
<td>289</td>
</tr>
<tr>
<td>Cemented gravel</td>
<td>4</td>
<td>293</td>
</tr>
<tr>
<td>Brown sandy clay</td>
<td>27</td>
<td>320</td>
</tr>
<tr>
<td>Gravel, egg-size</td>
<td>8</td>
<td>328</td>
</tr>
<tr>
<td>Sandy brown clay</td>
<td>8</td>
<td>336</td>
</tr>
<tr>
<td>Cemented gravel</td>
<td>6</td>
<td>342</td>
</tr>
<tr>
<td>Gravel</td>
<td>4</td>
<td>346</td>
</tr>
<tr>
<td>Brown clay and rocks</td>
<td>30</td>
<td>376</td>
</tr>
<tr>
<td>Hard cement</td>
<td>2</td>
<td>378</td>
</tr>
<tr>
<td>Clay and rocks</td>
<td>22</td>
<td>400</td>
</tr>
<tr>
<td>Sandy clay</td>
<td>20</td>
<td>420</td>
</tr>
<tr>
<td>Cement</td>
<td>10</td>
<td>430</td>
</tr>
<tr>
<td>Gravel, large</td>
<td>15</td>
<td>445</td>
</tr>
<tr>
<td>Rocks and clay</td>
<td>5</td>
<td>450</td>
</tr>
</tbody>
</table>
### Table 3A

**HN/W-2K1. J. P. Martin. Altitude about 2,865 feet. Drilled by J. S. Gobar in May 1932. 1\(\frac{1}{4}\)-inch casing, perforated 38-480 feet.**

<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Kaolin</td>
<td>42</td>
<td>45</td>
</tr>
<tr>
<td>Gray clay, hard</td>
<td>40</td>
<td>85</td>
</tr>
<tr>
<td>Kaolin</td>
<td>10</td>
<td>95</td>
</tr>
<tr>
<td>Light brown clay, sticky</td>
<td>25</td>
<td>120</td>
</tr>
<tr>
<td>Sandy gray clay</td>
<td>40</td>
<td>160</td>
</tr>
<tr>
<td>White clay</td>
<td>2</td>
<td>162</td>
</tr>
<tr>
<td>Brown sticky clay</td>
<td>18</td>
<td>180</td>
</tr>
<tr>
<td>Sandy clay</td>
<td>10</td>
<td>190</td>
</tr>
<tr>
<td>Reddish sandy clay</td>
<td>12</td>
<td>202</td>
</tr>
<tr>
<td>Red sticky clay</td>
<td>20</td>
<td>222</td>
</tr>
<tr>
<td>Kaolin</td>
<td>4</td>
<td>226</td>
</tr>
<tr>
<td>Brown clay</td>
<td>21</td>
<td>247</td>
</tr>
<tr>
<td>Sandy clay</td>
<td>9</td>
<td>256</td>
</tr>
<tr>
<td>Yellow clay</td>
<td>14</td>
<td>270</td>
</tr>
<tr>
<td>Hard cement</td>
<td>15</td>
<td>285</td>
</tr>
<tr>
<td>Sandy clay</td>
<td>25</td>
<td>310</td>
</tr>
<tr>
<td>Decomposed granitic sand</td>
<td>39</td>
<td>349</td>
</tr>
<tr>
<td>Clay</td>
<td>8</td>
<td>357</td>
</tr>
<tr>
<td>Gravel, dirty</td>
<td>11</td>
<td>360</td>
</tr>
<tr>
<td>Decomposed granitic soil and gravel</td>
<td>12</td>
<td>380</td>
</tr>
<tr>
<td>Rocks in granitic soil and gravel</td>
<td>5</td>
<td>385</td>
</tr>
<tr>
<td>Dirty gravel</td>
<td>30</td>
<td>415</td>
</tr>
<tr>
<td>Sandy clay</td>
<td>11</td>
<td>426</td>
</tr>
<tr>
<td>Dirty gravel</td>
<td>9</td>
<td>435</td>
</tr>
<tr>
<td>Cement</td>
<td>3</td>
<td>438</td>
</tr>
<tr>
<td>Dirty gravel</td>
<td>48</td>
<td>486</td>
</tr>
</tbody>
</table>

**HN/ZW-3NL. Bostwick. Altitude about 3,030 feet. Drilled by J. S. Gobar in July 1927. 10-inch casing 0-7 feet, uncased hole 7-138 feet.**

<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Decomposed granite</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Gypsum with kaolin</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>Decomposed granite, some gypsum, hard drilling</td>
<td>101</td>
<td>110</td>
</tr>
<tr>
<td>Decomposed granite</td>
<td>28</td>
<td>138</td>
</tr>
</tbody>
</table>
Table 3A

**LU/H, I-9R1.** Amos Z. French. Altitude about 2,975 feet. Roamed and deepened from 44 to 78 feet by J. S. Gobar in October 1949. 12-inch casing.

<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Old 8-inch diameter well. No data.)</td>
<td>44</td>
<td>44</td>
</tr>
<tr>
<td>Hard rock in clay</td>
<td>20</td>
<td>61</td>
</tr>
<tr>
<td>Decomposed granitic sand, water-bearing</td>
<td>4</td>
<td>68</td>
</tr>
<tr>
<td>Clay</td>
<td>2</td>
<td>70</td>
</tr>
<tr>
<td>Gravel</td>
<td>8</td>
<td>78</td>
</tr>
</tbody>
</table>

**LU/H, I-W10E1.** Lulu H. Stern and Bernice P. Ellis. Altitude about 2,980 feet. Drilled by F. D. McDougal in June 1950. 8-inch casing, perforated 54-94 feet.

<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loose gravelly soil</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Hard rocky clay</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>Light brown sandy clay</td>
<td>42</td>
<td>49</td>
</tr>
<tr>
<td>Hard dry clay with some small rocks</td>
<td>2</td>
<td>51</td>
</tr>
<tr>
<td>Light brown sandy clay</td>
<td>10</td>
<td>61</td>
</tr>
<tr>
<td>Water-bearing gravel</td>
<td>11</td>
<td>72</td>
</tr>
<tr>
<td>Decomposed granite with clay ribs</td>
<td>15</td>
<td>87</td>
</tr>
<tr>
<td>Loose sand, gravel, water-bearing</td>
<td>7</td>
<td>94</td>
</tr>
<tr>
<td>Decomposed granite with clay ribs</td>
<td>3</td>
<td>97</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top decomposed granitic sand</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Hard decomposed granitic soil</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>Decomposed granitic sand</td>
<td>24</td>
<td>34</td>
</tr>
<tr>
<td>Cemented decomposed granitic sand</td>
<td>5</td>
<td>39</td>
</tr>
<tr>
<td>Water in decomposed granitic sand</td>
<td>8</td>
<td>47</td>
</tr>
<tr>
<td>Cemented decomposed granitic sand</td>
<td>7</td>
<td>54</td>
</tr>
<tr>
<td>Water in decomposed granitic sand</td>
<td>8</td>
<td>62</td>
</tr>
<tr>
<td>Cemented decomposed granitic sand</td>
<td>6</td>
<td>68</td>
</tr>
<tr>
<td>Water in decomposed granitic sand</td>
<td>10</td>
<td>78</td>
</tr>
</tbody>
</table>
Table 3A


<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top soil</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Kaolin</td>
<td>10</td>
<td>12</td>
</tr>
<tr>
<td>Muck</td>
<td>8</td>
<td>20</td>
</tr>
<tr>
<td>Sand</td>
<td>28</td>
<td>48</td>
</tr>
<tr>
<td>Kaolin</td>
<td>62</td>
<td>110</td>
</tr>
<tr>
<td>White cement</td>
<td>2</td>
<td>112</td>
</tr>
<tr>
<td>White clay</td>
<td>13</td>
<td>125</td>
</tr>
<tr>
<td>Clay</td>
<td>4</td>
<td>129</td>
</tr>
<tr>
<td>Brown clay</td>
<td>21</td>
<td>150</td>
</tr>
<tr>
<td>Clay</td>
<td>10</td>
<td>160</td>
</tr>
<tr>
<td>Kaolin</td>
<td>6</td>
<td>166</td>
</tr>
<tr>
<td>Clay</td>
<td>10</td>
<td>176</td>
</tr>
<tr>
<td>Sandstone</td>
<td>4</td>
<td>180</td>
</tr>
<tr>
<td>Clay</td>
<td>26</td>
<td>206</td>
</tr>
<tr>
<td>Green clay</td>
<td>9</td>
<td>215</td>
</tr>
<tr>
<td>Brown clay</td>
<td>17</td>
<td>232</td>
</tr>
<tr>
<td>Blue clay</td>
<td>18</td>
<td>250</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Material</th>
<th>Depth (feet)</th>
<th>Thickness (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decomposed granitic sand</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Kaolin</td>
<td>11</td>
<td>26</td>
</tr>
<tr>
<td>Gravel</td>
<td>7</td>
<td>33</td>
</tr>
<tr>
<td>Cemented clay</td>
<td>10</td>
<td>43</td>
</tr>
<tr>
<td>Gravel</td>
<td>8</td>
<td>51</td>
</tr>
<tr>
<td>Decomposed granitic sand</td>
<td>12</td>
<td>63</td>
</tr>
<tr>
<td>Kaolin and gravel</td>
<td>7</td>
<td>70</td>
</tr>
<tr>
<td>Granite boulders</td>
<td>11</td>
<td>84</td>
</tr>
<tr>
<td>Granite</td>
<td>26</td>
<td>110</td>
</tr>
</tbody>
</table>

\textbf{RN/W-10H1.} V. H. Clemens, Sr. Altitude about 2,960 feet. Drilled by J. S. Gobar in July 1926. 12-inch casing, perforated 66-72 and 128-236 feet.

