# PUBLIC WATER SUPPLIES IN SOUTHERN TEXAS

By

W. L. Broadhurst, R. W. Sundstrom and J. H. Rowley

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## INTRODUCTION

### Extent of region and scope of report

This is the second in a series of reports giving summarized descriptions of the public water supplies throughout the State. The first report covering 77 counties in Eastern Texas was released in two volumes by the Texas State Board of Water Engineers in February 1945.

The region covered by this report includes the 42 counties extending from the Rio Grande northward and northeastward to the northern boundaries of Kinney, Uvalde, Bandera, Kendall, and Hays Counties and the northeastern boundaries of Caldwell, Gonzales, Dewitt, Victoria, and Calhoun Counties (see map). It comprises 43,897 square miles and in 1940 had a population of 1,147,340.

The cities and towns in this region that have public water-supply systems had a population of 668,000 in 1940. The amount of water used by them averages about 95,000,000 gallons a day, of which about 55,000,000 gallons is obtained from ground water and about 40,000,000 gallons from surface water. Ground water is used by 79 of these communities and surface water by 31.

The need for certain basic data in the studies of quantitative and qualitative problems of public water supplies has long been apparent. This is especially true in Texas where, in recent years, there has been an enormous increase in the demands for water for public and industrial uses. The phenomenal growth of many Texas cities has resulted in the need from time to time for expanding or rebuilding the waterworks systems. Most of the communities throughout the State originally used ground water, and most of them still do. Some still use the original source of supply, some have developed additional sources of ground water, and others have changed from inadequate supplies of ground water to surface water.

The available information for each community is given in condensed form as follows: population in 1940; name of official from whom the information was obtained; ownership of waterworks, whether private or municipal; source of supply, whether ground water or surface water; the amount of water consumed; the facilities for storage; the number of customers served; the character of the chemical and sanitary treatment of the water; and chemical analyses of the water. Where ground water is used the following is also given: records of wells, including depth, diameter, and drillers logs; character of pumping equipment; yield of the wells; records of water levels, if available; and temperature of the water. Unfortunately many communities have kept very poor records, or no records at all, regarding the amount of ground water pumped and the resulting decline of water level or artesian pressure

in the wells since they were drilled, and for such localities the information given is necessarily incomplete. The availability of this information is vitally important, particularly in areas where the withdrawals from underground supplies are approaching the limits of safety or where enormous increases in withdrawals are anticipated.

## Acknowledgments

Grateful acknowledgment is made to the well drillers, city officials, and others who furnished most of the descriptive material that is given for each public supply. The investigation was made possible through the cooperation of the Geological Survey, United States Department of the Interior, and the Texas State Board of Water Engineers. The greater part of the field work was done and most of this report was prepared by W. L. Broadhurst and R. W. Sundstrom of the Geological Survey, under the direction of W. N. White, district engineer in charge of the groundwater investigations in Texas. Most of the analyses of water were made in the laboratory of the Geological Survey at Austin, and the section on chemical character of water was prepared by Mrs. J. H. Rowley under the direction of W. W. Hastings, district chemist in charge of the laboratory.

## GROUND WATER

The scope of this report does not permit a discussion of the more complex details of the occurrence of ground water in each locality, and the following statements are brief and general. In several parts of the region, however, detailed studies of the geology and groundwater resources have been made and reports have been issued. The reader is referred to the bibliography on pages 13 to 14 for a list of such reports.

The extreme northern part of the region lies on the Edwards Plateau, and the remainder lies within the Gulf Coastal Plain. The rocks that crop out in the region are mostly sedimentary and consist chiefly of limestones, shales, clays, sandstones, sands, and gravels. They range in geologic age from Lower Cretaceous to Quaternary. Igneous rocks are exposed in a few localities along the Balcones fault zone which extends from Uvalde County eastward and northeastward through Medina, Bexar, Comal, and Hays Counties, but these rocks are not known to yield water.

The general geologic structure of the region is comparatively simple. The most prominent features are the regional gulfward dip of the formations at an angle greater than the slope of the land surface, which is a significant factor governing the occurrence of artesian water, and faulting along the Balcones fault zone which controls the occurrence and movement of ground water in the Edwards and associated limestones.

Among the most important aquifers are the following: the Edwards limestone of Lower Cretaceous age; the Carrizo sand, sands of the Mount Selman formation, the Oakville sandstone, and the Goliad sand of Tertiary age; and the Lissie formation and sands of the Beaumont clay of Quaternary age. Each of these units has outcrop areas from

which the beds dip beneath younger formations to increasingly greater depths.

In general each water-bearing formation is underlain and overlain by relatively impermeable clays or shales which serve effectively as confining beds. Hence, the fresh water that occurs in each water-bearing formation is derived mostly from precipitation or seepage from streams on the outcrop areas of that particular formation. In the outcrop areas of water-bearing formations the water occurs under water-table conditions; that is, the water will not rise in wells above the level at which it is encountered by the drill. As the water moves from the outcrop slowly down the dip between the confining beds it occurs under artesian conditions and will rise in wells above the level at which it is encountered. The water may or may not rise to the surface and overflow, depending on the hydrostatic pressure in the aquifer which under natural conditions before withdrawals are made is governed largely by the amount the altitude of the water table at the outcrop exceeds the altitude of the land surface at the well site.

For convenience in summarizing the sources of the municipal water supplies, the region has been divided into four areas, A, B, C, and D, as shown on the map.

Area A.--This area consists of a narrow belt extending from the Rio Grande northeastward across the Edwards Plateau along and adjacent to the Balcones fault zone. With the exception of Eagle Pass in Maverick County, which obtains water from the Rio Grande, all cities and towns in the area use ground water.

Sands in the Trinity group, the basal unit of the Lower Cretaceous series, crop out in the Edwards Plateau along the northern boundary of the area and dip southeastward. Bandera in east-central Bandera County is the only town in the area that obtains water from these sands. Devine in southeastern Medina County obtains water from sands in the Wilcox group or the Carrizo sand, and Boerne in southern Kendall County obtains its supply from Recent alluvium. The remaining municipalities in the area obtain water from the Edwards limestone, which has the greatest perennial yield of any aquifer in Texas. The large spring at San Marcos, New Braunfels, San Antonio, and other places along the Balcones fault zone, which are among the largest in the Southwest, issue from solution channels in the Edwards limestone. At San Antonio and vicinity artesian wells in the Edwards limestone supply more than 100 million gallons a day for municipal, industrial, military, and agricultural purposes.

The following table lists the municipalities in Area A which obtain their public supplies from ground water and gives the probable water-bearing formation or group of formations from which the water is drawn.

Table 1. Municipalities in Area A served by ground water and the probably geological formation or group of formations from which the water is drawn.

| Municipality | Probable water-bearing formation |
|---|---|
| Alamo Heights | Edwards limestone |
| Bandera | Trinity group |
| Boerne | Recent alluvium |
| Brackettville | Edwards limestone |
| Buda | Edwards limestone |
| Devine | Carrizo sand or Wilcox group |
| Hondo | Edwards limestone |
| Kyle | Edwards limestone |
| New Braunfels | Edwards limestone |
| Sabinal | Edwards limestone |
| San Antonio | Edwards limestone |
| San Marcos | Edwards limestone |
| Uvalde | Edwards limestone |

Area B.--This area joins Area A on the southeast. The Carrizo sand is the important aquifer in most of the area, although in the northeastern part of the area several towns that are northwest of the outcrop of the Carrizo sand obtain water from sands in the Wilcox group. The Carrizo sand crops out in a narrow belt that extends from the Rio Grande north and northeastward across Dimmit, Zavala, Frio, Atascosa, Wilson, Guadalupe, and Caldwell Counties. The sand dips southeastward toward the Gulf, and in LaSalle County it yields water suitable for municipal use at a depth of more than 2,500 feet, whereas in Gonzales County it yields rather highly mineralized water at a depth of 1,650 feet. A few towns in the area obtain water from the Mount Selman formation and a few rely on shallow wells in Pliocene or Pleistocene terrace deposits. Three towns, Campbellton, Fentress, and Seguin, use surface water.

The following table lists the municipalities in Area B which obtain their public supplies from ground water and gives the probable water-bearing formation or group of formations from which the water is drawn.

Table 2. Municipalities in Area B served by ground water and the probable geological formation or group of formations from which the water is drawn.

| Municipality | Probable water-bearing formation |
|---|---|
| Asherton | Carrizo sand |
| Big Wells | Carrizo sand |
| Brundage | Carrizo sand |
| Carrizo Springs | Carrizo sand |
| Catarina | Carrizo sand |
| Christine | Mount Selman formation |
| Cotulla | Carrizo sand |
| Coughran | Mount Selman formation |
| Crystal City | Carrizo sand |
| Dale | Wilcox group |
| Dilley | Carrizo sand |
| Floresville | Carrizo sand |
| Fowlerton | Mount Selman formation |
| Jourdanton | Carrizo sand |
| La Pryor | Carrizo sand |
| Lockhart | Pliocene or Pleistocene terrace deposits |
| Luling | Wilcox group |
| Lytton Springs | Wilcox group |
| McMahan | Wilcox group |
| Marion | Austin chalk |
| Martindale | Pliocene or Pleistocene terrace deposits |
| Maxwell | Pliocene or Pleistocene terrace deposits |
| Nixon | Carrizo sand |
| North Pleasanton | Carrizo sand |
| Pearsall | Carrizo sand |
| Pleasanton | Mount Selman formation |
| Potect | Carrizo sand |
| Poth | Carrizo sand |
| Saspamco | Wilcox group |
| Stockdale | Queen City sand member of the Mount Selman formation |
| Uhland | ------ |

Area C.--This area is L shaped, extending through the central part of the region and southeastward along the Rio Grande from Laredo to the Gulf. All cities and towns in the area use surface water, and with the exception of Falls City, Gonzales, and Three Rivers, they all obtain water from the Rio Grande.

Area D.--In area D, which is adjacent to the gulf coast, the principal sources of ground water are the Catahoula tuff, the Oakville sandstone, sands in the Lagarto clay, the Goliad sand, the Lissie formation, and sands of the Beaumont clay. With the exception of Corpus Christi, Raymondville, and Robstown, all communities in this area use ground water, most of which is obtained from the above named sands.

The following table lists the cities and towns in Area D which obtain their public supplies from ground water and gives the probable water-bearing formation or group of formations from which the water is drawn.