<table>
<thead>
<tr>
<th>Material</th>
<th>Depth (feet)</th>
<th>Thickness (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sand</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Kaolin</td>
<td>21</td>
<td>23</td>
</tr>
<tr>
<td>Sandy muck</td>
<td>12</td>
<td>35</td>
</tr>
<tr>
<td>Sandy clay</td>
<td>31</td>
<td>66</td>
</tr>
<tr>
<td>Granitic gravel</td>
<td>6</td>
<td>72</td>
</tr>
<tr>
<td>Cement</td>
<td>3</td>
<td>75</td>
</tr>
<tr>
<td>Clay</td>
<td>18</td>
<td>93</td>
</tr>
<tr>
<td>Cement</td>
<td>19</td>
<td>112</td>
</tr>
<tr>
<td>Gravel and clay</td>
<td>16</td>
<td>128</td>
</tr>
<tr>
<td>Gravel</td>
<td>7</td>
<td>135</td>
</tr>
<tr>
<td>Rock</td>
<td>15</td>
<td>150</td>
</tr>
</tbody>
</table>
Table 3A

**LN/1W-1OR1. J. W. Ellis. Altitude about 2,935 feet. Drilled by J. S. Gober in November 1917. 8-inch casing, perforated 30-80 feet.**

<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (foot)</th>
<th>Depth (foot)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sand</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Hard red clay</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Kaolin</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>Quicksand</td>
<td>6</td>
<td>14</td>
</tr>
<tr>
<td>Kaolin with grit</td>
<td>20</td>
<td>34</td>
</tr>
<tr>
<td>Brown gravelly clay</td>
<td>6</td>
<td>40</td>
</tr>
<tr>
<td>Cement</td>
<td>2</td>
<td>42</td>
</tr>
<tr>
<td>Brown gravelly clay</td>
<td>12</td>
<td>54</td>
</tr>
<tr>
<td>Kaolin</td>
<td>26</td>
<td>80</td>
</tr>
</tbody>
</table>

Note: Owner reports well deepened to 250 feet in 1948.
Log from memory is as follows:

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<tr>
<th>Material</th>
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<th>Depth (foot)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kaolin</td>
<td>169</td>
<td>249</td>
</tr>
<tr>
<td>Sand and gravel</td>
<td>1</td>
<td>250</td>
</tr>
</tbody>
</table>

**LN/1W-1OR2. Howard Loody. Altitude about 2,930 feet. Drilled by C. Steel in June 1951. 8-inch casing 0-80 feet, uncased hole 80-250 feet; casing not perforated.**

<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (foot)</th>
<th>Depth (foot)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top soil, sandy</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Hard rock-like kaoline</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Granulated kaoline, coarse sand and gravel, water-bearing</td>
<td>3</td>
<td>11</td>
</tr>
<tr>
<td>Adobe clay</td>
<td>15</td>
<td>26</td>
</tr>
<tr>
<td>Sand and gravel, water-bearing</td>
<td>4</td>
<td>30</td>
</tr>
<tr>
<td>Adobe clay</td>
<td>32</td>
<td>62</td>
</tr>
<tr>
<td>Sand, gravel, and kaoline, water-bearing</td>
<td>7</td>
<td>69</td>
</tr>
<tr>
<td>Hard, dark brown clay</td>
<td>27</td>
<td>96</td>
</tr>
<tr>
<td>White clay</td>
<td>61</td>
<td>160</td>
</tr>
<tr>
<td>Brown clay</td>
<td>22</td>
<td>182</td>
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<tr>
<td>Coarse sand and gravel, water-bearing</td>
<td>12</td>
<td>194</td>
</tr>
<tr>
<td>Brown clay</td>
<td>36</td>
<td>230</td>
</tr>
<tr>
<td>White clay</td>
<td>6</td>
<td>236</td>
</tr>
<tr>
<td>Coarse sand and gravel, water-bearing</td>
<td>6</td>
<td>242</td>
</tr>
<tr>
<td>Dark brown clay</td>
<td>8</td>
<td>250</td>
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</tbody>
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### Table 3A

<table>
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<th>Depth (foot)</th>
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<tr>
<td>Soil</td>
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<td>3</td>
</tr>
<tr>
<td>Hard kaolin</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Kaolin</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>Quicksand</td>
<td>13</td>
<td>23</td>
</tr>
<tr>
<td>Cement</td>
<td>4</td>
<td>27</td>
</tr>
<tr>
<td>Quicksand, red</td>
<td>18</td>
<td>45</td>
</tr>
<tr>
<td>Kaolin</td>
<td>31</td>
<td>76</td>
</tr>
<tr>
<td>White clay</td>
<td>11</td>
<td>87</td>
</tr>
<tr>
<td>Hard cement</td>
<td>3</td>
<td>90</td>
</tr>
<tr>
<td>Brown clay</td>
<td>24</td>
<td>114</td>
</tr>
<tr>
<td>White clay</td>
<td>6</td>
<td>120</td>
</tr>
<tr>
<td>Brown clay</td>
<td>8</td>
<td>128</td>
</tr>
<tr>
<td>White clay</td>
<td>7</td>
<td>135</td>
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<tr>
<td>Brown clay</td>
<td>35</td>
<td>170</td>
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<td>White clay</td>
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<tr>
<td>Hard cement</td>
<td>21</td>
<td>211</td>
</tr>
<tr>
<td>Sand</td>
<td>9</td>
<td>220</td>
</tr>
<tr>
<td>Cement</td>
<td>7</td>
<td>227</td>
</tr>
<tr>
<td>White clay</td>
<td>3</td>
<td>230</td>
</tr>
<tr>
<td>Brown clay</td>
<td>70</td>
<td>300</td>
</tr>
</tbody>
</table>

### Table 3B

<table>
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<tr>
<th>Material</th>
<th>Thickness (feet)</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Sand</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Kaolin</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>Sandy muck</td>
<td>22</td>
<td>32</td>
</tr>
<tr>
<td>Sandstone</td>
<td>10</td>
<td>42</td>
</tr>
<tr>
<td>Sandy clay</td>
<td>15</td>
<td>57</td>
</tr>
<tr>
<td>Kaolin and clay, smooth rocks in the clay at 170 feet</td>
<td>153</td>
<td>210</td>
</tr>
<tr>
<td>Hard kaolin</td>
<td>20</td>
<td>230</td>
</tr>
<tr>
<td>Packod gray sand, cemented</td>
<td>15</td>
<td>245</td>
</tr>
</tbody>
</table>

### Table 3C

<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (foot)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sandy loam</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Kaolin</td>
<td>18</td>
<td>30</td>
</tr>
<tr>
<td>Cemented gravel</td>
<td>12</td>
<td>42</td>
</tr>
<tr>
<td>Kaolin</td>
<td>18</td>
<td>60</td>
</tr>
</tbody>
</table>
Table 3


<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Old well; no data available)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kaolin</td>
<td>63</td>
<td>63</td>
</tr>
<tr>
<td>Cement</td>
<td>14</td>
<td>77</td>
</tr>
<tr>
<td>Gray clay</td>
<td>1</td>
<td>78</td>
</tr>
<tr>
<td>White clay</td>
<td>2</td>
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<tr>
<td>Brown clay</td>
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<td>82</td>
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<tr>
<td>Kaolin</td>
<td>2</td>
<td>106</td>
</tr>
<tr>
<td>Brown sandy clay</td>
<td>9</td>
<td>115</td>
</tr>
<tr>
<td>Sticky grey clay</td>
<td>2</td>
<td>110</td>
</tr>
<tr>
<td>Kaolin</td>
<td>7</td>
<td>117</td>
</tr>
<tr>
<td>Sandstone</td>
<td>10</td>
<td>157</td>
</tr>
<tr>
<td>Sticky grey clay</td>
<td>8</td>
<td>165</td>
</tr>
<tr>
<td>Cement and kaolin</td>
<td>7</td>
<td>172</td>
</tr>
<tr>
<td>Sandstone</td>
<td>6</td>
<td>178</td>
</tr>
<tr>
<td>Sticky grey clay</td>
<td>6</td>
<td>184</td>
</tr>
<tr>
<td>Sandstone</td>
<td>10</td>
<td>194</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top soil</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Fine sandy clay</td>
<td>3.5</td>
<td>5</td>
</tr>
<tr>
<td>Coarse gravel</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Fine sandy clay</td>
<td>14</td>
<td>20</td>
</tr>
<tr>
<td>Cemented rock, kaolin</td>
<td>4</td>
<td>24</td>
</tr>
<tr>
<td>Rocky white clay</td>
<td>10</td>
<td>34</td>
</tr>
<tr>
<td>Hard white clay</td>
<td>2</td>
<td>36</td>
</tr>
<tr>
<td>Loose sandy clay</td>
<td>12</td>
<td>48</td>
</tr>
<tr>
<td>Hard brown clay</td>
<td>4</td>
<td>52</td>
</tr>
<tr>
<td>Sticky white clay</td>
<td>5</td>
<td>57</td>
</tr>
<tr>
<td>Kaolin reef</td>
<td>6</td>
<td>63</td>
</tr>
<tr>
<td>Cemented rock and gravel, water-bearing</td>
<td>7</td>
<td>70</td>
</tr>
<tr>
<td>Sticky white clay</td>
<td>6</td>
<td>76</td>
</tr>
<tr>
<td>Hard brown clay</td>
<td>11</td>
<td>87</td>
</tr>
<tr>
<td>Cemented rock and gravel, water-bearing</td>
<td>19</td>
<td>106</td>
</tr>
<tr>
<td>Solid rock reef</td>
<td>2</td>
<td>108</td>
</tr>
<tr>
<td>Loose cemented rock</td>
<td>4</td>
<td>112</td>
</tr>
<tr>
<td>Sandy brown clay</td>
<td>36</td>
<td>148</td>
</tr>
<tr>
<td>Tough white clay and rock</td>
<td>10</td>
<td>158</td>
</tr>
<tr>
<td>Sandy white clay</td>
<td>32</td>
<td>190</td>
</tr>
<tr>
<td>Fine water sand</td>
<td>3</td>
<td>193</td>
</tr>
<tr>
<td>Sandy brown clay</td>
<td>9</td>
<td>202</td>
</tr>
<tr>
<td>Sticky grey clay</td>
<td>2</td>
<td>204</td>
</tr>
<tr>
<td>Material</td>
<td>Thickness (feet)</td>
<td>Depth (feet)</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>-----------------</td>
<td>--------------</td>
</tr>
<tr>
<td>Fine water sand</td>
<td>2</td>
<td>206</td>
</tr>
<tr>
<td>Sticky gray clay</td>
<td>19</td>
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<td>Fine brown sand</td>
<td>5</td>
<td>230</td>
</tr>
<tr>
<td>Kaolin</td>
<td>1</td>
<td>231</td>
</tr>
<tr>
<td>Kaolin intermixed with white clay</td>
<td>6</td>
<td>237</td>
</tr>
<tr>
<td>Sandy brown clay</td>
<td>7</td>
<td>244</td>
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<tr>
<td>Sticky gray clay</td>
<td>6</td>
<td>250</td>
</tr>
<tr>
<td>Sandy brown clay</td>
<td>1.5</td>
<td>261</td>
</tr>
<tr>
<td>Hard brown shale</td>
<td>2</td>
<td>266</td>
</tr>
<tr>
<td>Small water gravel</td>
<td>2</td>
<td>268</td>
</tr>
<tr>
<td>Brown sandy clay</td>
<td>2</td>
<td>270</td>
</tr>
<tr>
<td>Small water gravel</td>
<td>2</td>
<td>272</td>
</tr>
<tr>
<td>Layers of brown shale and sticky brown clay</td>
<td>12</td>
<td>284</td>
</tr>
<tr>
<td>Sticky brown clay</td>
<td>10</td>
<td>294</td>
</tr>
<tr>
<td>Sandy brown clay</td>
<td>6</td>
<td>300</td>
</tr>
</tbody>
</table>

*LWN-1W-11J1.* Robert Greenland. Altitude about 2,935 feet. Drilled 0-44 feet in September 1927 by J. S. Gobar, later deepened. 10-inch casing 0-120 feet, perforated 28-40 feet, uncased hole 120-234 feet.

| Soil                                        | 8               | 8            |
| Quicksand                                   | 20              | 28           |
| Kaolin and clay                             | 72              | 100          |
| Yellow clay                                 | 20              | 120          |
| Gravel                                      | (?)             | 234          |

*LWN-1W-11N1.* Robert Delperdang. Altitude about 2,935 feet. Deepened from 96 to 217 feet by J. S. Gobar in August 1950. 8-inch casing 0-121 feet, perforated 91-121 feet, uncased hole 121-247 feet.

*(Old well; no data available.)*

| Sandstone                                   | 96              | 96           |
| Brown clay                                  | 6               | 106          |
| Kaolin                                      | 6               | 112          |
| Brown clay                                  | 26              | 138          |
| Sandstone                                   | 12              | 150          |
| Brown clay                                  | 5               | 155          |
| Kaolin                                      | 10              | 165          |
| Brown clay                                  | 5               | 170          |
| Kaolin (very white)                         | 6               | 176          |
| Brown clay                                  | 4               | 180          |
| Sandstone                                   | 50              | 230          |
| Kaolin                                      | 7               | 237          |
| Sandstone                                   | 5               | 242          |
| Brown clay                                  | 5               | 247          |
Dr. Kenneth Smith. Altitude about 2,890 feet. Drilled by J. S. Gobar in May 1935. 16-inch casing, perforated 60-497 feet.

<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top soil and sandy loam</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Kaolin</td>
<td>33</td>
<td>45</td>
</tr>
<tr>
<td>Sandy kaolin</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Light brown clay</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Sandstone</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Soft clay</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>Sandstone</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>Clay</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Sandstone</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Sticky clay, brown and yellow</td>
<td>79</td>
<td></td>
</tr>
<tr>
<td>Greasy clay</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Light brown clay</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>Sandy clay</td>
<td>33</td>
<td></td>
</tr>
<tr>
<td>Red sandy clay</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Cement</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Sandy clay</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>Cement</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>Sandy clay</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Cement</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>Decomposed red granitic sand, water-bearing</td>
<td>34</td>
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</tr>
<tr>
<td>Clay</td>
<td>15</td>
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<tr>
<td>Dirty gravel</td>
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<td></td>
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<tr>
<td>Decomposed granitic sand</td>
<td>22</td>
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<tr>
<td>Very good gravel</td>
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<td></td>
</tr>
<tr>
<td>Decomposed granitic sand and clay</td>
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<tr>
<td>Excellent gravel</td>
<td>22</td>
<td></td>
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<tr>
<td>Rocks in clay and decomposed granite</td>
<td>26</td>
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</table>


<table>
<thead>
<tr>
<th>Material</th>
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<th>Depth (feet)</th>
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</thead>
<tbody>
<tr>
<td>Sand</td>
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<tr>
<td>Brown shale and boulders</td>
<td>210</td>
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</tr>
<tr>
<td>Water sand with shale streaks</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Shale</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Water gravel</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Hard shale</td>
<td>12</td>
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**Table 3A**

<table>
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<th>Depth (feet)</th>
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<tbody>
<tr>
<td>Blow sand and top soil</td>
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<td>2.5</td>
</tr>
<tr>
<td>Hard rock-like kaolin</td>
<td>4.5</td>
<td>7</td>
</tr>
<tr>
<td>Light adobe clay</td>
<td>51</td>
<td>58</td>
</tr>
<tr>
<td>Brown clay carrying sand and gravel</td>
<td>7</td>
<td>65</td>
</tr>
<tr>
<td>White granulated kaolin, water-bearing</td>
<td>7</td>
<td>72</td>
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<tr>
<td>Hard brown clay</td>
<td>56</td>
<td>128</td>
</tr>
<tr>
<td>White granulated kaolin, gravel, and sand, water-bearing</td>
<td>8</td>
<td>136</td>
</tr>
<tr>
<td>Composted sand and gravel</td>
<td>19</td>
<td>155</td>
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<tr>
<td>White clay with some gravel</td>
<td>10</td>
<td>165</td>
</tr>
<tr>
<td>Large granito boulder</td>
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<td>172</td>
</tr>
<tr>
<td>Soft white clay</td>
<td>18</td>
<td>190</td>
</tr>
<tr>
<td>Green sticky clay</td>
<td>14</td>
<td>204</td>
</tr>
<tr>
<td>Red clay</td>
<td>6</td>
<td>210</td>
</tr>
<tr>
<td>Fine sand, bits of kaolin and gravel</td>
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<td>216</td>
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<tr>
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<tr>
<td>Green sandstone</td>
<td>32</td>
<td>262</td>
</tr>
<tr>
<td>Brown clay</td>
<td>18</td>
<td>280</td>
</tr>
<tr>
<td>Coarse sand and pea gravel, water-bearing</td>
<td>11</td>
<td>291</td>
</tr>
<tr>
<td>Brown clay</td>
<td>18</td>
<td>309</td>
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<table>
<thead>
<tr>
<th>Material</th>
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<tbody>
<tr>
<td>Sandy soil</td>
<td>3</td>
<td>3</td>
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<tr>
<td>Hard Kaloin</td>
<td>3.5</td>
<td>6.5</td>
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<td>Adobe clay</td>
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<tr>
<td>Composted sand and gravel</td>
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<tr>
<td>Hard clay</td>
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<td>Porous white kaolin, water-bearing</td>
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<td>Water-bearing kaolin</td>
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<tr>
<td>Clay</td>
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### Table 3A

**4W/11-I4A2. Altitude about 2,965 feet. Drilled by J. S. Gobar in April 1936. 8-inch casing.**

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<td>Sand with rocks</td>
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<td>20</td>
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<tr>
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<td>5</td>
<td>25</td>
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<tr>
<td>Cement and sand</td>
<td>52</td>
<td>77</td>
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<tr>
<td>Very hard cement</td>
<td>1</td>
<td>78</td>
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<tr>
<td>Gravel, water-bearing</td>
<td>8</td>
<td>86</td>
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<tr>
<td>Kaolin</td>
<td>17</td>
<td>103</td>
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<tr>
<td>Gravel</td>
<td>37</td>
<td>110</td>
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**4W/11-I4A3. E. L. Moc. Altitude about 2,950 feet. Drilled by J. S. Gobar in October 1946. 10-inch casing.**

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<tr>
<td>Gravel and rocks</td>
<td>8</td>
<td>8</td>
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<tr>
<td>Kaolin and cement</td>
<td>49</td>
<td>57</td>
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<tr>
<td>Cement</td>
<td>11</td>
<td>68</td>
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<tr>
<td>Sandstone</td>
<td>14</td>
<td>82</td>
</tr>
<tr>
<td>Cement</td>
<td>10</td>
<td>92</td>
</tr>
<tr>
<td>Sandstone with gravel</td>
<td>21</td>
<td>116</td>
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<tr>
<td>Sandy clay</td>
<td>11</td>
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**4W/11-I4Bl. James Goulding. Altitude about 2,945 feet. Drilled by F. D. McDougall in February 1951. 10-inch casing, perforated 140-146 feet.**

<table>
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<td>Sandy soil</td>
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<td>20</td>
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<tr>
<td>Kaoline</td>
<td>3</td>
<td>23</td>
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<tr>
<td>Kaolene and water sand</td>
<td>12</td>
<td>35</td>
</tr>
<tr>
<td>Light gray clay and Kaolene</td>
<td>2</td>
<td>37</td>
</tr>
<tr>
<td>Hard roofs of Kaolene</td>
<td>5</td>
<td>42</td>
</tr>
<tr>
<td>Light gray clay and Kaolene roofs</td>
<td>19</td>
<td>61</td>
</tr>
<tr>
<td>Light brown sandy clay</td>
<td>3</td>
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<tr>
<td>Hard Kaolene reef</td>
<td>1</td>
<td>65</td>
</tr>
<tr>
<td>Kaolene and sand</td>
<td>2</td>
<td>67</td>
</tr>
<tr>
<td>Brown sandy clay</td>
<td>25</td>
<td>92</td>
</tr>
<tr>
<td>Coarse sand and small gravel</td>
<td>5</td>
<td>97</td>
</tr>
<tr>
<td>Brown sandy clay</td>
<td>4</td>
<td>101</td>
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<tr>
<td>Light gray clay</td>
<td>3</td>
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<td>Light brown sandy clay</td>
<td>37</td>
<td>141</td>
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<tr>
<td>Coarse sand and gravel</td>
<td>5</td>
<td>146</td>
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<tr>
<td>Light brown sandy clay</td>
<td>15</td>
<td>161</td>
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<tr>
<td>Hard clay</td>
<td>2</td>
<td>163</td>
</tr>
<tr>
<td>Coarse sandy brown clay</td>
<td>8</td>
<td>171</td>
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<tr>
<td>Coarse sand and light gray clay</td>
<td>15</td>
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<tr>
<td>Light gray clay</td>
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*Note: Water level rose from 23 feet to land surface after casing was perforated.*
**Table 3A**


<table>
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<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
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<tbody>
<tr>
<td>Light gray clay</td>
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<tr>
<td>Light brown sandy clay</td>
<td>16</td>
<td>18</td>
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<tr>
<td>Light gray clay</td>
<td>3</td>
<td>21</td>
</tr>
<tr>
<td>Coarse water sand</td>
<td>3</td>
<td>24</td>
</tr>
<tr>
<td>Kaolino and white clay</td>
<td>2</td>
<td>26</td>
</tr>
<tr>
<td>Light brown clay</td>
<td>8</td>
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</tr>
<tr>
<td>White clay</td>
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<tr>
<td>Light gray clay</td>
<td>4</td>
<td>51</td>
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<td>Water gravel and kaolino</td>
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<td>76</td>
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<td>29</td>
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<table>
<thead>
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<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
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<tbody>
<tr>
<td>Soil</td>
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<td>12</td>
</tr>
<tr>
<td>Sandy muck</td>
<td>10</td>
<td>22</td>
</tr>
<tr>
<td>Kaolin</td>
<td>14</td>
<td>36</td>
</tr>
<tr>
<td>Sandy muck</td>
<td>9</td>
<td>45</td>
</tr>
<tr>
<td>Sandstone</td>
<td>15</td>
<td>60</td>
</tr>
<tr>
<td>Kaolin</td>
<td>20</td>
<td>80</td>
</tr>
<tr>
<td>Brown clay and kaolin mixed</td>
<td>17</td>
<td>97</td>
</tr>
<tr>
<td>Gray clay</td>
<td>9</td>
<td>106</td>
</tr>
<tr>
<td>Brown clay</td>
<td>9</td>
<td>115</td>
</tr>
<tr>
<td>Capping cement</td>
<td>1</td>
<td>116</td>
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<tr>
<td>Sandstone (flowing stratum)</td>
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<td>133</td>
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<tr>
<td>Kaolino and cement</td>
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<td>146</td>
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<tr>
<td>Sandstone</td>
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<td>172</td>
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<tr>
<td>Cement</td>
<td>3</td>
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<tr>
<td>Kaolin with grit</td>
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<td>192</td>
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<td>Brown clay</td>
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<td>218</td>
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<tr>
<td>Kaolin</td>
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<td>234</td>
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<tr>
<td>Brown clay</td>
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<tr>
<td>Cement</td>
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<tr>
<td>Water sand</td>
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<td>259</td>
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<tr>
<td>Clay</td>
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<td>267</td>
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<td>Thickness (feet)</td>
<td>Depth (feet)</td>
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<tr>
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<td>--------------</td>
</tr>
<tr>
<td>Soil</td>
<td>4</td>
<td>4</td>
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<tr>
<td>Sand and rock</td>
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<td>16</td>
</tr>
<tr>
<td>Kaolin</td>
<td>8</td>
<td>21</td>
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<tr>
<td>Sandy clay</td>
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<td>30</td>
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<tr>
<td>Cement</td>
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<td>43</td>
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<tr>
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<td>70</td>
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<tr>
<td>Kaolin</td>
<td>11</td>
<td>81</td>
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<tr>
<td>Soft sandstone</td>
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<td>100</td>
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<th>Depth (feet)</th>
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<tbody>
<tr>
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<td>1.5</td>
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<tr>
<td>Dry hard clay</td>
<td>6.5</td>
<td>8</td>
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<tr>
<td>Brown sandy gravel</td>
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<td>10</td>
</tr>
<tr>
<td>Light sandy gravel</td>
<td>28</td>
<td>38</td>
</tr>
<tr>
<td>Water sand and gravel</td>
<td>14</td>
<td>52</td>
</tr>
<tr>
<td>Brown clay</td>
<td>8</td>
<td>60</td>
</tr>
<tr>
<td>Light clay</td>
<td>7</td>
<td>67</td>
</tr>
<tr>
<td>Kaolino</td>
<td>1.5</td>
<td>68.5</td>
</tr>
<tr>
<td>Water gravel and sand</td>
<td>11.5</td>
<td>80</td>
</tr>
<tr>
<td>Clay</td>
<td>26</td>
<td>106</td>
</tr>
<tr>
<td>Kaolino</td>
<td>2</td>
<td>108</td>
</tr>
<tr>
<td>Water gravel and sand</td>
<td>16</td>
<td>124</td>
</tr>
<tr>
<td>Clay</td>
<td>34</td>
<td>158</td>
</tr>
<tr>
<td>Gravel</td>
<td>12</td>
<td>170</td>
</tr>
<tr>
<td>Light clay, rock</td>
<td>27</td>
<td>197</td>
</tr>
<tr>
<td>Brown clay</td>
<td>11</td>
<td>208</td>
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<tr>
<td>Rock, gravel</td>
<td>16</td>
<td>224</td>
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<tr>
<td>Light clay</td>
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<td>230</td>
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Table 3A