Table 3. Municipalities in Area D served by ground water and the probable geological formation or group of formations from which the water is drawn.

| Municipality | Probable water-bearing formation |
|---|---|
| Agua Dulce | Goliad sand |
| Aransas Pass | Beach deposits or sands in Beaumont clay |
| Anstwell | Sands in Beaumont clay |
| Beeville | ------ |
| Benevedas | Goliad sand |
| Bishop | Goliad sand or Lissie formation |
| Combes | Recent alluvium |
| Cuero | Catahoula tuff and Oakville sandstone |
| Falfurrias | Goliad sand |
| Freer | Catahoula tuff |
| George West | Catahoula tuff or Oakville sandstone |
| Gillett | Yegua formation |
| Goliad | Sands in Lagarto clay or Goliad sand |
| Hebbronville | Catahoula tuff or Oakville sandstone |
| Karnes City | Catahoula tuff |
| Kenedy | Oakville sandstone |
| Kingsville | Goliad sand or Lissie formation |
| La Feria | ------ |
| Lyford | Goliad sand or Lissie formation |
| Mathis | Goliad sand |
| Nordheim | Catahoula tuff or Oakville sandstone |
| Odem | Sands in Beaumont clay |
| Orange Grove | Goliad sand |
| Pettus | Oakville sandstone or sands in Lagarto clay |
| Port Aransas | Beach deposits |
| Port Lavaca | Lissie formation or sands in Beaumont clay |
| Premont | Goliad sand |
| Refugio | Goliad sand |
| Rockport | Beach deposits or sands in Beaumont clay |
| Runge | Oakville sandstone |
| San Diego | Goliad sand? |
| Seadrift | Beach deposits or sands in Beaumont clay |
| Sinton | Goliad sand or Lissie formation |
| Woodsboro | Lissie formation |
| Yorktown | Catahoula tuff or Oakville sandstone |

## SURFACE WATER

In the region covered by this report surface water is used by 31 communities of which 24 are in Area C where little or no ground water suitable for public supply is available. The average total consumption of surface water for municipal use in the region is about 40,000,000 gallons a day.

In Area A the public supply of Eagle Pass is obtained from the Rio Grande, and the requirement for the city averages about 900,000 gallons a day.

In Area B water for Campbellton in Atascosa County is obtained from the Atascosa River; a part of the supply for Fentress in Caldwell County is obtained from the San Marcos River; and at Seguin in Guadalupe County the supply is obtained from the Guadalupe River. The requirements for Seguin are by far the largest and average about 1,000,000 gallons a day.

In Area C, 21 of the municipalities use an average of about 19,000,000 gallons a day from the Rio Grande. The requirement for Laredo, which is about 7,000,000 gallons a day, is by far the largest in this area. Small quantities of water are pumped from the San Antonio River for a part of the public supply of Falls City. Gonzales uses about 350,000 gallons a day from the Guadalupe River; and Three Rivers uses about 100,000 gallons a day from the Frio River.

In Area D, Raymondville uses about 500,000 gallons a day from the Rio Grande. Corpus Christi uses about 16,000,000 gallons a day and Robstown about 640,000 gallons a day from the Nueces River.

## CHEMICAL CHARACTER OF WATER

### Analyses of water

The analyses in this report deal with the dissolved mineral constituents in water and have no bearing on the sanitary fitness of the water. Of the 182 analyses listed, 10 were made by the Texas State Department of Health, and 172 were made by the Geological Survey.

As the chemical quality of water from an individual well seldom shows any appreciable variation, except in very shallow wells or wells in aquifers subject to salt water encroachment, a single analysis of water from a well is generally representative of the character of water over long periods. For supplies that are treated or are obtained from surface streams, periodical analyses are needed to determine the range in the chemical character of the water. Water from a river will sometimes vary more than 100 percent in dissolved minerals and hardness.

About one-third of the public supplies from wells listed in this report receive treatment. All except two of the supplies from streams are given some chemical treatment and about two-thirds of them are filtered. The processes are listed in the report in the order of their use.

The analyses were made by the methods in general use 1/. They include results from silica ($SiO_2$), iron (Fe), calcium (Ca), magnesium (Mg), sodium (Na), potassium (K) (or sodium and potassium as sodium), bicarbonate ($HCO_3$), sulfate ($SO_4$), chloride (Cl), fluoride (F), nitrate ($NO_3$), dissolved solids, total hardness as $CaCO_3$, and hydrogen ion concentration (pH). The mineral constituents are reported in parts per million and in equivalents per million for those radicals that enter into ionic balance.

### Mineral constituents in solution

Precipitation is almost free from mineral constituents, but when the water reaches the earth it begins to dissolve the minerals in the rocks and soils over which it flows or through which it percolates. The amount and type of minerals that are dissolved depend on the solubility and type of rocks and soils present and the length of time in which the water has to react with these materials. The constituents given in the analyses in this report are discussed in the following paragraphs.

Silica ($SiO_2$) is found in all natural waters and is usually present in greater quantities in well waters than in surface waters. The presence of silica in water does not effect its usefulness except when used as a boiler feed water. It contributes to the formation of boiler scale, either by a direct silica scale causing local overheating, or by

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1/ Collins, W. D., notes on practical water analysis: U. S. Geological Survey Water-Supply Paper 596-H, 1928. Am. Public Health Ass'n. Standard Methods of the Examination of Water and Sewage, 7th Ed., 1932.

cementing the other minerals together into a hard troublesome scale which causes loss in heat transfer.

Iron (Fe) is dissolved from practically all rocks. It is often dissolved from pipes, hot water lines, and boilers in quantities large enough to be objectionable. Waters low in dissolved mineral matter and waters of low pH tend to be the more corrosive. Even a small amount of iron in water is undesirable because the iron precipitates on exposure to air, causing a "reddish" appearance of the water and resulting in stains on white enameled or porcelain ware and fixtures, and on clothing and other fabrics washed in the water. Iron is easily removed from many waters by aeration and filtration.

Calcium (Ca) and magnesium (Mg) are found in waters that have come in contact with limestone, dolomite, calcareous sand, and gypsum. They are also the chief basic constituents in many soft waters. Magnesium is found in quantities when the waters are contaminated with sea water or have come in contact with deposits of sea salts. The scale found in containers where water is heated or evaporated is almost entirely caused by the presence of calcium and magnesium.

Sodium (Na) and potassium (K) are found in all natural waters, the quantities of potassium being generally comparatively small. Sodium is the chief basic constituent in sea water and most brines. In semi-arid regions, large quantities of sodium salts may be dissolved from soils and alkali deposits. Sodium sulfate may be present in large quantities in streams receiving drainage from irrigated land. Moderate quantities of sodium and potassium have no effect on the suitability of the water either for domestic or most industrial uses. Higher quantities may cause trouble in operation of high pressure steam boilers.

Carbonate ($CO_3$) and bicarbonate ($HCO_3$) in water are mainly due to the action of carbon dioxide in solution on carbonates in soils and rocks. Carbonate is not generally found in natural waters. Bicarbonate has little effect on the suitability of municipal water supplies, except that when present in very large amounts it effects the potability of the water.

Sulfate ($SO_4$) may be dissolved in large quantities from gypsum or from alkali deposits of sodium sulfate. Sulfate is also found in considerable quantities in water from mines and beds of shale as a result of the oxidation of sulfides of iron. The content of sulfate is increased by the use of alum as a coagulent in the treatment of the water. High sulfate in waters in combination with high calcium and magnesium causes the formation of hard scale in steam boilers. This same combination increases the cost of softening of the water.

Chloride (Cl), in combination with sodium, in large amounts causes a salty taste, making the water undesirable for drinking. Appreciable quantities of chloride in equilibrium with calcium and magnesium may increase the corrosiveness of water. In some Texas waters, sodium chloride is the main chemical constituent and occurs in such concentrations as to cause the water to be unsatisfactory for some industrial uses.

Nitrate ($NO_3$) is considered to be the final oxidation product of nitrogenous organic material. Some nitrate may be dissolved from rocks and soils but very few rocks contain appreciable amounts of nitrate salts.

Nitrate has no effect on the value of water for ordinary purposes. It may serve as an indicator of contamination by sewage or other organic material.

Fluoride (F) is reported to occur in rocks in about half the amounts reported for chloride. However, the amount of fluoride in natural water is much less than the amount of chloride. The relation of the occurrence of fluoride in water to mottled enamel of teeth has been recognized for some time. 2/. Mottled enamel of the teeth of children has been found to be associated with the use of drinking water having a fluoride content of 1.0 or more parts per million 3/. Additional studies 4/ have indicated that the occurrence of dental caries (decay) has been decreased by the use of drinking water containing measurable amounts of fluoride though not as much as 1.0 part per million.

The dissolved solids represents the total of the dissolved mineral constituents in the water, including any organic matter and water of crystallization. The palatability of water is affected by the amount of dissolved solids contained in the water. A water with more than 1,000 parts per million of total solids may be undesirable in some respects for a municipal water supply.

The hydrogen ion concentration (pH) of a water indicates its degree of acidity or alkalinity, a factor which determines the corrosiveness of the water. Dissolved oxygen, carbon dioxide, free acid, and acid generating salts are the main constituents that cause corrosion; alkalinity is a factor that decreases corrosion. A public water supply should not be corrosive because it will attack and destroy metal surfaces and cause not only an increase in the iron content of the water but a loss of the pipes used in the distribution system. Proper control of the pH by treatment will inhibit corrosion.

Hardness is probably the most important factor to be considered in deciding the suitability of a water supply for industrial or domestic use. Hardness is due almost entirely to the calcium and magnesium present in the water. It is commonly known that limestone waters are hard, whereas sandstone waters are soft. The two types of hardness are carbonate and non-carbonate. Carbonate hardness is that caused by calcium and magnesium equivalent to the bicarbonate contained in the water, and the non-carbonate hardness is the remainder of the hardness. These two terms are approximately equivalent to the old terms "temporary hardness" and "permanent hardness", respectively. The scale caused by the carbonate hardness may be porous and easily removed, but the scale due to non-carbonate hardness is hard and very difficult to remove. Hardness is recognized by the layman by the amount of soap required to make a good lather and by the deposits of insoluble material formed when water is heated or evaporated. Treatment of water to soften it

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2/ Smith, H. V., and Smith, M. C., Mottled enamel in Arizona and its correlation with concentration of fluorides in water supplies: Ariz. Univ. College Agr. Bulletin, 43, p. 284, 1932.

3/ Dean, H. Trendley, Chronic endemic dental fluorosis; Amer. Med. Assoc. Journal. Vol. 107, pp. 1269-1272, 1936.

4/ Dean, H. T., Jac, P., Arnold, F. A., Jr., and Elveve, E., Domestic water and dental caries: Publ. Health Reports, Vol. 56, pp. 365-381, 761-792, 1941.

depends on the kind and degree present of hardness. The degrees of hardness as referred to in this report are as follows: waters with hardness of 50 parts per million or less are considered soft; between 50 and 100 parts per million, moderately soft; between 100 and 150 parts per million, moderately hard; between 150 and 250 parts per million, hard; and above 250 parts per million, very hard.

## Standards of water quality

The effect of various constituents in water that is used for public supplies and for industrial purposes with reference to Texas well waters is discussed by Cohen in an early bulletin by the Texas State Department of Health 5/. The standards most widely used now for quality of domestic water supplies are the United States Public Health Service drinking water standards for the drinking and culinary water supply used by common carriers in Interstate Commerce 6/.

## Chemical character of ground-water supplies

Of the 182 analyses given in this report, 138 are for public supplies obtained from wells or springs. In general, these supplies conform to the accepted standards of water quality. In dissolved solids about one-fourth of the waters have less than 500 parts per million; about three-eights have between 500 and 1,000 parts per million; and the remainder have more than 1,000 parts per million. Less than half of the supplies have chlorides of more than 250 parts per million, and only a very few have sulfates of more than 250 parts per million.

The hardness of about one-third of the waters is in the soft to moderately soft range; about one-third in the moderately hard to hard range; and one-third in the very hard range.

All the cities and towns in this region that are served with ground water are in areas A, B, and D, (see map). In area A the ground-water supplies are generally very hard, but most of them have dissolved solids below 500 parts per million. In area B the dissolved solids are usually above 500 parts per million but seldom exceed 1,000 parts per million; some of the supplies are soft although about half are considered hard. In area D many of the ground-water supplies have dissolved solids above 1,000 parts per million and are generally hard.