**Lee/NW-1191.** Roy Cliff. Altitude about 3,020 feet. Drilled by E. Moss in December 1950. 12-inch casing 0-11½ feet, uncased hole 11½-120 feet.

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Top soil</td>
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<td>4</td>
</tr>
<tr>
<td>Hardpan</td>
<td>5</td>
<td>9</td>
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<tr>
<td>Clay</td>
<td>21</td>
<td>33</td>
</tr>
<tr>
<td>Gravel</td>
<td>6</td>
<td>39</td>
</tr>
<tr>
<td>Clay-bearing medium sand in streaks</td>
<td>28</td>
<td>67</td>
</tr>
<tr>
<td>Fine water sand</td>
<td>4</td>
<td>71</td>
</tr>
<tr>
<td>Shale</td>
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<td>79</td>
</tr>
<tr>
<td>Water gravel</td>
<td>9</td>
<td>88</td>
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<tr>
<td>Clay-bearing medium, sand in streaks</td>
<td>21</td>
<td>109</td>
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<tr>
<td>Water gravel, 1/4-inch to 1½-inch diameter</td>
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<tr>
<td>Sticky shale</td>
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</table>

**Lee/NW-1193.** Carl C. Holler. Altitude about 3,025 feet. Drilled 0-102 feet in September 1947 by F. D. McDougall and deepened from 102 to 21½ feet in March 1949. 10-inch casing 0-11½ feet, perforated 11½-1½ feet, uncased hole 1½-21½ feet.

<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
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<tbody>
<tr>
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<td>8</td>
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<tr>
<td>Dark sandy soil</td>
<td>7</td>
<td>15</td>
</tr>
<tr>
<td>Soft slime</td>
<td>4</td>
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<td>35</td>
<td>54</td>
</tr>
<tr>
<td>Water gravel</td>
<td>4</td>
<td>58</td>
</tr>
<tr>
<td>Brown clay</td>
<td>3½</td>
<td>92</td>
</tr>
<tr>
<td>Water gravel</td>
<td>5</td>
<td>97</td>
</tr>
<tr>
<td>Brown clay</td>
<td>5</td>
<td>102</td>
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<tr>
<td>Light clay</td>
<td>25</td>
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<td>Water sand</td>
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### Table 3A


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<tr>
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<td>38</td>
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<tr>
<td>Cement</td>
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<td>42</td>
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<tr>
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<td>50</td>
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<tr>
<td>Black gravelly clay</td>
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<tr>
<td>Cement</td>
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<td>Cement</td>
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<td>Kaolin</td>
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<td>Gray clay</td>
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<td>95</td>
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<td>Decomposed granitic sand</td>
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<td>Cemented gravel</td>
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<td>Gravel</td>
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<td>Brown sandy clay</td>
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</tr>
<tr>
<td>Light clay</td>
<td>5</td>
<td>36</td>
</tr>
<tr>
<td>Dirty gravel</td>
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<td>48</td>
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<td>Kaolin</td>
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</tr>
<tr>
<td>Gravel</td>
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<td>62</td>
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<tr>
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<td>17</td>
<td>109</td>
</tr>
<tr>
<td>Water sand</td>
<td>9</td>
<td>118</td>
</tr>
<tr>
<td>Clay</td>
<td>9</td>
<td>127</td>
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<tr>
<td>Gravel</td>
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<tr>
<td>Clay</td>
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<tbody>
<tr>
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<td>4</td>
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<tr>
<td>Kaolin</td>
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<td>16</td>
</tr>
<tr>
<td>Quicksand</td>
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</table>
Table 3A (continued)

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<th>Depth (feet)</th>
</tr>
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<tbody>
<tr>
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<td>46</td>
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<td>Brown sandy clay</td>
<td>13</td>
<td>60</td>
</tr>
<tr>
<td>Cement, water-bearing</td>
<td>6</td>
<td>66</td>
</tr>
<tr>
<td>Dark gray clay</td>
<td>8</td>
<td>74</td>
</tr>
<tr>
<td>Kaolin</td>
<td>23</td>
<td>97</td>
</tr>
<tr>
<td>Cemented sand</td>
<td>7</td>
<td>104</td>
</tr>
<tr>
<td>Kaolin</td>
<td>16</td>
<td>120</td>
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<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
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<td>Light gray clay</td>
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<td>Kalone, bearing some water</td>
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<td>Brown sandy clay</td>
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<tr>
<td>Light gray clay</td>
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<tr>
<td>Kalone and water-bearing sand</td>
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**LW/1W-15D3. C. V. Wickware.** Altitude about 2,965 feet. Drilled by F. D. McDougall in August 1950. 8-inch casing, perforated 80-120 feet.

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</tr>
<tr>
<td>Kalone</td>
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<td>33</td>
</tr>
<tr>
<td>Kalone, bearing small amount of water</td>
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<td>41</td>
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<td>53</td>
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<tr>
<td>Water sand and small gravel</td>
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<tr>
<td>Light brown clay</td>
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<td>92</td>
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<tr>
<td>Kalone and water sand</td>
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<td>103</td>
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<tr>
<td>Layers of kalone, sand and clay</td>
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<tr>
<td>Light brown sandy clay</td>
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<td>Sand</td>
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**UN/N-15L1.** F. M. VanNorman. Altitude about 3,005 feet. Drilled by F. D. McDougall in April 1948. 8-inch casing 0-96 feet, perforated 72-96 feet.

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<td>76</td>
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<tr>
<td>Water gravel</td>
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<td>81</td>
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<tr>
<td>Clay</td>
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<tr>
<td>Gravel</td>
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<tr>
<td>Clay</td>
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<th>Material</th>
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<td>65</td>
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<tr>
<td>Sandstone</td>
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<tr>
<td>White clay</td>
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Table 3A


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<th>Material</th>
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<td>Gravelly soil and rocks</td>
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<tr>
<td>Clay and sand</td>
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<td>14</td>
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<tr>
<td>Cement</td>
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<td>158</td>
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<tr>
<td>Cemented gravel, fine</td>
<td>24</td>
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**UN/1H-21J1. Dave Sweeney and George Rayle. Altitude about 3,140 feet. Drilled by F. D. McDougall in August 1952. 12-inch casing 0-330 feet, perforated 188-208, 216-224, 284-296, and 315-325 feet.**

<table>
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<tr>
<td>Rocky sandy soil</td>
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<td>34</td>
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<tr>
<td>Loose rocks, coarse sand with clay</td>
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<td>72</td>
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<tr>
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<td>75</td>
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<td>Clay</td>
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<tr>
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<td>84</td>
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<td>Light sandy clay</td>
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<td>108</td>
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<tr>
<td>Coarse dry gravel in clay</td>
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<td>116</td>
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<tr>
<td>Light sandy clay</td>
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<td>130</td>
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<tr>
<td>Coarse sand and gravel in brown clay</td>
<td>58</td>
<td>188</td>
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<tr>
<td>Fine water sand</td>
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<tr>
<td>Coarse water sand and small gravel</td>
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<td>Sandy clay</td>
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<tr>
<td>Hard brown sandstone</td>
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<td>219</td>
</tr>
<tr>
<td>Water sand and gravel</td>
<td>3</td>
<td>222</td>
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<tr>
<td>Rocky sandy clay</td>
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<td>227</td>
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<tr>
<td>Cemented rock reefs</td>
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<tr>
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<td>Water gravel</td>
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<td>Coarse gravel</td>
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**Table 3A**


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<td>Dry gravel and brown sandy clay</td>
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<td>19</td>
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<tr>
<td>Dark brown clay and gravel</td>
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<td>Hard dry clay, few rocks</td>
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<td>112</td>
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<tr>
<td>Light brown clay, few rocks</td>
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<td>114</td>
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<tr>
<td>Fine water sand, bearing some water</td>
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<td>116</td>
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<tr>
<td>Cement roof</td>
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<td>Brown clay with thin cement roofs</td>
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<td>Brown sandy clay</td>
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<tr>
<td>Water gravel and coarse sand with thin, tight ribs</td>
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<td>Light gray clay with a few rocks</td>
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**HN/IV-23D2.** F. M. Bazl. Altitude about 3,050 feet. Drilled by J. S. Gobar in March 1948. 8-inch casing, perforated 75-155 feet.

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<tr>
<td>Kaolin</td>
<td>12</td>
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</tr>
<tr>
<td>Decomposed granitic sand and rocks</td>
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<td>Sandy clay</td>
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<td>Cemented rocks and gravel</td>
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<td>Gravel</td>
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<tr>
<td>Clay with gravel</td>
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<tbody>
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<td>Boulders and soft sandstone</td>
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<td>Sandy clay</td>
<td>59</td>
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</tr>
<tr>
<td>Water gravel</td>
<td>19</td>
<td>158</td>
</tr>
<tr>
<td>Clay</td>
<td>2</td>
<td>160</td>
</tr>
</tbody>
</table>

UN/1W-23K1. C. V. Wickware. Altitude about 3,100 feet. Drilled by F. D. McDougall in October 1946. 8-inch casing, perforated 69-76, 104-109, 122-127, and 147-152 feet.

<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coarse sand</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td>Gray sand</td>
<td>34</td>
<td>69</td>
</tr>
<tr>
<td>Water gravel</td>
<td>6</td>
<td>75</td>
</tr>
<tr>
<td>Sandy clay</td>
<td>29</td>
<td>104</td>
</tr>
<tr>
<td>Water gravel</td>
<td>4</td>
<td>108</td>
</tr>
<tr>
<td>Clay</td>
<td>16</td>
<td>121</td>
</tr>
<tr>
<td>Gravel</td>
<td>2</td>
<td>126</td>
</tr>
<tr>
<td>&quot;Talc&quot; (?)</td>
<td>22</td>
<td>148</td>
</tr>
<tr>
<td>Brown sand</td>
<td>4</td>
<td>152</td>
</tr>
</tbody>
</table>

5N/1E-702. Guy Gilliland. Altitude about 2,093 feet. Drilled by J. S. Gobar in August 1952. 12-inch casing, perforated 74-84, 90-102, 121-130, and 150-166 feet.