## Chemical character of surface-water supplies

The mineral content and hardness of some surface waters vary widely from time to time, the concentration usually decreasing during periods of high flow and increasing during periods of low discharge. Therefore, the analysis of a single sample from a surface source may be entirely inadequate as an index of the suitability of the water for public supply;

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5/ Cohen, Chester A., Chemical analyses of Texas well waters, Texas State Dept. of Health Bull., 1931.

6/ Public Health Service drinking water standards: Public Health Reports, Vol. 61, pp. 371-384, 1946.

a daily sampling program continued for years may be necessary in order to determine the extremes and average in mineral content.

In the region covered by this report 23 public supplies are obtained from the Rio Grande, 2 from the Nueces River, 2 from the Guadalupe River, and 1 each from the Atascosa, Frio, San Antonio, and San Marcos Rivers.

Considerable information is available concerning the quality of the water in the Rio Grande, Nueces, San Antonio, and Guadalupe Rivers. The average composition together with the maximum and minimum concentrations shown by the available records is given in the following table:

Average and extremes in composition of the Rio Grande, Nueces, San Antonio, and Guadalupe Rivers

| | Specific conductance ($K \times 10^5$ at 25° C) | Calcium (Ca) | Magnesium (Mg) | Sodium and Potassium (Na + K) (calc.) | Bicarbonate ($HCO_3$) | Sulfate ($SO_4$) | Chloride (Cl) | Dissolved solids | Total hardness as $CaCO_3$ |
|---|---|---|---|---|---|---|---|---|---|
| **Rio Grande at Rio Grande City, 1935-1942 1/** | | | | | | | | | |
| Average | 101 | 80 | 19 | 101 | 142 | 195 | 126 | 591 | 280 |
| Minimum | 50 | 39 | 12 | 37 | 115 | 73 | 35 | 255 | 147 |
| Maximum | 282 | 179 | 63 | 344 | 154 | 580 | 514 | 1,760 | 705 |
| **Nueces River at Three Rivers, 1941-1945 2/** | | | | | | | | | |
| Average | 95.9 | 58 | 11 | 120 | 205 | 80 | 142 | 512 | 190 |
| Minimum | 27.2 | 38 | 3.5 | 18 | 138 | 17 | 12 | 195 | 109 |
| Maximum | 183 | 115 | 25 | 248 | 380 | 205 | 287 | 1,068 | 390 |
| **Guadalupe River at Spring Branch, 1942 2/** | | | | | | | | | |
| Average | 50.5 | 62 | 22 | 16 | 272 | 21 | 21 | 290 | 245 |
| Minimum | 23.9 | | | | | | 6.0 | 150 | |
| Maximum | 88.1 | | | | 302 | 86 | 86 | 540 | 352 |
| **San Antonio River at Goliad, 1942 2/** | | | | | | | | | |
| Average | 75.1 | 89 | 16 | 40 | 276 | 67 | 54 | 473 | 288 |
| Minimum | 17.4 | | | | | | 9.0 | 110 | |
| Maximum | 121 | | | | | | 192 | 750 | |

1/ Analyzed by International Boundary Commission
2/ Analyzed by U. S. Geological Survey.

A study of the records compiled by International Boundary Commission indicates that there is little change in the composition of water in the Rio Grande between Rio Grande City and Brownsville. Therefore, the data available for the Rio Grande at Rio Grande City is probably representative of the composition of the water served to all users in the lower valley. The analyses of samples collected in 1946, in connection with this report, from public supplies served by the Rio Grande are on the whole very close to the average analysis given in the table above. Three supplies show a slightly higher concentration than the average with only one, the Laredo

supply, approaching the maximum concentration shown at Rio Grande City between 1935 and 1942.

The analyses of single samples collected in 1946 from public supplies from the Nueces River show a lower concentration than was recorded at Three Rivers during 1941-45.

The public supplies of Gonzales in Gonzales County, and Seguin in Guadalupe County are obtained from the Guadalupe River. The analysis of a single sample at Gonzales shows a concentration that is twice the average for the river at Spring Branch, while the analysis for Seguin shows a concentration that is just below the average at Spring Branch.

The analysis of the samples obtained at Falls City, Karnes County from the San Antonio River shows about the same concentration as the average given in the table for the San Antonio River at Goliad.

The analysis of a sample obtained at Fentress, Caldwell County, which is served from the San Marcos River, shows a water that is low in dissolved solids, but very hard. The sample obtained at Three Rivers from the Frio River was hard but the dissolved solids was just below 500 parts per million. The sample from Atascosa River water at Campbellton, Atascosa County, had a dissolved solids content above 1,000 parts per million and was very hard. The sulfate was slightly less than 250 parts; the chloride was above 250 parts per million.

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3. Ground water in Dimmit and Zavala Counties, Texas: U. S. Geological Survey Press Release, 1934.

4. Geology and ground-water resources of Atascosa and Frio Counties, Texas: U. S. Geological Survey Water-Supply Paper 676, by J. T. Lonsdale, 1936.

5. Geology and ground-water resources of Uvalde and Medina Counties, Texas: U. S. Geological Survey Water-Supply Paper 678, by A. N. Sayre, 1936.

6. Water resources of the Edwards limestone in the San Antonio area, Texas: U. S. Geological Survey Water-Supply Paper 773-B, by Penn Livingston, A. N. Sayre, and L. N. White, 1936.

7. Ground-water resources of Kleberg County, Texas: U. S. Geological Survey Water-Supply Paper 773-D, by Penn Livingston and T. W. Bridges, 1936.

8. Geology and ground-water resources of Duval County, Texas: U. S. Geological Survey Water-Supply Paper 776, by A. N. Sayre, 1937.

9. Geology and ground-water resources of Webb County, Texas: U. S. Geological Survey Water-Supply Paper 778, by J. T. Lonsdale and J. R. Day, 1937.

10. Ground-water resources of Atascosa County, Texas: Texas State Board of Water Engineers, by R. W. Sundstrom and C. R. Follett, 1945.

In addition to the above listed reports, mimeographed publications containing records of wells and springs, drillers' logs, partial chemical analyses of water from wells and springs, and a map showing the location of wells have been released by the Texas State Board of Water Engineers for the following Counties in the region: Aransas, Bee, Brooks, Calhoun, Comal, DeWitt, Dimmitt and Zavala, Gonzales, Guadalupe, Hays, Hidalgo, Jim Hogg, Jim Wells, Karnes, Kendall, Kinney, Live Oak, Nueces, Refugio, San Patricio, Victoria, and Wilson.

## Unpublished reports

The following manuscript reports giving results of ground-water investigations are available for reference in the office of the Geological Survey and Texas State Board of Water Engineers at Austin:

1. Ground-water in the Corpus Christi area, 1940.

2. Relation of shallow ground water to Las Moras Springs, 1942.

3. Ground-water in the vicinity of San Marcos and Buda, 1942.

4. Recent observations of ground-water conditions in the vicinity of Kingsville, 1943.

5. Ground-water supply for the Celanese plant at Bishop, 1944.

6. Ground water conditions in the Fremount-Falfurrias district, Texas, 1944.

7. Ground water in the Lower Rio Grande Valley, 1946.

Aransas County

Rockport

Population in 1940: 1,729.

Source of information: Tom Shults, Water Superintendent July 17, 1945

Ownership: Municipal.

Source of supply: 3 wells.

Well 1. Six blocks north of elevated tank, drilled in 1938 by Layne-Texas Company, depth 78 feet, diameter 13 to 6 inches, screen from 68 to 78 feet; deep-well turbine pump and 3-horsepower electric motor.

Well 2. About 200 feet from well 1, drilled in 1938 by Layne-Texas Company; depth 78 feet, diameter 13 to 6 inches, screen from 68 to 78 feet; deep-well turbine pump and 3-horsepower electric motor.

Well 3. One block west of well 2, drilled in 1944 by Layne-Texas Company, depth 78 feet, diameter 16 to 8-5/8 inches, screen from 53 to 78 feet; deep-well turbine pump and 3-horsepower electric motor; static water level 16 feet below land surface, August 6, 1944; pumping level 61 feet below land surface when pumping 28 gallons a minute, August 6, 1944.

Pumpage (estimated): 75,000 gallons a day for 3 months; 50,000 gallons a day for 9 months.

Storage: Elevated tank, 50,000 gallons; ground reservoir 55,000 gallons.

Number of customers: 400.

Treatment: None.

Analyses of water:

Date of collection: July 17, 1945. Analyzed by J. H. Rowley

| | Well 1 | | Well 3 | |
|---|---|---|---|---|
| | Parts per million | Equivalents per million | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 17 | | 15 | |
| Iron (Fe) | 0.43 | | 0.15 | |
| Calcium (Ca) | 92 | 4.59 | 96 | 4.79 |
| Magnesium (Mg) | 16 | 1.32 | 13 | 1.07 |
| Sodium (Na) | 182 | 7.90 | 116 | 5.06 |
| Potassium (K) | 12 | 0.31 | 13 | 0.33 |
| Bicarbonate ($HCO_3$) | 339 | 5.56 | 315 | 5.16 |
| Sulfate ($SO_4$) | 15 | 0.31 | 5.7 | 0.12 |
| Chloride (Cl) | 292 | 8.24 | 211 | 5.95 |
| Fluoride (F) | 0 | 0.00 | 0.2 | 0.01 |
| Nitrate ($NO_3$) | 0.5 | 0.01 | 0.8 | 0.01 |
| Dissolved solids | 869 | | 670 | |
| Total hardness as $CaCO_3$ | 296 | | 293 | |
| pH | 7.6 | | 7.6 | |

Aransas County

Rockport -- Continued

Drillers' log:

Well 3

| | Thickness (feet) | Depth (feet) |
|---|---|---|
| White sand | 18 | 18 |
| Gray sand | 29 | 47 |
| Clay and sandy clay | 8 | 55 |
| Sandy clay | 4 | 59 |
| White sand | 6 | 65 |
| Brown sandy clay and fine-grained sand | 15 | 80 |

Atascosa County

Campbellton

Population in 1940: 250.

Ownership: Municipal.

Source of information: J. N. Ahns, Superintendent August 14, 1945

Source of supply: Atascosa River. Water is pumped from river to an automatic pressure system.

Storage: Pressure tank, 1,500 gallons.

Number of customers: 50.

Treatment: None.

Analysis of water:

Date of collection: August 14, 1945. Analyzed by J. H. Rowley

| | Parts per million | Equivalents per million |
|---|---|---|
| Silica ($SiO_2$) | 16 | |
| Iron (Fe) | 0.47 | |
| Calcium (Ca) | 46 | 2.30 |
| Magnesium (Mg) | 21 | 1.73 |
| Sodium (Na) | 283 | 12.29 |
| Potassium (K) | 26 | 0.67 |
| Bicarbonate ($HCO_3$) | 294 | 4.82 |
| Sulfate ($SO_4$) | 223 | 4.64 |
| Chloride (Cl) | 265 | 7.47 |
| Fluoride (F) | 1.0 | 0.05 |
| Nitrate ($NO_3$) | 0.5 | 0.01 |
| Dissolved solids | 1,030 | |
| Total hardness as $CaCO_3$ | 202 | |
| pH | 8.2 | |

Christine

Population in 1940: 286.

Ownership: Municipal.

Source of information: Glen Patterson Water Superintendent May 25, 1944

Source of supply: One well in north part of town, drilled in 1917, depth 1,314 feet, diameter 6 to 4 inches; well flows with a head of 25 feet above land surface; well is connected directly with the mains.

Storage: None.

Treatment: None.

Atascosa County

Analysis of water:

Date of collection: May 25, 1944 — Analyzed by J. H. Rowley

| | Parts per million | Equivalents per million |
|---|---|---|
| Silica ($SiO_2$) | 14 | |
| Iron (Fe) | 0.08 | |
| Calcium (Ca) | 4.8 | 0.24 |
| Magnesium (Mg) | 1.4 | 0.12 |
| Sodium (Na) | 667 | 29.01 |
| Potassium (K) | 4.6 | 0.12 |
| Bicarbonate ($HCO_3$) | 743 | 12.17 |
| Sulfate ($SO_4$) | 152 | 3.16 |
| Chloride (Cl) | 497 | 14.02 |
| Fluoride (F) | 1.7 | 0.09 |
| Nitrate ($NO_3$) | 2.0 | 0.03 |
| Dissolved solids | 1,710 | |
| Total hardness as $CaCO_3$ | 18 | |
| pH | 8.2 | |

Coughran

Population in 1940: 50.

Owner: W. H. Gibson.

Source of information: W. H. Gibson, Owner August 14, 1945

Source of supply: One well, northeast of railroad station in Coughran, depth 885 feet, diameter 6 inches; well flows into elevated tank, artesian pressure 20.5 feet above land surface, May 1944.

Storage: Elevated tank, 5,000 gallons.

Number of customers: 15.

Analysis of water:

Date of collection: August 14, 1945 — Analyzed by J. H. Rowley

| | Parts per million | Equivalents per million |
|---|---|---|
| Silica ($SiO_2$) | 16 | |
| Iron (Fe) | .14 | |
| Calcium (Ca) | 3.7 | 0.18 |
| Magnesium (Mg) | 1.2 | 0.10 |
| Sodium (Na) | 373 | 16.22 |
| Potassium (K) | 15 | 0.38 |
| Bicarbonate ($HCO_3$) | 624 | 10.42 |
| Sulfate ($SO_4$) | 94 | 1.96 |
| Chloride (Cl) | 164 | 4.63 |
| Fluoride (F) | 1.0 | 0.05 |
| Nitrate ($NO_3$) | 0.0 | 0.00 |
| Dissolved solids | 996 | |
| Total hardness as $CaCO_3$ | 14 | |
| pH | 8.4 | |

Atascosa County

Jourdanton

Population in 1940: 950.

Ownership: Municipal.

Source of information: Eva Childress, City Secretary August 14, 1945

Source of supply: One well at standpipe, drilled in 1930 by Layne-Texas Company, depth 1,635 feet, diameter 10 to 6 inches; deep-well turbine pump and electric motor; static water level 20 feet below land surface; yield 161 gallons a minute with drawdown of 57.5 feet.

Storage: Elevated tank, 55,000 gallons; ground-storage reservoir, 50,000 gallons.

Number of customers: 248.

Treatment: Chlorination.

Analysis of water:

Date of collection: August 14, 1945 Analyzed by J. H. Rowley

| | Parts per million | Equivalents per million |
|---|---|---|
| Silica ($SiO_2$) | 13 | |
| Iron (Fe) | 0.67 | |
| Calcium (Ca) | 69 | 3.44 |
| Magnesium (Mg) | 13 | 1.07 |
| Sodium (Na) | 26 | 1.15 |
| Potassium (K) | 11 | 0.28 |
| Bicarbonate ($HCO_3$) | 266 | 4.36 |
| Sulfate ($SO_4$) | 31 | 0.65 |
| Chloride (Cl) | 32 | 0.90 |
| Fluoride (F) | 0.4 | 0.02 |
| Nitrate ($NO_3$) | 0.5 | 0.01 |
| Dissolved solids | 336 | |
| Total hardness as $CaCO_3$ | 226 | |
| pH | 7.6 | |

Drillers' log:

| | Thickness (feet) | Depth (feet) | | Thickness (feet) | Depth (feet) |
|---|---|---|---|---|---|
| Surface soil | 4 | 4 | Blue shale and boulders | 20 | 244 |
| Clay | 50 | 54 | Rock | 2 | 246 |
| Rock | 1 | 55 | Shale and sand | 14 | 260 |
| Blue shale | 14 | 69 | Rock | 1 | 261 |
| Rock | 2 | 71 | Shale | 19 | 280 |
| Blue shale and boulders | 115 | 186 | Rock | 2 | 282 |
| Rock | 1 | 187 | Sand | 24 | 306 |
| Blue shale | 13 | 200 | Shale and boulders | 23 | 329 |
| Rock (pyrites) | 2 | 202 | | | |
| Hard sand | 22 | 224 | | | |

(Continued on next page)

Jourdanton -- Continued

| | Thickness (feet) | Depth (feet) | | Thickness (feet) | Depth (feet) |
|---|---|---|---|---|---|
| Rock (pyrites) | 3 | 332 | Rock | 2 | 1071 |
| Shale | 21 | 353 | Shale | 15 | 1086 |
| Rock | 1 | 354 | Sand | 43 | 1129 |
| Shale | 10 | 364 | Rock | 3 | 1132 |
| Rock | 1 | 365 | Shale | 16 | 1148 |
| Shale and boulders | 147 | 512 | Rock | 2 | 1150 |
| Hard sand | 23 | 535 | Sand | 24 | 1174 |
| Shale and boulders | 23 | 558 | Rock | 1 | 1175 |
| Sand | 20 | 578 | Shale | 17 | 1192 |
| Shale and boulders | 22 | 600 | Sand (good) | 51 | 1243 |
| Sandy shale | 80 | 680 | Rock | 4 | 1247 |
| Rock | 1 | 681 | Shale | 46 | 1293 |
| Sandy shale | 104 | 785 | Rock | 3 | 1296 |
| Rock | 1 | 786 | Shale and boulders | 85 | 1381 |
| Shale and boulders | 56 | 842 | Rock | 2 | 1383 |
| Rock | 2 | 844 | Shale | 8 | 1391 |
| Shale | 13 | 857 | Rock | 6 | 1397 |
| Sand | 53 | 910 | Shale and boulders | 47 | 1444 |
| Sandy shale | 65 | 975 | Rock | 3 | 1447 |
| Rock | 2 | 977 | Sand (dry) | 45 | 1492 |
| Hard shale | 20 | 997 | Shale | 16 | 1508 |
| Sand | 46 | 1043 | Sand (hard streaks) | 96 | 1604 |
| Sandy shale | 26 | 1069 | Coarse-grained white sand | 31 | 1635 |

North Pleasanton

Population in 1940: 673.

Ownership: Municipal (Missouri Pacific Railway Co. owns the well, Hammond Rose owns the distribution system).

Source of information: Hammond Rose, Owner of Distribution system. August 14, 1945

Source of supply: One well at Missouri-Pacific Railroad shops, drilled in 1928, depth 1,550 feet, diameter 8 inches; well flows directly into distribution system, artesian head 69 feet above land surface, May 9, 1944.

Pumpage (estimated): 15,000 gallons a day.

Storage: None.

Number of customers: 75.

Treatment: None.

Atascosa County

North Pleasanton -- Continued

Analysis of water:

Date of collection: August 14, 1945. Analyzed by J. H. Rowley

| | Parts per million | Equivalents per million |
|---|---|---|
| Silica ($SiO_2$) | 13 | |
| Iron (Fe) | 0.89 | |
| Calcium (Ca) | 64 | 3.19 |
| Magnesium (Mg) | 7.8 | 0.64 |
| Sodium (Na) | 27 | 1.19 |
| Potassium (K) | 10 | 0.26 |
| Bicarbonate ($HCO_3$) | 206 | 3.38 |
| Sulfate ($SO_4$) | 40 | 0.83 |
| Chloride (Cl) | 36 | 1.02 |
| Nitrate ($NO_3$) | 0 | 0.00 |
| Fluoride (F) | 1.0 | 0.05 |
| Dissolved solids | 303 | |
| Total hardness as $CaCO_3$ | 192 | |
| pH | 7.5 | |

Pleasanton

Population in 1940: 2,074

Ownership: Municipal.

Source of information: B. B. Gillett August 14, 1945

Source of supply: One well at elevated tank, drilled in 1917, depth 815 feet, diameter 8 to 4 inches; deep-well turbine pump and electric motor; static water level about 10 feet below land surface; well flows when drilled; yield 150 gallons a minute.

Pumpage (estimated): Average 50,000 gallons a day; maximum in summer, about 100,000 gallons a day.

Storage: Elevated tank, 75,000 gallons; concrete ground reservoir, 75,000 gallons.

Number of customers: 430.

Treatment: None.

Atascosa County

Pleasanton -- Continued

Analysis of water:

Date of collection: August 14, 1945 Analyzed by J. H. Rowley

| | Parts per million | Equivalents per million |
|---|---|---|
| Silica ($SiO_2$) | 15 | |
| Iron (Fe) | 0.05 | |
| Calcium (Ca) | 7.8 | 0.39 |
| Magnesium (Mg) | 3.8 | 0.31 |
| Sodium (Na) | 175 | 7.62 |
| Potassium (K) | 6.3 | 0.16 |
| Bicarbonate ($HCO_3$) | 354 | 5.81 |
| Sulfate ($SO_4$) | 0.7 | 0.01 |
| Chloride (Cl) | 94 | 2.65 |
| Fluoride (F) | 0.2 | 0.01 |
| Nitrate ($NO_3$) | 0.0 | 0.00 |
| Dissolved solids | 480 | |
| Total hardness as $CaCO_3$ | 35 | |
| pH | 8.0 | |

Poteet

Population in 1940: 2,515.

Ownership: Municipal.

Source of information: H. R. De Viviss Water Superintendent August 14, 1945

Source of supply: One well at elevated tank, drilled in 1928 by J. Wolfe, depth 855 feet, diameter 6 inches; centrifugal pump and electric motor; well flows with a head of 12 feet above land surface, April 25, 1944.

Pumpage (estimated): 38,000 gallons in the summer, 10,000 gallons in winter.

Storage: Elevated tank, 55,000 gallons.

Number of customers: 357.

Treatment: None.

Atascosa County

Poteet -- Continued

Analysis of water:

Date of collection: August 14, 1945. Analyzed by J. H. Rowley

| | Parts per million | Equivalents per million |
|---|---|---|
| Silica ($SiO_2$) | 17 | |
| Iron (Fe) | 1.3 | |
| Calcium (Ca) | 25 | 1.248 |
| Magnesium (Mg) | 5.0 | 0.411 |
| Sodium (Na) | 24 | 1.065 |
| Potassium (K) | 5.6 | 0.143 |
| Bicarbonate ($HCO_3$) | 48 | 0.787 |
| Sulfate ($SO_4$) | 33 | 0.687 |
| Chloride (Cl) | 49 | 1.382 |
| Fluoride (F) | 0.2 | 0.011 |
| Nitrate ($NO_3$) | 0.0 | 0.000 |
| Dissolved solids | 196 | |
| Total hardness as $CaCO_3$ | 83 | |
| pH | 7.8 | |

Bandera County

Bandera

Population in 1940: 1,250.

Owner: Bandera Water Control and Improvement District No. 1.

Source of information: F. C. Billins, President of District November 2, 1945

Source of supply: 2 wells.