<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large good gravel; decomposed granitic soil</td>
<td>71</td>
<td>71</td>
</tr>
<tr>
<td>Broken rock, water-bearing</td>
<td>13</td>
<td>84</td>
</tr>
<tr>
<td>Sandy clay</td>
<td>6</td>
<td>90</td>
</tr>
<tr>
<td>Broken rock, water-bearing</td>
<td>12</td>
<td>102</td>
</tr>
<tr>
<td>Sand</td>
<td>22</td>
<td>124</td>
</tr>
</tbody>
</table>
### Table 3A - continued

<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rocks</td>
<td>6</td>
<td>130</td>
</tr>
<tr>
<td>Sandy clay</td>
<td>4</td>
<td>134</td>
</tr>
<tr>
<td>Cemented gravel</td>
<td>10</td>
<td>154</td>
</tr>
<tr>
<td>Sandy clay</td>
<td>6</td>
<td>150</td>
</tr>
<tr>
<td>Boulders, water gravel</td>
<td>16</td>
<td>166</td>
</tr>
<tr>
<td>Decomposed granitic rocks</td>
<td>6</td>
<td>172</td>
</tr>
</tbody>
</table>

### 5N/1E-8C1. Tony Patchell. Altitude about 2,935 feet. Drilled by J. S. Gobar in May 1929. 12-inch casing, perforated 93-120 feet.

<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decomposed granitic sand with large gravel</td>
<td>88</td>
<td>88</td>
</tr>
<tr>
<td>Cement</td>
<td>5</td>
<td>93</td>
</tr>
<tr>
<td>Gravel, coarse and water-bearing</td>
<td>27</td>
<td>120</td>
</tr>
<tr>
<td>Dirty gravel and clay with boulders</td>
<td>33</td>
<td>153</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top soil</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Gray sandy clay</td>
<td>16.5</td>
<td>18</td>
</tr>
<tr>
<td>Brown sandy clay</td>
<td>12</td>
<td>30</td>
</tr>
<tr>
<td>Rocky brown clay</td>
<td>2</td>
<td>32</td>
</tr>
<tr>
<td>Brown sandy clay</td>
<td>20</td>
<td>52</td>
</tr>
<tr>
<td>Water gravel, coarse sand and small gravel</td>
<td>5</td>
<td>57</td>
</tr>
<tr>
<td>Coarse sandy gravel</td>
<td>3</td>
<td>60</td>
</tr>
<tr>
<td>Brown clay</td>
<td>4</td>
<td>61</td>
</tr>
<tr>
<td>Water gravel and coarse sandy gravel</td>
<td>10</td>
<td>74</td>
</tr>
<tr>
<td>Coarse brown gravelly clay</td>
<td>20</td>
<td>94</td>
</tr>
<tr>
<td>Brown sandy clay</td>
<td>21</td>
<td>115</td>
</tr>
<tr>
<td>Layers of water sand and brown sandy clay</td>
<td>31</td>
<td>116</td>
</tr>
<tr>
<td>Light brown sticky clay</td>
<td>5</td>
<td>151</td>
</tr>
</tbody>
</table>
**Table 3A**


<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top soil</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Gray clay</td>
<td>57</td>
<td>60</td>
</tr>
<tr>
<td>Brown clay</td>
<td>40</td>
<td>100</td>
</tr>
<tr>
<td>Dirty gravel</td>
<td>20</td>
<td>120</td>
</tr>
<tr>
<td>Clay</td>
<td>10</td>
<td>130</td>
</tr>
<tr>
<td>Dirty gravel</td>
<td>36</td>
<td>160</td>
</tr>
<tr>
<td>Gravel</td>
<td>17</td>
<td>183</td>
</tr>
<tr>
<td>Dirty gravel</td>
<td>7</td>
<td>190</td>
</tr>
<tr>
<td>Good gravel</td>
<td>23</td>
<td>213</td>
</tr>
<tr>
<td>Dirty gravel</td>
<td>16</td>
<td>229</td>
</tr>
</tbody>
</table>

*5N/1E-19P2. E. E. Allen. Altitude about 2,853 feet. Redrilled by J. S. Gobar in June 1951. 12-inch casing 0-80 feet, 7-inch casing 76-140 feet, perforated 40-80 feet.*

<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top soil</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Clay</td>
<td>97</td>
<td>100</td>
</tr>
<tr>
<td>Decomposed granitic sand and gravel</td>
<td>5</td>
<td>105</td>
</tr>
<tr>
<td>Clay</td>
<td>35</td>
<td>140</td>
</tr>
</tbody>
</table>

*5N/1E-20E1. Harvey Laschansky. Altitude about 2,855 feet. Drilled by J. S. Gobar in October 1951. 8-inch casing 0-51 feet, uncased hole 51-77 feet.*

<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top soil</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Clay</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Kaolin</td>
<td>10</td>
<td>16</td>
</tr>
<tr>
<td>Brown clay</td>
<td>20</td>
<td>36</td>
</tr>
<tr>
<td>Gray clay</td>
<td>16</td>
<td>52</td>
</tr>
<tr>
<td>Gray sandstone</td>
<td>8</td>
<td>60</td>
</tr>
<tr>
<td>Brown cemented sand</td>
<td>17</td>
<td>77</td>
</tr>
</tbody>
</table>
Table 3A


<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top soil</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Kaolin</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Gray clay</td>
<td>10</td>
<td>18</td>
</tr>
<tr>
<td>Brown clay</td>
<td>8</td>
<td>26</td>
</tr>
<tr>
<td>Gray clay</td>
<td>4</td>
<td>30</td>
</tr>
<tr>
<td>Sandy clay</td>
<td>10</td>
<td>40</td>
</tr>
<tr>
<td>Cemented sand</td>
<td>18</td>
<td>58</td>
</tr>
<tr>
<td>Clay and rocks</td>
<td>22</td>
<td>80</td>
</tr>
<tr>
<td>Cemented decomposed granitic sand</td>
<td>120</td>
<td>200</td>
</tr>
<tr>
<td>Good gravel</td>
<td>16</td>
<td>216</td>
</tr>
<tr>
<td>Brown sandy clay</td>
<td>16</td>
<td>232</td>
</tr>
<tr>
<td>Gravel</td>
<td>4</td>
<td>240</td>
</tr>
<tr>
<td>Sandy clay</td>
<td>4</td>
<td>240</td>
</tr>
<tr>
<td>Gravel</td>
<td>4</td>
<td>240</td>
</tr>
<tr>
<td>Sandy clay</td>
<td>4</td>
<td>240</td>
</tr>
<tr>
<td>Gravel</td>
<td>4</td>
<td>240</td>
</tr>
<tr>
<td>Cement</td>
<td>2</td>
<td>266</td>
</tr>
<tr>
<td>Gravel</td>
<td>2</td>
<td>266</td>
</tr>
<tr>
<td>Sand, clay, and cement</td>
<td>2</td>
<td>272</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kaolin</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Light brown clay</td>
<td>5</td>
<td>17</td>
</tr>
<tr>
<td>Dark brown clay</td>
<td>9</td>
<td>26</td>
</tr>
<tr>
<td>Kaolin</td>
<td>11</td>
<td>40</td>
</tr>
<tr>
<td>Brown clay</td>
<td>22</td>
<td>62</td>
</tr>
<tr>
<td>Sandstone</td>
<td>36</td>
<td>98</td>
</tr>
<tr>
<td>Black rocks</td>
<td>4</td>
<td>102</td>
</tr>
<tr>
<td>Decomposed granitic sand</td>
<td>8</td>
<td>110</td>
</tr>
<tr>
<td>Brown clay</td>
<td>61</td>
<td>174</td>
</tr>
<tr>
<td>Gravel</td>
<td>21</td>
<td>195</td>
</tr>
<tr>
<td>Gravel, 2-inch, water-bearing</td>
<td>10</td>
<td>205</td>
</tr>
<tr>
<td>Decomposed granitic sand</td>
<td>17</td>
<td>222</td>
</tr>
<tr>
<td>Cement</td>
<td>2</td>
<td>224</td>
</tr>
<tr>
<td>Gravel</td>
<td>32</td>
<td>256</td>
</tr>
<tr>
<td>Cement</td>
<td>12</td>
<td>268</td>
</tr>
<tr>
<td>Gravel, egg-size</td>
<td>8</td>
<td>276</td>
</tr>
<tr>
<td>Very good gravel, base-ball size</td>
<td>30</td>
<td>306</td>
</tr>
<tr>
<td>Gravel</td>
<td>6</td>
<td>312</td>
</tr>
<tr>
<td>Rocks in clay</td>
<td>8</td>
<td>320</td>
</tr>
</tbody>
</table>
Table 3A

**5N/1E-21R1. J. R. Baker. Altitude about 2,905 feet. Drilled by C. Steele in September 1952. 12-inch casing 0-298 feet, 10-inch casing 298-324 feet, perforated 80-324 feet.**

<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top soil</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Hard packed sand, gravel, clay</td>
<td>35</td>
<td>41</td>
</tr>
<tr>
<td>Ledge of hard clay</td>
<td>6</td>
<td>47</td>
</tr>
<tr>
<td>Soft sticky clay</td>
<td>34</td>
<td>81</td>
</tr>
<tr>
<td>Granulated kaolin, sand and water gravel</td>
<td>9</td>
<td>90</td>
</tr>
<tr>
<td>Hard packed clay, sand and gravel</td>
<td>38</td>
<td>128</td>
</tr>
<tr>
<td>Hard clay</td>
<td>5</td>
<td>133</td>
</tr>
<tr>
<td>Water and loose gravel, coarse sand</td>
<td>4</td>
<td>137</td>
</tr>
<tr>
<td>Hard packed clay, sand and gravel, cemented formation</td>
<td>35</td>
<td>172</td>
</tr>
<tr>
<td>Soft loose sand and gravel, some cobblestones, water-bearing</td>
<td>16</td>
<td>188</td>
</tr>
<tr>
<td>Hard ledge of gray clay</td>
<td>4</td>
<td>192</td>
</tr>
<tr>
<td>Fine sand, some pea gravel, water-bearing</td>
<td>18</td>
<td>210</td>
</tr>
<tr>
<td>Hard reddish clay</td>
<td>4</td>
<td>214</td>
</tr>
<tr>
<td>Cemented formation, as hard as concrete</td>
<td>18</td>
<td>232</td>
</tr>
<tr>
<td>Hard gray clay carrying sand and gravel</td>
<td>48</td>
<td>280</td>
</tr>
<tr>
<td>Cemented gray formation</td>
<td>4</td>
<td>284</td>
</tr>
<tr>
<td>Red clay carrying sand and gravel</td>
<td>24</td>
<td>308</td>
</tr>
<tr>
<td>Loose sand and gravel carrying water; sand brown and very</td>
<td>12</td>
<td>320</td>
</tr>
<tr>
<td>fine</td>
<td>4</td>
<td>324</td>
</tr>
<tr>
<td>Cemented formation, very hard</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**5N/1E-22Q1. Herbert J. Baumchen. Altitude about 2,930 feet. Drilled by F. D. McDougall in March 1950. 12-inch casing, perforated 110-163 feet.**