Well 1. Drilled in 1940, depth 467 feet, diameter 10 inches; deep-well cylinder and pump jack and electric motor; static water level 40 feet below land surface; yield 26 gallons a minute (breaks suction at yield in excess of 26 gallons a minute).

Well 2. Drilled in 1945 by Rayfield Brothers, depth 435 feet, diameter 6 inches; deep-well cylinder and pump jack and electric motor; yield 40 gallons a minute.

Pumpage (estimated): Summer 430,000 gallons; winter 200,000 gallons.

Storage: Elevated tank, 60,000 gallons; ground storage, 60,000 gallons.

Number of customers: 250.

Treatment: None.

Analyses of water:

Date of collection: November 2, 1946 — Analyzed by J. H. Rowley and C. B. Cibulka

| | Well 1 | | Well 2 | |
|---|---|---|---|---|
| | Parts per million | Equivalents per million | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 13 | | 14 | |
| Iron (Fe) | 0.06 | | 1.1 | |
| Calcium (Ca) | 86 | 4.29 | 73 | 3.64 |
| Magnesium (Mg) | 62 | 5.10 | 51 | 4.19 |
| Sodium (Na) | 39 | 1.70 | 38 | 1.64 |
| Potassium (K) | 20 | 0.51 | 21 | 0.54 |
| Bicarbonate ($HCO_3$) | 358 | 5.87 | 362 | 5.93 |
| Sulfate ($SO_4$) | 220 | 4.58 | 139 | 2.89 |
| Chloride (Cl) | 36 | 1.02 | 37 | 1.04 |
| Fluoride (F) | 2.4 | 0.13 | 2.8 | 0.15 |
| Nitrate ($NO_3$) | 0.0 | 0.00 | 0.0 | 0.00 |
| Dissolved solids | 682 | | 560 | |
| Total hardness as $CaCO_3$ | 464 | | 392 | |
| pH | 6.9 | | 7.2 | |

Bee County

Beeville

Population in 1940: 6,789.

Owner: Central Power & Light Co.

Source of information: C. R. Gordon, Manager April 19, 1945

Source of supply: 3 wells.

Well 2. At pump station, drilled in 1937 by Layne-Texas Company, depth 1,539 feet, diameter 15-1/2 to 8 inches; deep-well turbine pump and 40-horsepower electric motor, pump set at 184 feet; static water level 56 feet below land surface when drilled, 61 feet on June 26, 1934, 63 feet on November 10, 1939, and 73 feet on November 11, 1942; yield 500 gallons a minute; temperature 95° F.

Well 3. At pump station, drilled in 1941 by Layne-Texas Company, depth 1,539 feet, diameter 12-3/4 to 6-5/8 inches, screen from 1,484 to 1,533 feet; deep-well turbine pump and 50-horsepower electric motor, pump set at 215 feet; static water level 68 feet below land surface in April 1943; yield 490 gallons a minute; temperature 95° F.

Well 4. At intersection of Monroe and Cleveland streets, drilled in 1945 by Layne-Texas Company, depth 622 feet, diameter 14 to 8-5/8 inches, screens between 528 and 622 feet; static water level reported 84 feet below land surface when drilled; yield, during test, 400 gallons a minute with drawdown of 95 feet (new well unused to date).

Pumpage: Maximum 750,000 gallons, average 500,000 gallons a day.

Storage: Elevated tank, 150,000 gallons; concrete ground reservoir, 50,000 gallons.

Number of customers: 1,207.

Treatment: Chlorination.

Bee County

Beeville -- Continued

Analysis of water:

Date of collection: April 19, 1945. Analyzed by J. H. Rowley

| | Well 3 | |
|---|---|---|
| | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 19 | |
| Iron (Fe) | 0.15 | |
| Calcium (Ca) | 7.1 | 0.35 |
| Magnesium (Mg) | 1.3 | 0.11 |
| Sodium (Na) | 514 | 22.36 |
| Potassium (K) | 27 | 0.69 |
| Bicarbonate ($HCO_3$) | 601 | 9.85 |
| Sulfate ($SO_4$) | 0.9 | 0.02 |
| Chloride (Cl) | 480 | 13.54 |
| Fluoride (F) | 1.8 | 0.09 |
| Nitrate ($NO_3$) | 0.8 | 0.01 |
| Dissolved solids | 1,350 | |
| Total hardness as $CaCO_3$ | 23 | |
| pH | 7.5 | |

Drillers' logs:

Well 2

| | Thickness (feet) | Depth (feet) | | Thickness (feet) | Depth (feet) |
|---|---|---|---|---|---|
| Soil | 15 | 15 | Hard brown clay | 60 | 815 |
| Rock (caliche) | 13 | 28 | Clay, hard | 15 | 830 |
| Hard sand rock and lime rock | 42 | 70 | Rock | 5 | 835 |
| Sand | 22 | 92 | Clay | 10 | 845 |
| Sandy shale | 88 | 180 | Gumbo | 65 | 910 |
| Red clay | 50 | 230 | Sandy shale | 25 | 935 |
| Sand | 55 | 285 | Clay | 40 | 975 |
| Red clay | 120 | 405 | Shale | 325 | 1300 |
| Broken formation | 20 | 425 | Shale and boulders | 25 | 1325 |
| Clay | 10 | 435 | Tough clay | 15 | 1340 |
| Rock | 15 | 450 | Shale | 25 | 1365 |
| Clay and rock | 10 | 460 | Hard sand | 3 | 1368 |
| Gumbo | 70 | 530 | Sand rock | 12 | 1380 |
| Sand and clay layers | 75 | 605 | Hard shale | 8 | 1388 |
| Rock | 5 | 610 | Sand rock | 12 | 1400 |
| Clay | 15 | 625 | Shale | 70 | 1470 |
| Rock | 5 | 630 | Sand, some layers of shale | 69 | 1539 |
| Gumbo | 120 | 750 | | | |
| Rock | 5 | 755 | | | |

Bee County

Beeville -- Continued

Well 3

| | Thickness (feet) | Depth (feet) | | Thickness (feet) | Depth (feet) |
|---|---|---|---|---|---|
| Soil | 5 | 5 | Sandy clay, layer of rock | 25 | 835 |
| Sand and caliche | 7 | 12 | Gumbo | 68 | 901 |
| Caliche | 11 | 23 | Sandy clay | 28 | 929 |
| Sand and caliche | 16 | 39 | Clay | 35 | 964 |
| Caliche | 5 | 44 | Sandy shale | 30 | 994 |
| Sand and caliche | 3 | 47 | Shale | 27 | 1021 |
| Hard caliche | 107 | 154 | Hard shale | 7 | 1028 |
| Red clay | 24 | 178 | Sandy shale | 51 | 1079 |
| Rock | 8 | 186 | Hard shale | 17 | 1096 |
| Red clay and lime | 30 | 216 | Sandy shale | 5 | 1101 |
| Sand | 6 | 222 | Hard shale | 46 | 1147 |
| Cavity | 5 | 227 | Sandy shale | 9 | 1156 |
| Sand, hard layers | 47 | 274 | Sand | 10 | 1166 |
| Clay | 15 | 289 | Sandy shale | 10 | 1176 |
| Lime rock | 8 | 297 | Shale | 25 | 1201 |
| Red clay | 6 | 303 | Sand and sandy shale | 25 | 1226 |
| Lime rock | 9 | 312 | Hard shale | 19 | 1245 |
| Brown clay | 79 | 391 | Sandy shale and sand | 25 | 1270 |
| Sand | 21 | 412 | Hard shale | 17 | 1287 |
| Rock | 1 | 413 | Sandy shale and boulders | 25 | 1312 |
| Clay | 14 | 427 | Shale | 14 | 1326 |
| Sand | 8 | 435 | Shale and lime | 34 | 1360 |
| Clay, layers of rock | 20 | 455 | Hard shale | 9 | 1369 |
| Clay | 78 | 523 | Hard sand | 9 | 1378 |
| Sand | 15 | 538 | Sandy shale | 13 | 1391 |
| Clay | 2 | 540 | Rock | 1 | 1392 |
| Sand | 21 | 561 | Sandy shale and boulders | 18 | 1410 |
| Clay | 19 | 580 | Hard sand and shale | 25 | 1435 |
| Sand | 9 | 589 | Sandy shale | 29 | 1464 |
| Clay | 6 | 595 | Shale | 17 | 1481 |
| Rock | 2 | 597 | Good sand | 50 | 1531 |
| Clay | 3 | 600 | Shale | 4 | 1539 |
| Sand | 27 | 627 | | | |
| Clay | 5 | 633 | | | |
| Gumbo | 103 | 736 | | | |
| Fine-grained sand and clay | 22 | 758 | | | |
| Brown clay | 50 | 808 | | | |

Bee County

Beeville -- Continued

Well 4

| | Thickness (feet) | Depth (feet) | | Thickness (feet) | Depth (feet) |
|---|---|---|---|---|---|
| Soil | 5 | 5 | Clay and lime | 36 | 398 |
| Sand and caliche | 6 | 11 | Sandy clay, layers rock | 36 | 434 |
| Caliche | 19 | 30 | Clay and hard layers | 90 | 524 |
| Sandy caliche | 7 | 37 | Sand | 24 | 548 |
| Caliche and sand | 5 | 42 | Clay | 4 | 552 |
| Sandy caliche | 96 | 138 | Sand | 11 | 563 |
| Caliche and red clay | 33 | 171 | Sandy clay | 7 | 570 |
| Red clay | 25 | 196 | Clay | 7 | 577 |
| Red clay and lime | 30 | 226 | Sand | 41 | 618 |
| Sand | 58 | 284 | Clay | 4 | 622 |
| Clay and sand breaks | 62 | 346 | | | |
| Clay | 10 | 356 | | | |
| Lime | 6 | 362 | | | |

Pettus

Population in 1940: 700.

Source of information: C. R. Gordon, Manager April 19, 1945

Owner: Central Power and Light Co.

Source of supply: 2 wells.

Well 1. At standpipe, drilled in 1930 by Layne-Texas Company, depth 238 feet, diameter 8-1/4 to 6 inches; Hi-Lift pump and 5-horsepower electric motor; standby well.

Well 2. About 50 feet south of well 1, drilled in 1944 by Layne-Texas Company, depth 367 feet, diameter 8-1/4 to 6 inches, underreamed and gravel-walled, screen from 327 to 367 feet; deep-well submersible pump and 5-horsepower electric motor; yield 40 gallons a minute.

Pumpage (estimated): Average 25,000 to 30,000 gallons a day.

Storage: Standpipe, 50,000 gallons.

Number of customers: 62.

Treatment: Occasional chlorination.