<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loose sandy clay and top soil</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Hard dry rib of sandy clay</td>
<td>2</td>
<td>11</td>
</tr>
<tr>
<td>Hard and soft ribs of brown sandy clay</td>
<td>66</td>
<td>77</td>
</tr>
<tr>
<td>Very hard formation of rocky clay</td>
<td>13</td>
<td>90</td>
</tr>
<tr>
<td>Fine water sand</td>
<td>6</td>
<td>96</td>
</tr>
<tr>
<td>Light brown clay</td>
<td>1</td>
<td>97</td>
</tr>
<tr>
<td>Cement reef of different kinds of rock</td>
<td>2</td>
<td>99</td>
</tr>
<tr>
<td>Light brown clay</td>
<td>11</td>
<td>110</td>
</tr>
<tr>
<td>Fine water sand</td>
<td>11</td>
<td>116</td>
</tr>
<tr>
<td>Coarse water sand, small gravel and rock</td>
<td>7</td>
<td>123</td>
</tr>
<tr>
<td>Brown sandy clay</td>
<td>4</td>
<td>127</td>
</tr>
<tr>
<td>Ribs of brown sand and water sand</td>
<td>8</td>
<td>135</td>
</tr>
<tr>
<td>Brown sandy clay</td>
<td>28</td>
<td>163</td>
</tr>
</tbody>
</table>
Table 3A


<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top soil</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Light brown sandy clay</td>
<td>75</td>
<td>78</td>
</tr>
<tr>
<td>Coarse sand, small gravel</td>
<td>18</td>
<td>96</td>
</tr>
<tr>
<td>Tight clay</td>
<td>6</td>
<td>102</td>
</tr>
<tr>
<td>Sand and gravel</td>
<td>8</td>
<td>110</td>
</tr>
<tr>
<td>Small gravel</td>
<td>10</td>
<td>120</td>
</tr>
<tr>
<td>Clay and cement reefs</td>
<td>26</td>
<td>114</td>
</tr>
<tr>
<td>Sand and gravel</td>
<td>6</td>
<td>152</td>
</tr>
<tr>
<td>Brown sandy clay</td>
<td>2</td>
<td>154</td>
</tr>
<tr>
<td>Sand and gravel</td>
<td>7.5</td>
<td>161.5</td>
</tr>
<tr>
<td>Sand and gravel with clay ribs</td>
<td>26.5</td>
<td>188</td>
</tr>
<tr>
<td>Brown clay</td>
<td>7</td>
<td>195</td>
</tr>
</tbody>
</table>

5N/1E-29K1. R. R. Walton. Altitude about 2,865 feet. Drilled by J. S. Gober in November 1950. 9-inch casing 0-5 feet, uncased hole 5-102 feet.

<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blow sand</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Silt</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>White kaolin</td>
<td>15</td>
<td>23</td>
</tr>
<tr>
<td>Light blue kaolin</td>
<td>3</td>
<td>26</td>
</tr>
<tr>
<td>Brown clay</td>
<td>18</td>
<td>114</td>
</tr>
<tr>
<td>Sandstone</td>
<td>12</td>
<td>56</td>
</tr>
<tr>
<td>Gray clay</td>
<td>11</td>
<td>67</td>
</tr>
<tr>
<td>Sandstone</td>
<td>15</td>
<td>82</td>
</tr>
<tr>
<td>Brown clay</td>
<td>10</td>
<td>92</td>
</tr>
<tr>
<td>Sandstone</td>
<td>10</td>
<td>102</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Old well, no data available</td>
<td>54</td>
<td>54</td>
</tr>
<tr>
<td>Grey clay</td>
<td>3</td>
<td>57</td>
</tr>
<tr>
<td>Brown clay, very sticky</td>
<td>29</td>
<td>86</td>
</tr>
<tr>
<td>Sandy clay</td>
<td>6</td>
<td>92</td>
</tr>
<tr>
<td>Rocky, sandy clay with black rocks</td>
<td>15</td>
<td>107</td>
</tr>
<tr>
<td>Hard red clay with rocks</td>
<td>9</td>
<td>116</td>
</tr>
<tr>
<td>Decomposed granitic sand</td>
<td>66</td>
<td>182</td>
</tr>
<tr>
<td>Sandstone</td>
<td>18</td>
<td>200</td>
</tr>
<tr>
<td>Gravel</td>
<td>6</td>
<td>206</td>
</tr>
<tr>
<td>Decomposed granitic sand</td>
<td>20</td>
<td>226</td>
</tr>
<tr>
<td>Brown clay with gravel</td>
<td>44</td>
<td>270</td>
</tr>
<tr>
<td>Gravel</td>
<td>6</td>
<td>276</td>
</tr>
</tbody>
</table>
### Table 3A

<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>dirty sand</td>
<td>5</td>
<td>281</td>
</tr>
<tr>
<td>hard cement</td>
<td>6</td>
<td>287</td>
</tr>
<tr>
<td>decomposed granitic soil</td>
<td>3</td>
<td>290</td>
</tr>
<tr>
<td>sand gravel</td>
<td>8</td>
<td>298</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>top soil</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>clay</td>
<td>20</td>
<td>22</td>
</tr>
<tr>
<td>aolin</td>
<td>2½</td>
<td>46</td>
</tr>
<tr>
<td>brown clay</td>
<td>35</td>
<td>81</td>
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<tr>
<td>white clay</td>
<td>13</td>
<td>94</td>
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<tr>
<td>gray clay</td>
<td>13</td>
<td>107</td>
</tr>
<tr>
<td>sticky brown clay</td>
<td>8</td>
<td>115</td>
</tr>
<tr>
<td>sandy brown clay</td>
<td>8</td>
<td>123</td>
</tr>
<tr>
<td>light brown gritty clay</td>
<td>15</td>
<td>138</td>
</tr>
<tr>
<td>brown cement</td>
<td>6</td>
<td>134</td>
</tr>
<tr>
<td>decomposed granitic sand</td>
<td>20</td>
<td>164</td>
</tr>
<tr>
<td>coarse decomposed granitic sand</td>
<td>4</td>
<td>168</td>
</tr>
<tr>
<td>decomposed granitic sand</td>
<td>20</td>
<td>188</td>
</tr>
<tr>
<td>sand, water gravel</td>
<td>23</td>
<td>211</td>
</tr>
<tr>
<td>decomposed granitic sand</td>
<td>3</td>
<td>214</td>
</tr>
<tr>
<td>gravel</td>
<td>3</td>
<td>217</td>
</tr>
<tr>
<td>decomposed granite</td>
<td>50</td>
<td>267</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>oil</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>aolin</td>
<td>29</td>
<td>31</td>
</tr>
<tr>
<td>brown sandstone and clay</td>
<td>9</td>
<td>40</td>
</tr>
</tbody>
</table>
Table 3A

5N/1E-32KL. Mark H. Hitchcock. Altitude about 2,875 feet. Drilled by F. D. McDougall in March 1949. 8-inch casing(?), perforated 18-65 feet.

<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light gray sand</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>Light brown sandy clay</td>
<td>18</td>
<td>36</td>
</tr>
<tr>
<td>Light gray clay</td>
<td>21</td>
<td>57</td>
</tr>
<tr>
<td>Water sand and gravel</td>
<td>6</td>
<td>63</td>
</tr>
<tr>
<td>Light brown sandy clay</td>
<td>2</td>
<td>65</td>
</tr>
</tbody>
</table>

5N/1E-32RL. Dan Boom. Altitude about 2,885 feet. 12-inch casing 0-396 feet.

<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clay</td>
<td>1/6</td>
<td>46</td>
</tr>
<tr>
<td>Fine gravel</td>
<td>1</td>
<td>47</td>
</tr>
<tr>
<td>Clay</td>
<td>87</td>
<td>134</td>
</tr>
<tr>
<td>Cemented sand</td>
<td>5</td>
<td>139</td>
</tr>
<tr>
<td>Gravel</td>
<td>5</td>
<td>144</td>
</tr>
<tr>
<td>Clay, red</td>
<td>86</td>
<td>230</td>
</tr>
<tr>
<td>Clay, white</td>
<td>1</td>
<td>231</td>
</tr>
<tr>
<td>Clay, red</td>
<td>9</td>
<td>240</td>
</tr>
<tr>
<td>Clay and gravel</td>
<td>5</td>
<td>245</td>
</tr>
<tr>
<td>Fine gravel</td>
<td>5</td>
<td>250</td>
</tr>
<tr>
<td>Clay, red</td>
<td>31</td>
<td>281</td>
</tr>
<tr>
<td>Sand and gravel</td>
<td>7</td>
<td>288</td>
</tr>
<tr>
<td>Sand and gravel with clay</td>
<td>7</td>
<td>295</td>
</tr>
<tr>
<td>Clay, red</td>
<td>1/2</td>
<td>337</td>
</tr>
<tr>
<td>Rock and clay</td>
<td>2</td>
<td>339</td>
</tr>
<tr>
<td>Clay</td>
<td>11</td>
<td>350</td>
</tr>
<tr>
<td>Cemented clay</td>
<td>15</td>
<td>365</td>
</tr>
<tr>
<td>Rock and clay</td>
<td>2</td>
<td>367</td>
</tr>
<tr>
<td>Cemented rock</td>
<td>29</td>
<td>395</td>
</tr>
<tr>
<td>Limo rock</td>
<td>19</td>
<td>415</td>
</tr>
<tr>
<td>Decomposed granite</td>
<td>12</td>
<td>427</td>
</tr>
<tr>
<td>Granite</td>
<td>30</td>
<td>457</td>
</tr>
</tbody>
</table>

5N/1E-35FL. Norman Metcalf. Altitude about 2,960 feet. Drilled by F. D. McDougall in July 1950. 8-inch casing 0-141 feet, perforated 141-136 feet.