Bee County

Pettus -- Continued

Analysis of water:

Date of collection: April 19, 1945 Analyzed by J. H. Rowley

| | Well 2 | |
|---|---|---|
| | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 33 | |
| Iron (Fe) | 1.9 | |
| Calcium (Ca) | 182 | 9.08 |
| Magnesium (Mg) | 31 | 2.55 |
| Sodium (Na) | 166 | 7.23 |
| Potassium (K) | 23 | 0.59 |
| Bicarbonate ($HCO_3$) | 344 | 5.64 |
| Sulfate ($SO_4$) | 81 | 1.69 |
| Chloride (Cl) | 428 | 12.07 |
| Fluoride (F) | 0.6 | 0.03 |
| Nitrate ($NO_3$) | 1.2 | 0.02 |
| Dissolved solids | 1,120 | |
| Total hardness as $CaCO_3$ | 582 | |
| pH | 7.2 | |

Drillers' log:

Well 1

| | Thickness (feet) | Depth (feet) | | Thickness (feet) | Depth (feet) |
|---|---|---|---|---|---|
| Surface | 10 | 10 | Clay, hard layers | 25 | 210 |
| Hard rock | 7 | 17 | Sand | 53 | 263 |
| Hard caliche | 14 | 31 | Clay | 48 | 311 |
| Hard sand | 4 | 35 | Sand | 3 | 314 |
| Hard caliche | 14 | 49 | Gumbo | 1 | 315 |
| Soft sand | 12 | 61 | Sand | 21 | 336 |
| Lime rock | 2 | 63 | Gumbo | 20 | 356 |
| Packsand | 9 | 72 | Hard sand | 14 | 370 |
| Clay | 58 | 130 | Sand | 3 | 373 |
| Sand | 15 | 145 | Gumbo | 12 | 385 |
| Clay, hard layers | 25 | 170 | Sand | 20 | 405 |
| Sand | 15 | 185 | Gumbo | 2 | 407 |

Bexar County

Alamo Heights

Population in 1940: 5,700.

Source of information: Paul G. Villaret, Water Superintendent November 16, 1945

Ownership: Municipal.

Source of supply: 3 wells near city hall.

Well 1. Old well just northeast of city hall, depth about 550 feet; deep-well turbine pump and 60-horsepower electric motor; yield 450 gallons a minute.

Well 2. About 200 feet west of well 1, depth about 550 feet; deep-well turbine pump and 40-horsepower electric motor; yield 300 gallons a minute.

Well 3. About 300 feet northwest of well 1, drilled in 1939 by I. L. Dingham, depth 603 feet, diameter 13 inches, cased to 424 feet; deep-well turbine pump and 60-horsepower electric motor; yield 450 gallons a minute.

Pumpage: Average 395,000 gallons a day during August, 1945.

Storage: Elevated tank, 100,000 gallons; concrete ground reservoir, 150,000 gallons.

Number of customers: 1,350.

Treatment: None.

Analysis of water:

Date of collection: November 16, 1945 Analyzed by J. H. Rowley

| | Well 1 | |
|---|---|---|
| | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 12 | |
| Iron (Fe) | 0.06 | |
| Calcium (Ca) | 67 | 3.344 |
| Magnesium (Mg) | 16 | 1.316 |
| Sodium (Na) ) | | |
| Potassium (K) ) | 3.4 | 0.148 |
| Bicarbonate ($HCO_3$) | 247 | 4.049 |
| Sulfate ($SO_4$) | 17 | 0.354 |
| Chloride (Cl) | 12 | 0.338 |
| Fluoride (F) | 0.2 | 0.011 |
| Nitrate ($NO_3$) | 3.5 | 0.056 |
| Dissolved solids | 261 | |
| Total hardness as $CaCO_3$ | 233 | |
| pH | 7.7 | |

Bexar County

Alamo Heights -- Continued

Drillers' log:

Well 3

| | Thickness (feet) | Depth (feet) | | Thickness (feet) | Depth (feet) |
|---|---|---|---|---|---|
| Soil | 2 | 2 | Soft brown Edwards limestone | 25 | 510 |
| Caliche | 22 | 24 | Hard brown Edwards limestone | 16 | 526 |
| Caliche and yellow clay | 54 | 78 | Soft white lime | 10 | 536 |
| Hard blue clay | 12 | 90 | Hard limestone | 2 | 538 |
| Yellow clay | 20 | 110 | Soft limestone | 11 | 549 |
| Gray shale | 35 | 145 | Hard limestone | 1 | 550 |
| Hard Taylor chalk | 50 | 195 | Soft porous spongy limestone | 2 | 552 |
| Austin chalk-brown | 30 | 225 | Soft lime rock | 2 | 554 |
| Hard gray chalky shale | 20 | 245 | Hard Edwards limestone-soft streaks | 18 | 572 |
| Hard gray chalky rock | 42 | 287 | Soft honeycomb lime | ½ | 572½ |
| Eagle Ford lignite | 22 | 309 | Hard lime rock | 5½ | 578 |
| Buda lime | 56 | 365 | Soft honeycomb lime | 2 | 580 |
| Del Rio blue clay | 50 | 415 | Hard Edwards limestone | 16 | 596 |
| Del Rio yellow soft sticky clay | 7 | 422 | Soft honeycomb limestone | 4 | 600 |
| Hard sandy yellow lime (13" O.D. Casing cemented at 424 feet) | 2 | 424 | Cavity | 2 | 602 |
| Hard tan limestone | 16 | 440 | Very hard Edwards lime rock | 1½ | 603½ |
| Hard white limestone | 10 | 450 | | | |
| White Edwards limestone | 30 | 480 | | | |
| Hard brown limestone | 5 | 485 | | | |

San Antonio

Population in 1940: 253,854.

Ownership: Municipal.

Source of information: W. D. Masterson, Water Superintendent November 15, 1945

Source of supply: 38 wells.

Austin Road (Terrell Hills). 1 well, depth 600 feet.

North Brackenridge Park Station. 1 well, drilled in 1940, depth 700 feet, diameter 15 inches; deep-well turbine pump and electric motor; yield 2,800 gallons a minute.

Brackenridge Park Station. 13 wells, depths range from 750 to about 900 feet, diameters are 15, 12, and 8 inches; wells have natural flow but are equipped with booster pumps; temperature 76° F.

Market Street Station. 11 wells, drilled between 1894 and 1936, depths range from 880 to 936 feet, diameters are 15 and 12 inches; wells have natural flow but are equipped with booster pumps; temperature 76° F.

Bexar County

San Antonio -- Continued

Mission Station. 8 wells, drilled between 1914 and 1945, depths range from about 1,400 to 1,800 feet, diameters are 15, 12, and 10 inches; wells have natural flow but are equipped with booster pumps. Well No. 8, on bank of San Antonio River, drilled by Draper and Dozier in 1945, depth 1,400 feet, diameter 22 to 12-1/2 inches; deep-well turbine pump and electric motor; static water level 68 feet above land surface; yield when pumped 6,250 gallons a minute; temperature 81.5° F.

Los Angeles Heights Station. 1 well, drilled in 1941, depth 1,000 feet, diameter 15 to 12 inches; deep-well submersible pump and electric motor; yield 1,400 gallons a minute.

Olmos Heights Station. 1 well, drilled in 1940, depth 900 feet, diameter 15 to 12 inches; deep-well turbine pump and electric motor; yield 1,400 gallons a minute.

West Mistletoe Station. 1 well, drilled in 1942, depth 900 feet, diameter 15 to 12 inches; deep-well submersible pump and electric motor; yield 2,100 gallons a minute.

Woodlawn Lake Station. 1 well, drilled in 1942, depth 900 feet, diameter 12 inches; deep-well turbine pump and electric motor; yield 2,100 gallons a minute.

Pumpage:

(Average in millions of gallons a day)

| Month | 1939 | 1940 | 1941 | 1942 | 1943 | 1944 | 1945 |
|---|---|---|---|---|---|---|---|
| January | 19.4 | 24.0 | 21.9 | 23.8 | 27.8 | 27.6 | 30.3 |
| February | 22.2 | 24.0 | 22.7 | 25.4 | 32.3 | 28.4 | 32.9 |
| March | 21.1 | 24.1 | 20.7 | 24.0 | 27.0 | 25.5 | 29.3 |
| April | 30.1 | 27.6 | 24.8 | 26.9 | 34.3 | 32.2 | 34.5 |
| May | 31.1 | 26.7 | 24.4 | 26.0 | 37.4 | 30.3 | 38.1 |
| June | 33.0 | 28.3 | 27.6 | 35.5 | 35.2 | 37.9 | 45.3 |
| July | 34.7 | 28.3 | 33.5 | 32.2 | 38.8 | 44.9 | 45.9 |
| August | 29.1 | 38.0 | 38.7 | 38.4 | 44.7 | 49.2 | 46.5 |
| September | 30.4 | 31.4 | 32.1 | 31.4 | 33.2 | 36.7 | 46.7 |
| October | 26.9 | 24.8 | 23.9 | 27.1 | 29.0 | 33.7 | |
| November | 25.7 | 23.0 | 24.5 | 28.5 | 29.9 | 33.1 | |
| December | 22.5 | 21.0 | 21.7 | 25.9 | 26.3 | 29.2 | |

Maximum - 56,000,000 gallons a day in August, 1944
Total capacity of wells is 98,000,000 gallons a day.

Storage: 3 elevated tanks, Hildebrand Avenue tank, 1,000,000 gallons; Morningside Avenue tank, 1,500,000 gallons; and Terrell Hills tank, 250,000 gallons; standpipe on Dakota Street, 2,500,000 gallons.

Bexar County

San Antonio -- Continued

Number of customers: 58,049

Treatment: Chlorination at Market Street Station, which is connected with the Mission Station and serves the southern part of the city.

Analyses of water:

Date of collection: November 15, 1945 Analyzed by J. H. Rowley

| | Brackenridge Station Comp. of 13 wells | |
|---|---|---|
| | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 11 | |
| Iron (Fe) | 0.46 | |
| Calcium (Ca) | 65 | 3.244 |
| Magnesium (Mg) | 16 | 1.316 |
| Sodium (Na) | 2.1 | 0.092 |
| Potassium (K) | 1.6 | 0.041 |
| Bicarbonate ($HCO_3$) | 246 | 4.032 |
| Sulfate ($SO_4$) | 13 | 0.271 |
| Chloride (Cl) | 12 | 0.338 |
| Fluoride (F) | 0 | 0.000 |
| Nitrate ($NO_3$) | 3.2 | 0.052 |
| Dissolved solids | 258 | |
| Total hardness as $CaCO_3$ | 228 | |
| pH | 8.1 | |

Date of collection: November 15, 1945

| | Market Street Station Composite of 11 wells | | Mission Station No. 8 | |
|---|---|---|---|---|
| | Parts per million | Equivalents per million | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 12 | | 15 | |
| Iron (Fe) | 0.08 | | 0.06 | |
| Calcium (Ca) | 66 | 3.294 | 68 | 3.39 |
| Magnesium (Mg) | 15 | 1.234 | 18 | 1.48 |
| Sodium (Na) | 2.9 | 0.125 | 7.8 | 0.34 |
| Potassium (K) | 2.0 | 0.051 | 2.0 | 0.05 |
| Bicarbonate ($HCO_3$) | 245 | 4.016 | 240 | 3.93 |
| Sulfate ($SO_4$) | 13 | 0.271 | 35 | 0.73 |
| Chloride (Cl) | 12 | 0.338 | 19 | 0.54 |
| Fluoride (F) | 0 | 0.000 | 0.2 | 0.01 |
| Nitrate ($NO_3$) | 4.9 | 0.079 | 3.2 | 0.05 |
| Dissolved solids | 252 | | 295 | |
| Total hardness as $CaCO_3$ | 226 | | 244 | |
| pH | 8.2 | | 8.0 | |

Bexar County

San Antonio -- Continued

Drillers' logs:

Brackenridge Park Station

| | Thickness (feet) | Depth (feet) | | Thickness (feet) | Depth (feet) |
|---|---|---|---|---|---|
| Pit | 41 | 41 | Porous yellow lime | 12 | 745 |
| Blue shale and shells | 197 | 238 | Hard white lime | 6 | 751 |
| Austin chalk | 67 | 305 | Porous yellow lime | 5 | 756 |
| Lime and shells | 220 | 525 | Soft yellow lime | 8 | 764 |
| Lignite | 32 | 557 | Hard yellow lime | 3 | 767 |
| Lime | 48 | 605 | Honeycomb- big water | 9 | 776 |
| Del Rio mud- Set 660'4" | | | Hard yellow lime | 4 | 780 |
| of 12-1/2" casing | 54 | 659 | Honeycomb | 3 | 783 |
| Light gray lime | 8 | 667 | Hard gray lime and | | |
| Soft yellow lime | 3 | 670 | flint | 9 | 792 |
| Gray and yellow lime | 23 | 693 | Honeycomb | 3 | 795 |
| Yellow lime- 3" crevices | | | Hard flinty lime | 4 | 799 |
| at 710 and 733 feet | 40 | 733 | Honeycomb | 4 | 803 |
| | | | Hard flinty lime | 9 | 812 |
| | | | Honeycomb | 3 | 815 |
| | | | Hard flinty lime | 7 | 822 |

Market Street Station

Well 1

| | Thickness (feet) | Depth (feet) |
|---|---|---|
| Alluvial soil | 16 | 16 |
| Blue clay | 400 | 416 |
| Limestone | 304 | 720 |
| Blue clay | 40 | 760 |
| Hard limestone | 120 | 880 |

Well 15

| | Thickness (feet) | Depth (feet) | | Thickness (feet) | Depth (feet) |
|---|---|---|---|---|---|
| Rotary to surface | 6 | 6 | Hard gray shale | 41 | 262 |
| Sandy soil and rock | 10 | 16 | Very hard gray shale | 37 | 299 |
| Yellow and blue clay | 13 | 29 | Rock | 3 | 302 |
| Gravel and sand | 4 | 33 | Hard gray shale | 2 | 304 |
| Blue shale | 91 | 124 | Rock | 2 | 306 |
| Shale and shell rocks | 36 | 160 | Very hard gray shale | 18 | 324 |
| Shale | 46 | 206 | Very hard rock-chalk | 9 | 333 |
| Rock | 15 | 221 | Hard gray shale | 3 | 336 |

(Continued on next page)

Bexar County

San Antonio -- Continued

Well 15 -- Continued

| | Thickness (feet) | Depth (feet) | | Thickness (feet) | Depth (feet) |
|---|---|---|---|---|---|
| Hard rock- chalk | 2 | 338 | Hard limey shale | 10 | 783 |
| Broken lime and hard shale | 15 | 353 | Georgetown lime | 23 | 806 |
| Very hard limestone | 8 | 361 | "Doughby" Edwards | 2 | 808 |
| Hard gray sticky shale | 29 | 390 | Hard brown Edwards | 4 | 812 |
| Broken lime with streaks of shale | 94 | 484 | Hard and soft brown lime | 16 | 828 |
| Austin chalk- white | 6 | 490 | Cavity | 2 | 830 |
| Austin chalk- brown | 32 | 522 | Hard and soft lime | 38 | 868 |
| Very rough white chalk | 6 | 528 | Porous or cavity | 1 | 869 |
| Dark brown chalk | 52 | 580 | Hard lime | 17 | 886 |
| Gray Austin chalk | 52 | 632 | Porous or cavity | 2 | 888 |
| Eagle Ford lignite | 26 | 658 | Hard lime with soft streaks | 5 | 893 |
| Buda lime | 54 | 712 | Hard and soft lime with porous or honeycomb structure | 42 | 935 |
| Del Rio | 61 | 773 | Hard rock- black flint | 1 | 936 |

Mission Station

Well 8

| | Thickness (feet) | Depth (feet) |
|---|---|---|
| Gravel and clay | 30 | 30 |
| Yellow clay | 15 | 45 |
| Gravel | 5 | 50 |
| Blue clay | 30 | 80 |
| Brown shale | 700 | 780 |
| Hard Taylor | 250 | 1030 |
| Austin chalk | 175 | 1205 |
| Shale | 31 | 1236 |
| Lime | 21 | 1257 |
| Lime | 10 | 1267 |
| Shale and lime | 18 | 1285 |
| Lime | 22 | 1307 |
| Lost circulation | 5 | 1312 |
| Edwards limestone | 78 | 1400 |

## Brooks County

### Falfurrias

Population in 1940: 2,800.

Owner: Central Power & Light Co.

Source of information: Ted Lester, Operator March 10, 1945

Source of supply: 3 wells at water and ice plant near center of city.

Well 1. Drilled in 1922 by Chester Downs, depth 749 feet, diameter 5-3/16 inches, 63 feet of screen at bottom; air-lift; static water level 26.2 feet below land surface on November 5, 1943; yield 140 gallons a minute; standby well; temperature 84° F.

Well 2. Drilled in 1930 by Layne-Texas Company, depth 755 feet, diameter 12 to 8 inches, 61 feet of screen at bottom; deep-well turbine pump and 30-horsepower electric motor; static water level 25.4 below land surface on November 5, 1943; yield 200 gallons a minute.

Well 3. Drilled in 1945 by Layne-Texas Company, depth 787 feet, diameter 10-3/4 to 5-1/2 inches, screen from 678 to 766 feet; deep-well turbine pump and 25-horsepower electric motor; static water level 54.7 feet below land surface in March 1945; yield 305 gallons a minute with a drawdown of 128 feet after 8 hours pumping.

Pumpage:

(Average in gallons a day)

| | 1941 | 1942 | 1943 | 1944 | 1945 |
|---|---|---|---|---|---|
| January | | 126,000 | 139,000 | 160,000 | 245,000 |
| February | | 140,000 | 168,000 | 182,000 | 280,000 |
| March | | 135,000 | 161,000 | 208,000 | |
| April | | 152,000 | 180,000 | 254,000 | |
| May | | 145,000 | 218,000 | 255,000 | |
| June | | 220,000 | 191,000 | 254,000 | |
| July | | 142,000 | 225,000 | 283,000 | |
| August | | 169,000 | 274,000 | 325,000 | |
| September | | 163,000 | 218,000 | 263,000 | |
| October | 114,000 | 152,000 | 173,000 | 276,000 | |
| November | 143,000 | 175,000 | 161,000 | 258,000 | |
| December | 111,000 | 122,000 | 153,000 | 267,000 | |

Brooks County

Falfurrias -- Continued

Storage: Concrete ground reservoir, 50,000 gallons; elevated steel tank, 50,000 gallons.

Number of customers: 631.

Treatment: Occasional chlorination.

Analyses of water:

Date of collection: March 10, 1945 Analyzed by M. L. Begley

| | Well 1 | | Well 2 | |
|---|---|---|---|---|
| | Parts per million | Equivalents per million | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 23 | | 23 | |
| Iron (Fe) | 1.1 | | 0.08 | |
| Calcium (Ca) | 42 | 2.10 | 40 | 2.00 |
| Magnesium (Mg) | 17 | 1.40 | 17 | 1.40 |
| Sodium (Na) | 161 | 7.02 | 167 | 7.27 |
| Potassium (K) | 9.1 | 0.23 | 9.9 | 0.25 |
| Bicarbonate ($HCO_3$) | 286 | 4.69 | 289 | 4.74 |
| Sulfate ($SO_4$) | 42 | 0.87 | 41 | 0.85 |
| Chloride (Cl) | 183 | 5.16 | 188 | 5.30 |
| Fluoride (F) | 0.6 | 0.03 | 0.6 | 0.03 |
| Nitrate ($NO_3$) | 0 | 0.00 | 0 | 0.00 |
| Dissolved solids | 619 | | 629 | |
| Total hardness as $CaCO_3$ | 175 | | 170 | |
| pH | 8.1 | | 7.8 | |

Drillers' logs:

Well 2

| | Thickness (feet) | Depth (feet) | | Thickness (feet) | Depth (feet) |
|---|---|---|---|---|---|
| Surface soil | 1 | 1 | Sand | 6 | 226 |
| Clay | 6 | 7 | Clay | 5 | 231 |
| White sand | 12 | 19 | Sand and clay | 23 | 254 |
| Clay | 3 | 22 | Soft clay | 46 | 300 |
| Hard caliche | 18 | 40 | Hard dry clay | 52 | 352 |
| Clay | 14 | 54 | Rock | 2 | 354 |
| Soft caliche | 15 | 69 | Clay | 6 | 360 |
| Hard dry clay | 8 | 77 | Sand and boulders | 20 | 380 |
| Soft clay | 23 | 100 | Tough clay | 23 | 403 |
| Hard caliche | 9 | 109 | Sand | 9 | 412 |
| Tough clay and lime | 21 | 130 | Gumbo | 27 | 439 |
| Tough clay and lime rock | 74 | 204 | Sand (broken) | 6 | 445 |
| | | | Gumbo | 22 | 467 |
| Sand and soft clay | 12 | 216 | Tough lime | 3 | 470 |
| Clay | 4 | 220 | Sand | 4 | 474 |

(Continued on next page)

Brooks County

Falfurrias -- Continued

Well 2 -- Continued

| | Thickness (feet) | Depth (feet) | | Thickness (feet) | Depth (feet) |
|---|---|---|---|---|---|
| Hard clay | 3 | 477 | Gumbo | 4 | 574 |
| Sand (fine-grained brown water sand) | 20 | 497 | Soft water sand | 17 | 591 |
| Hard sand and lime | 43 | 540 | Gumbo | 6 | 597 |
| Tough gumbo | 7 | 547 | Sand | 27 | 624 |
| Hard water sand | 23 | 570 | Tough gumbo | 58 | 682 |
| | | | Sand (good) | 68 | 750 |
| | | | Sand rock | 1 | 751 |
| | | | Gumbo | 4 | 755 |

Well 3

| | Thickness (feet) | Depth (feet) | | Thickness (feet) | Depth (feet) |
|---|---|---|---|---|---|
| Surface soil | 1 | 1 | Clay and sand | 24 | 424 |
| Clay | 7 | 8 | Sand | 10 | 434 |
| Sand | 12 | 20 | Hard clay | 59 | 493 |
| Clay | 3 | 23 | Brown sand | 18 | 511 |
| Hard caliche | 17 | 40 | Hard sand and lime | 54 | 565 |
| Clay and caliche | 36 | 76 | Lime | 2 | 567 |
| Sandy clay | 26 | 102 | Sand | 35 | 602 |
| Caliche | 10 | 112 | Sand and lime | 5 | 607 |
| Clay and lime | 90 | 202 | Sand | 18 | 625 |
| Sand and clay | 27 | 249 | Hard clay and sand | 20 | 645 |
| Sand | 6 | 255 | Hard clay | 51 | 696 |
| Sand and clay | 65 | 320 | Sand | 20 | 716 |
| Hard clay | 60 | 380 | Broken sand | 68 | 784 |
| Sand and boulders | 20 | 400 | Clay and sand | 3 | 787 |

## Caldwell County

### Dale

Population in 1940: 200.

Owner: A. R. Osteen.

Source of information: A. R. Osteen, Owner February 27, 1946

Source of supply: Well near M. K. & T. Railway track in southeast edge of town, drilled in 1927 by A. R. Osteen, depth 110 feet, diameter 7 inches; cylinder pump and electric motor; static water level 71.6 feet below land surface on February 27, 1946.