<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Kaolin</td>
<td>8</td>
<td>11</td>
</tr>
<tr>
<td>Sandy clay with hard clay ribs</td>
<td>81</td>
<td>92</td>
</tr>
<tr>
<td>Loose dry sand</td>
<td>6</td>
<td>98</td>
</tr>
<tr>
<td>Sandy clay</td>
<td>14</td>
<td>112</td>
</tr>
<tr>
<td>Water sand</td>
<td>4</td>
<td>116</td>
</tr>
<tr>
<td>Sand with clay ribs</td>
<td>24</td>
<td>140</td>
</tr>
<tr>
<td>Hard dry clay</td>
<td>10</td>
<td>150</td>
</tr>
</tbody>
</table>
**Table 3A**

<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decomposed granitic sand</td>
<td>50</td>
<td>50</td>
</tr>
</tbody>
</table>

**5N/W-21HD1.** Harry Blanch. Altitude about 2,855 feet. Drilled by J. S. Gobar in September 1929. 10-inch casing 0-7 feet.

| Top soil                              | 4                | 4            |
| Kaolin and clay                       | 38               | 42           |
| White clay                            | 5                | 43           |
| Cement                                | 5                | 52           |
| Gray clay                             | 28               | 80           |
| White clay                            | 4                | 81           |
| Cement                                | 26               | 110          |
| Hard clay                             | 48               | 158          |
| Cement                                | 14               | 166          |
| Clay                                  | 10               | 176          |
| Cement                                | 7                | 183          |
| Sandy clay                            | 7                | 190          |


| Top soil                              | 8                | 8            |
| Clay and scattered lime               | 12               | 20           |
| Yellow clay                           | 60               | 100          |
| Yellow clay                           | 28               | 128          |
| Yellow and green clay                 | 23               | 152          |
| Yellow clay and scattered gravel      | 8                | 160          |
| Brown gravel, 1/2-inch to 3-inches    | 42               | 202          |

**5N/W-25C1.** Guthro. Altitude about 2,850 feet. Drilled by M. R. Peck in November 1951. 16-inch casing, perforated 164-200 feet.

| Top soil                              | 8                | 8            |
| Brown clay                            | 12               | 20           |
| Brown clay and scattered lime         | 60               | 100          |
| Yellow clay                           | 28               | 128          |
| Yellow and green clay                 | 22               | 150          |
| Brown gravel, 1/2-inch to 1-inch      | 52               | 208          |

**5N/W-25HL.** W. M. Schildmeyer. Altitude about 2,851 feet. Drilled by M. R. Peck in October 1951. 16-inch casing, perforated 164-204 feet.

<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top soil</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>White sand</td>
<td>45</td>
<td>50</td>
</tr>
<tr>
<td>White shale</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>Brown shale</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>Brown sandy shale</td>
<td>100</td>
<td>240</td>
</tr>
<tr>
<td>Water sand with streaks of shale</td>
<td>120</td>
<td>360</td>
</tr>
<tr>
<td>Brown shale</td>
<td>40</td>
<td>400</td>
</tr>
<tr>
<td>Brown sandy shale</td>
<td>20</td>
<td>420</td>
</tr>
<tr>
<td>Water gravel and white shale</td>
<td>48</td>
<td>468</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adobe shale</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Brown shale</td>
<td>40</td>
<td>60</td>
</tr>
<tr>
<td>Water sand</td>
<td>10</td>
<td>70</td>
</tr>
<tr>
<td>Brown shale and boulders</td>
<td>130</td>
<td>200</td>
</tr>
<tr>
<td>Water gravel</td>
<td>200</td>
<td>400</td>
</tr>
<tr>
<td>Rock set in shale</td>
<td>68</td>
<td>468</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Old will, no data</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td>Sand</td>
<td>6</td>
<td>206</td>
</tr>
<tr>
<td>Rocks, gravel and sand, very hard, water-bearing</td>
<td>28</td>
<td>234</td>
</tr>
</tbody>
</table>
### Table 3A

#### Part 2.- Fry and Johnson Valleys


<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top soil</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Rocks and kaolin</td>
<td>23</td>
<td>25</td>
</tr>
<tr>
<td>Rocks and hard green cement</td>
<td>20</td>
<td>45</td>
</tr>
<tr>
<td>Rocks with cement</td>
<td>25</td>
<td>70</td>
</tr>
<tr>
<td>Kaolin</td>
<td>4</td>
<td>74</td>
</tr>
<tr>
<td>Cemented rocks</td>
<td>15</td>
<td>113</td>
</tr>
<tr>
<td>Cement</td>
<td>10</td>
<td>84</td>
</tr>
<tr>
<td>Cemented rocks</td>
<td>9</td>
<td>98</td>
</tr>
<tr>
<td>Sandy formation</td>
<td>15</td>
<td>113</td>
</tr>
<tr>
<td>Cement</td>
<td>7</td>
<td>120</td>
</tr>
<tr>
<td>Conglomerate sand</td>
<td>86</td>
<td>206</td>
</tr>
<tr>
<td>Cement gravel</td>
<td>6</td>
<td>212</td>
</tr>
<tr>
<td>Sand and muck</td>
<td>12</td>
<td>226</td>
</tr>
<tr>
<td>Light brown clay</td>
<td>19</td>
<td>212</td>
</tr>
<tr>
<td>Brown sand in clay</td>
<td>12</td>
<td>288</td>
</tr>
<tr>
<td>Cement</td>
<td>12</td>
<td>300</td>
</tr>
</tbody>
</table>

---

**3N/3E-23G1. Maurice A. Donahue.** Altitude about 2,850 feet. Drilled by C. Stoclo in October 1950. 10-inch casing, perforated 76-150 feet.

<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sandy loam, top soil</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Hard adobe clay</td>
<td>3.5</td>
<td>5</td>
</tr>
<tr>
<td>Dune sand</td>
<td>18</td>
<td>23</td>
</tr>
<tr>
<td>Hard brown clay</td>
<td>49</td>
<td>72</td>
</tr>
<tr>
<td>Hard rock-like kaolin</td>
<td>6</td>
<td>78</td>
</tr>
<tr>
<td>Granulated gravel and coarse sand, water-bearing</td>
<td>4</td>
<td>82</td>
</tr>
<tr>
<td>Red cemented formation, coarse gravel, sand, very little clay</td>
<td>22</td>
<td>108</td>
</tr>
<tr>
<td>Loose coarse gravel, coarse sand, water-bearing</td>
<td>3</td>
<td>107</td>
</tr>
<tr>
<td>Red cemented coarse gravel and sand, a little clay</td>
<td>41</td>
<td>118</td>
</tr>
<tr>
<td>Water-bearing pea gravel, coarse sand</td>
<td>3</td>
<td>151</td>
</tr>
<tr>
<td>Brown hard clay</td>
<td>3</td>
<td>154</td>
</tr>
</tbody>
</table>
Clarence Roath. Altitude about 2,775 feet. Drilled by C. Stoolc in September 1952. 8-inch casing, perforated 24-56 and 81-85 feet.

<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness (feet)</th>
<th>Depth (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sandy top soil</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Clay</td>
<td>4.5</td>
<td>7</td>
</tr>
<tr>
<td>Blow sand, very fine</td>
<td>13</td>
<td>20</td>
</tr>
<tr>
<td>Clay</td>
<td>9</td>
<td>29</td>
</tr>
<tr>
<td>Coarse sand, some gravel and cobblestones</td>
<td>6</td>
<td>35</td>
</tr>
<tr>
<td>Very hard adobe clay</td>
<td>12</td>
<td>47</td>
</tr>
<tr>
<td>Water-bearing coarse sand and peo gravel</td>
<td>4</td>
<td>51</td>
</tr>
<tr>
<td>Gray clay</td>
<td>3</td>
<td>54</td>
</tr>
<tr>
<td>Very hard greenish clay, carrying coarse sand and gravel</td>
<td>7</td>
<td>61</td>
</tr>
<tr>
<td>Very hard sandstone</td>
<td>21</td>
<td>82</td>
</tr>
<tr>
<td>Water-bearing coarse sand and gravel</td>
<td>3</td>
<td>85</td>
</tr>
<tr>
<td>Very hard clay</td>
<td>1</td>
<td>86</td>
</tr>
</tbody>
</table>
Table 4A. - Chemical analyses of water from wells

Constituents: Where the value for sodium is preceded by the letter a it indicates sodium and potassium expressed as sodium. The value for dissolved solids is the analytically determined value reported by the laboratory. The sum of determined constituents is the sum of the tabulated constituents minus 50.6 percent of the bicarbonate. Because all of the commonly occurring major constituents (except silica in many of the analyses) were analytically determined, the values for dissolved solids and sum of determined constituents should be approximately the same. Where there is a pronounced difference in the values an error in the analytical determination of dissolved solids is indicated. All values have been rounded where necessary to conform to the standards of the Geological Survey, Quality of Water Branch.

Point of collection: B, bailed from well; D, collected from discharge pipe while well was flowing or being pumped; S, collected from storage facility at an active well which was not necessarily being pumped at the time sample was collected.

Analyzing laboratory: CAH, C. A. Hoag Testing Laboratory; DA, U. S. Department of Agriculture, Rubidoux Laboratory, Riverside, California; DWR, State of California, Department of Public Works, Division of Water Resources; GS, U. S. Geological Survey (from Water-Supply Paper 578); SEC, San Bernardino County Flood Control District.
# Part 1. Lucerne Valley

## Constituents (parts per million)

<table>
<thead>
<tr>
<th>Constituent</th>
<th>3N/1E-3F1</th>
<th>4N/1E-1R2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silica (SiO₂)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Iron (Fe)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Calcium (Ca)</td>
<td>43</td>
<td>29</td>
</tr>
<tr>
<td>Magnesium (Mg)</td>
<td>21</td>
<td>2.2</td>
</tr>
<tr>
<td>Sodium (Na)</td>
<td>18</td>
<td>202</td>
</tr>
<tr>
<td>Potassium (K)</td>
<td>1.7</td>
<td>4.9</td>
</tr>
<tr>
<td>Carbonate (CO₃⁻)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Bicarbonate (HCO₃⁻)</td>
<td>23.4</td>
<td>131</td>
</tr>
<tr>
<td>Sulfate (SO₄²⁻)</td>
<td>21</td>
<td>2.40</td>
</tr>
<tr>
<td>Chloride (Cl⁻)</td>
<td>7</td>
<td>100</td>
</tr>
<tr>
<td>Nitrate (NO₃⁻)</td>
<td>4.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Fluoride (F⁻)</td>
<td>0.8</td>
<td>4.0</td>
</tr>
<tr>
<td>Boron (B)</td>
<td>0.02</td>
<td>1.2</td>
</tr>
<tr>
<td>Dissolved solids (Dis. sol.)</td>
<td>24.5</td>
<td>695</td>
</tr>
<tr>
<td>Sum of determined constituents (Sum)</td>
<td>232</td>
<td>651</td>
</tr>
<tr>
<td>Hardness calculated as CaCO₃ (Hardness)</td>
<td>19.4</td>
<td>82</td>
</tr>
</tbody>
</table>

## Additional Information

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value 1</th>
<th>Value 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent sodium (% Na)</td>
<td>17</td>
<td>84</td>
</tr>
<tr>
<td>Specific conductance (Sp C)</td>
<td>398</td>
<td>1,120</td>
</tr>
<tr>
<td>pH</td>
<td>7.6</td>
<td>7.6</td>
</tr>
<tr>
<td>Temperature of water when sampled (°F)</td>
<td>68</td>
<td>77</td>
</tr>
<tr>
<td>Point of collection (P C)</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>Date collected (Date)</td>
<td>3-10-55</td>
<td>5-9-54</td>
</tr>
<tr>
<td>Analyzing laboratory (Lab.)</td>
<td>DWR</td>
<td>DWR</td>
</tr>
<tr>
<td>Laboratory number (Lab. No.)</td>
<td>5422</td>
<td>P-659</td>
</tr>
<tr>
<td>Depth of well, in feet (Depth)</td>
<td>47</td>
<td>286</td>
</tr>
</tbody>
</table>
### Part 1. - Lucerne Valley—Continued

<table>
<thead>
<tr>
<th>Well number</th>
<th>LN/1E-1R2</th>
<th>LN/1E-2E1</th>
<th>LN/1E-3Q1</th>
<th>LN/1E-5Q1</th>
</tr>
</thead>
<tbody>
<tr>
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| % Na | 84 | 36 | 24 | 32 |
| Sp C | 1,130 | 690 | 1,010 | 364 |
| pH | 8.1 | 7.8 | 7.8 | 7.9 |
| GP | - | - | - | - |

| P C | S | D | - | D |
| Date | 3-10-55 | 2-28-52 | 3-17-52 | 2-28-52 |
| Lab. | DWR | SEC | SEC | SEC |
| Lab. No. | 5438 | 2024 | 2042 | 2023 |
| Depth | 286 | 100 | 135+ | - |
### Table 1A

#### Part 1.— Lucerne Valley—Continued

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### Other Values

| % Na | 21 | 27 | 27 | - | 24 |
| Sp C | 623 | 503 | 1h61 | - | 528 |
| pH  | 8.3 | 7.4 | 7.7 | - | 7.4 |
| CF  | - | 70 | 65 | - | 69 |

| PC | D | D | D | - | D |
| Date 9-17-53 | 5-9-54 | 3-9-55 | 8-12-16 | 5-9-54 |
| Lab. SBC | DWR | DWR | GS | DWR |
| Lab. No. | 2h25 | P-662 | 5h23 | - | P-661 |
| Depth | 300 | 360 | 120 | - | 227 |
### Table 4A

#### Part 1: Lucorne Valley—Continued

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### Table 4A

#### Part 1 - Lucern Valley--Continued

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<th>l(\text{N}/2\text{E}-17\text{H1} )</th>
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#### Constituents (parts per million)

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<th>l(\text{N}/2\text{E}-17\text{H1} )</th>
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<th>l(\text{N}/1\text{W}-1\text{E1} )</th>
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- **SiO\(_2\)**
- **Fe**
- **Ca**
- **Mg**
- **Na**
- **K**
- **CO\(_3\)**
- **HCO\(_3\)**
- **SO\(_4\)**
- **Cl**
- **NO\(_3\)**
- **F**
- **B**
- **Dis. sol.**
- **Sum**
- **Hardness**

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<th>l(\text{N}/1\text{W}-1\text{E1} )</th>
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- **% Na**
- **Sp C**
- **pH**
- **b\(_{\text{F}}\)**

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<th>l(\text{N}/2\text{E}-17\text{H1} )</th>
<th>l(\text{N}/2\text{E}-17\text{H1} )</th>
<th>l(\text{N}/1\text{W}-1\text{E1} )</th>
<th>l(\text{N}/1\text{W}-1\text{E1} )</th>
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- **P C**
- **Date**
- **Lab.**
- **Lab. No.**
- **Depth**

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<th>l(\text{N}/1\text{W}-1\text{E1} )</th>
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</table>

## Additional Notes

1. **SiO\(_2\)**: Silicon dioxide
2. **Fe**: Iron
3. **Ca**: Calcium
4. **Mg**: Magnesium
5. **Na**: Sodium
6. **K**: Potassium
7. **CO\(_3\)**: Carbonate
8. **HCO\(_3\)**: Bicarbonate
9. **SO\(_4\)**: Sulfate
10. **Cl**: Chloride
11. **NO\(_3\)**: Nitrate
12. **F**: Fluoride
13. **B**: Boron
14. **Dis. sol.**: Dissolved solids
15. **Sum**: Sum of constituents
16. **Hardness**: Water hardness
17. **% Na**: Percent sodium
18. **Sp C**: Specific conductance
19. **pH**: Acid-base balance
20. **b\(_{\text{F}}\)**: Dissolved oxygen
21. **P C**: Project code
22. **Date**: Date of sampling
23. **Lab.**: Laboratory code
24. **Lab. No.**: Laboratory number
25. **Depth**: Depth of sampling

---

1. Lucern Valley: A geographical area.
2. L\(\text{N}/2\text{E}-7\text{N2} \): Well or sample number.
3. L\(\text{N}/2\text{E}-17\text{H1} \): Well or sample number.
4. L\(\text{N}/1\text{W}-1\text{E1} \): Well or sample number.
5. L\(\text{N}/1\text{W}-1\text{E1} \): Well or sample number.
6. **Table 4A** appears to be part of a larger dataset or report, possibly in geology or hydrogeology, providing detailed analysis of water composition and characteristics from different well locations.
7. **Constituents** are elements or substances measured in water, which can include major ions (e.g., sodium, calcium), trace elements (e.g., iron, manganese), and other contributors to water's composition.
8. **% Na** indicates the percentage of sodium in the sample.
9. **Sp C** (specific conductance) is a measure of the water's ability to conduct electricity, which is often related to the number of dissolved ions.
10. **pH** is a measurement of water's acidity or alkalinity.
11. **b\(_{\text{F}}\)** (dissolved oxygen) is crucial for understanding aquatic life and water quality.
12. **P C** codes are likely identifiers for different projects or studies.
13. **Date** and **Lab.** information might be used to trace data collection and analysis.
14. **Depth** indicates the depth at which the sample or data was collected.

---

*Note: The table includes detailed chemical and physical properties of water samples from different locations, providing insights into water quality and potential issues such as hardness and pH balance.*
# Part 1. - Lucerne Valley—Continued

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| % Na                              | 32        | 26        | 29        | 52        | 57        |
| Sp C                              | 330       | 500       | 515       | 2,520     | 571       |
| pH                                | 7.9       | 7.8       | 8.3       | 7.9       | 8.2       |
| O₂                                | 60        | 80        | 72        | 65        | 73        |
| P C                               | D         | b         | D         | D         | D         |
| Date                              | 4-7-52    | 8-13-54   | 3-9-55    | 5-9-54    | 6-22-52   |
| Lab.                             | DWR       | DWR       | DWR       | DWR       | DA        |
| Lab. No.                          | 1715      | 1597      | 5532      | P-697     | 6393      |
| Depth                            | 404       | 404       | 404       | 59        | 778       |

b. Pumped for many hours before sampling.
Part 1.- Lucerne Valley--Continued

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| p'f | 7.5 | 8.2 | 7.9 | 7.7 | 7.5 |
| 6F | 65 | - | - | 69 | - |
| P C | cD | D | S | D | - |
| Date | 2-28-52 | 6-22-32 | 2-28-52 | 3-9-55 | - |
| Lab. | SBC | DA | SBC | DWR | - |
| Lab. No. | 2025 | 6394 | 2013 | R-570 | - |
| Depth | 773 | - | 93 | 78 | 120 |

c. Pumped for 5 minutes before sampling.
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### Additional Information

- Pumped for many hours before sampling.

### Table 4B

#### Part 1: Lucerne Valley--Continued

| % Na | 24 | 26 | 16 | 20 |
| Sp C | 393 | 383 | 370 | 395 |
| pH   | 8.0 | 8.3 | 7.9 | 8.1 |
| Sp F | 60 | 72 |  |

#### Table 4C

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| Depth | 219 | 84 | 129.4 | 324 | 159 |

| % Na  | 13  | 17  | 13  | 58  | 25  |
| Sp C  | 370 | 400 | 391 | 359 | 400 |
| pH    | 7.7 | 7.7 | 8.0 | 7.9 | 7.8 |
| GP    | -   | 70  | -   | -   | 68  |

| P C  | -   | 5   | -   | -   | -   |
| Date | 3-28-52 | 10-23-52 | 3-9-55 | 12-10-53 | 10-23-52 |
| Lab. | SEC | DWR | DWR | SEC | DWR |
| Lab. No. | 2070 | 2446 | R-573 | 2939 | 2447 |

Table 1A
### Table 4A

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\[ d. \text{Sampled from bailer during drilling.}\]
Table 1A

Part 1. - Lucerne Valley--Continued

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c. Pumped for 5 minutes before sampling.
### Part 1. - Lucerne Valley—Continued

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| pH | 7.2 | 7.5 | 7.6 | 7.4 | 7.6 |
| op | 68 | 68 | - | 70 | 68 |
| P C | D | D | D | - | D |
| Date | 5-8-54 | 3-10-55 | 2-28-52 | 10-23-52 | 3-10-55 |
| Lab. | DWR | DMR | SBC | DWR | DWR |
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| % Na      | 81         | 83         | 31        | 26         | 25         |
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| pH        | 7.5        | 7.3        | 8.1       | 7.7        | 7.4        |
| OF        | 72         | -          | -         | -          | 70         |
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| Date      | 5-9-54     | 3-10-55    | 1-5-54    | 7-31-53    | 5-9-54     |
| Lab.      | LWR        | DMR        | SBC       | DBC        | DMR        |
| Lab. No.  | P-684      | 5420       | 3136      | 2782       | P-682      |
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Part 1.- Lucerne Valley—Continued

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b. Pumped for many hours before sampling.
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b. Pumped for many hours before sampling.

c. Pumped for 5 minutes before sampling.
### Well number

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| % Na                            | 1.1  | 3.1 | 33  | 37  | 37  |    |     |      |     |     |     |    |    |           |     |           |
| Sp C                            | 457  | 485 | 494 | 456 | 550 |    |     |      |     |     |     |    |    |           |     |           |
| pH                              | 7.6  | 8.3 | 7.9 | 7.8 | 7.7 |    |     |      |     |     |     |    |    |           |     |           |
| Temp                            |      |     |     |     |     | 68 | 72  | 72   |     |     |     |    |    |           |     |           |
| Date                            | 5-9-51 | 7-8-51 | 3-10-55 | 2-28-52 | 2-28-52 | 526 |     |     |     |     |     |    |    |           |     |           |
| Lab.                            | DWR  | SBC | DWR | SBC | SBC |    |     |      |     |     |     |    |    |           |     |           |
| Lab. No.                        | P-679 | 3199 | 5433 | 2016 | 2017 |    |     |      |     |     |     |    |    |           |     |           |
| Depth                           | 200  | 200 | 200 | 135 | 150 |    |     |      |     |     |     |    |    |           |     |           |

- c. Pumped for 5 minutes before sampling.
## Table 1A

### Part 1.- Lucerne Valley—Continued

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| % Na        | 42                              | 37          | 40          |             |
| Sp C        | 129                             | 690         | 647         |             |
| pH          | 7.9                             | 7.9         | 8.3         |             |
| °F          | -                               | -           | -           |             |
| P C         | D                               | -           | -           |             |
| Date        | 2-28-52                         | 4-17-52     | 4-17-52     |             |
| Lab.        | SBC                             | SBC         | SBC         |             |
| Lab. No.    | 2015                            | 2148        | 2149        |             |
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e. NH₃ = 14ppm
Poorly sorted fenglomere and unsaturated mudstone breccia, consisting of boulders, gravel, sand, and silt, underlies fans, aprons, and fills in reentrants saturated poorly to moderately with water.

Commonly-occurring玩松ite and tuff rock, sausages, and earthy, unconsolidated continental deposits, comprising sand, silt, fine sand, silt, clay, and a few gravelly strata, post-dated by some dooms, but not readily recognizable in mollusks, probably poorly water yielding.

Bason diatremes and flanks, scoria, and local deposits of chestnut not lapped by metas, but yields material freely at Old Hooatan Spring.

Gneissic, monzonite, granite, and melamorphic rocks, principally granites, are exposed in the mountains of the area and underlie the unconsolidated deposits in the valleys. Generally non-metal-bearing, but locally yields small to moderate quantities of material at springs.

Faults that have broken the alluvial deposits usually act as partial barriers to ground-water movement.

Explanations: Dashed where approximately located, dotted where concealed, questioned where doubtful.