Storage: Elevated tank, about 3,000 gallons.

Number of customers: 20.

Treatment: None.

Analysis of water:

Date of collection: February 27, 1946 Analyzed by J. H. Rowley

| | Parts per million | Equivalents per million |
|---|---|---|
| Silica ($SiO_2$) | 36 | |
| Iron (Fe) | 0.88 | |
| Calcium (Ca) | 132 | 6.59 |
| Magnesium (Mg) | 18 | 1.48 |
| Sodium (Na) | 36 | 1.57 |
| Potassium (K) | 17 | 0.43 |
| Bicarbonate ($HCO_3$) | 376 | 6.16 |
| Sulfate ($SO_4$) | 72 | 1.50 |
| Chloride (Cl) | 85 | 2.40 |
| Fluoride (F) | 0.0 | 0.00 |
| Nitrate ($NO_3$) | 0.8 | 0.01 |
| Dissolved solids | 647 | |
| Total hardness as $CaCO_3$ | 404 | |
| pH | 7.4 | |

### Fentress

Population in 1940: 250.

Owner: Fentress-Prairie Lea Utilities Company.

Source of information: J. C. Dauchy, Gin Operator February 9, 1943.

Source of supply: San Marcos River and well. Water is pumped both from the river and a concrete curbed dug well about 40 feet deep near the river bank. A low dam has been constructed below the pumping station to provide channel storage. The station is equipped with three Triplex pumps. This plant supplies Fentress, Prairie Lea, and a rural area consisting of 7,700 acres of farms.

Caldwell County

Fentress -- Continued

Storage: Elevated tank at Fentress, estimated 15,000 gallons; elevated tank at Prairie Lee, 15,000 gallons; elevated tank in rural area, 60,000 gallons.

Number of customers: 159.

Treatment: Chlorination.

Analysis of water:

Date of collection: February 9, 1943 Analyzed by J. H. Rowley

| | Well | |
|---|---|---|
| | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 15 | |
| Iron (Fe) | 0.05 | |
| Calcium (Ca) | 67 | 3.34 |
| Magnesium (Mg) | 19 | 1.56 |
| Sodium (Na) | 12 | 0.51 |
| Potassium (K) | 3.4 | 0.09 |
| Bicarbonate ($HCO_3$) | 257 | 4.21 |
| Sulfate ($SO_4$) | 26 | 0.54 |
| Chloride (Cl) | 20 | 0.56 |
| Fluoride (F) | 0.6 | 0.03 |
| Nitrate ($NO_3$) | 10 | 0.16 |
| Dissolved solids | 300 | |
| Total hardness as $CaCO_3$ | 245 | |
| pH | 8.0 | |

Lockhart

Population in 1940: 5,018.

Source of information: M. Lancaster, Manager Public Utilities Company February 6, 1946

Ownership: Municipal.

Source of supply: Spring and 2 large open-pit wells.

Spring. At old waterworks on Brazos Street, four-tenths mile east of elevated tank; yield 350 gallons a minute.

Well 2. One block east of water tower; depth about 200 feet; yield 600 gallons a minute; unused since 1943.

Well 3. Located 150 yards northwest of elevated tank; yield 375 gallons a minute.

Pumpage: Maximum 218,000 gallons, minimum 172,000 gallons, average 195,000 gallons a day.

Caldwell County

Lockhart -- Continued

Storage: Elevated tank, 300,000 gallons; ground reservoir, 430,000 gallons.

Number of customers: 1,095.

Treatment: Coagulation, sedimentation, and chlorination.

Analyses of water:

Date of collection: February 8, 1946 Analyzed by C. B. Cibulka

| | Spring | | Well 2 | |
|---|---|---|---|---|
| | Parts per million | Equivalents per million | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 14 | | 12 | |
| Iron (Fe) | 0.04 | | 0.96 | |
| Calcium (Ca) | 126 | 6.29 | 246 | 12.28 |
| Magnesium (Mg) | 6.1 | 0.50 | 15 | 1.23 |
| Sodium (Na) | 54 | 2.34 | 269 | 11.70 |
| Potassium (K) | 12 | 0.31 | 15 | 0.38 |
| Bicarbonate ($HCO_3$) | 322 | 5.28 | 293 | 4.80 |
| Sulfate ($SO_4$) | 47 | 0.98 | 321 | 6.68 |
| Chloride (Cl) | 82 | 2.31 | 465 | 13.11 |
| Fluoride (F) | 0.0 | 0.00 | 0.6 | 0.03 |
| Nitrate ($NO_3$) | 54 | 0.87 | 60 | 0.97 |
| Dissolved solids | 566 | | 1,620 | |
| Total hardness as $CaCO_3$ | 340 | | 676 | |
| pH | 7.3 | | 7.4 | |

Date of collection: February 8, 1946 Analyzed by C. B. Cibulka

| | Well 3 | |
|---|---|---|
| | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 15 | |
| Iron (Fe) | 0.14 | |
| Calcium (Ca) | 166 | 8.29 |
| Magnesium (Mg) | 10 | 0.82 |
| Sodium (Na) | 147 | 6.40 |
| Potassium (K) | 11 | 0.28 |
| Bicarbonate ($HCO_3$) | 308 | 5.05 |
| Sulfate ($SO_4$) | 174 | 3.62 |
| Chloride (Cl) | 218 | 6.15 |
| Fluoride (F) | 0.0 | 0.00 |
| Nitrate ($NO_3$) | 60 | 0.97 |
| Dissolved solids | 979 | |
| Total hardness as $CaCO_3$ | 456 | |
| pH | 7.4 | |

Caldwell County

## Luling

Population in 1940: 4,437.

Ownership: Municipal.

Source of information: A. O. Krauskoff, Water Superintendent February 7, 1946.

Source of supply: 2 wells about 300 feet apart, at the Central Power and Light Company Plant, between Davis and Fannin Streets.

Well 1. Depth 320 feet, diameter 16 to 8 inches; deep-well turbine pump and 30-horsepower electric motor; pump set at 125 feet; yield 460 gallons a minute.

Well 2. Depth 304 feet, diameter 16 to 8 inches; deep-well turbine pump and 25-horsepower electric motor; pump set at 168 feet; yield 300 gallons a minute.

Pumpage (estimated): Average 185,000 gallons a day; summer 325,000 gallons a day.

Storage: 2 standpipes, 188,000 and 84,600 gallons; ground reservoir, 50,000 gallons.

Number of customers: 1,181.

Treatment: None.

Analyses of water:

Date of collection: February 7, 1946 Analyzed by J. H. Rowley

| | Well 1 | | Well 2 | |
|---|---|---|---|---|
| | Parts per million | Equivalents per million | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 6.0 | | 8.0 | |
| Iron (Fe) | 0.02 | | 0.09 | |
| Calcium (Ca) | 2.7 | 0.13 | 2.0 | 0.10 |
| Magnesium (Mg) | 1.7 | 0.14 | 1.4 | 0.12 |
| Sodium (Na) | 419 | 18.20 | 416 | 18.09 |
| Potassium (K) | 5.0 | 0.13 | 5.2 | 0.13 |
| Bicarbonate ($HCO_3$) | 628 | 10.28 | 545 | 8.92 |
| Sulfate ($SO_4$) | 178 | 3.71 | 227 | 4.73 |
| Chloride (Cl) | 163 | 4.60 | 170 | 4.79 |
| Fluoride (F) | 0.2 | 0.01 | 0.0 | 0.00 |
| Nitrate ($NO_3$) | 0.0 | 0.00 | 0.0 | 0.00 |
| Dissolved solids | 1,085 | | 1,098 | |
| Total hardness as $CaCO_3$ | 14 | | 11 | |
| pH | 8.4 | | 8.4 | |

Caldwell County

Luling -- Continued

Drillers' logs:

Well 1

| | Thickness (feet) | Depth (feet) | | Thickness (feet) | Depth (feet) |
|---|---|---|---|---|---|
| Gravel | 20 | 20 | Sand rock | 3 | 176 |
| Sand | 20 | 40 | Rock | 4 | 180 |
| Sand rock | 1 | 41 | Sand | 26 | 206 |
| Blue shale | 38 | 79 | Rock | 2 | 208 |
| Rock | 2 | 81 | Sand | 6 | 214 |
| Mud and sand | 11 | 92 | Rock | 2 | 216 |
| Lignite | 15 | 107 | Sand | 58 | 274 |
| Hard shale | 33 | 140 | Rock | 2 | 276 |
| Soft shale | 12 | 152 | Sand | 4 | 280 |
| Fine grained sand | 15 | 167 | Rock | 2 | 282 |
| Shale | 6 | 173 | Sand | 38 | 320 |

Well 2

| | Thickness (feet) | Depth (feet) | | Thickness (feet) | Depth (feet) |
|---|---|---|---|---|---|
| Clay and boulders | 48 | 48 | Sand | 11 | 187 |
| Clay and sand | 63 | 111 | Gumbo | 4 | 191 |
| Rock | 5 | 116 | Sand | 42 | 233 |
| Sand | 5 | 121 | Gumbo | 3 | 236 |
| Rock gumbo | 4 | 125 | Sand | 10 | 246 |
| Sand | 20 | 145 | Gumbo | 5 | 251 |
| Gumbo | 20 | 165 | Sand | 27 | 278 |
| Sand | 7 | 172 | Sand and boulders | 21 | 299 |
| Gumbo | 4 | 176 | Lignite | 5 | 304 |

Lytton Springs

Population in 1940: 200.

Source of information: D. R. Straum, Operator, February 27, 1946

Owners: Lytton Springs Park Ass'n.
Lytton Springs Gin Company

Source of supply: Large pit in creek channel and well.

System a. Pit in creek channel owned by Lytton Springs Park Association, dug by L. Glasscock, depth 18 feet, diameter 16 feet; piston-type pump and gasoline engine; static water level 16.9 feet below land surface on February 27, 1946; temperature 58½° F.

System b. Well owned by Lytton Springs Gin Company, dug by Mr. Crosswaite, depth 49 feet, diameter 17-1/2 feet; jet-type pump and 1½-horsepower electric motor; static water level 47.4 feet below land surface on February 27, 1946; yield 12 gallons a minute; temperature 63° F.

Caldwell County

Lytton Springs -- Continued

Storage: Steel ground tank, 20,000 gallons.

Number of customers: 25.

Treatment: None.

Analysis of water:

Date of collection: February 27, 1946 Analyzed by J. H. Rowley

| | Well | |
|---|---|---|
| | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 35 | |
| Iron (Fe) | 1.7 | |
| Calcium (Ca) | 46 | 2.296 |
| Magnesium (Mg) | 6.7 | 0.551 |
| Sodium (Na) | 36 | 1.566 |
| Potassium (K) | 4.6 | 0.118 |
| Bicarbonate ($HCO_3$) | 153 | 2.508 |
| Sulfate ($SO_4$) | 20 | 0.416 |
| Chloride (Cl) | 51 | 1.438 |
| Fluoride (F) | 0.2 | 0.011 |
| Nitrate ($NO_3$) | 9.8 | 0.158 |
| Dissolved solids | 298 | |
| Total hardness as $CaCO_3$ | 142 | |
| pH | 7.2 | |

Martindale

Population in 1940: 500.

Source of information: Gin operator

Owner: A. H. Smith Gin Company.

February 9, 1947

Source of supply: Dug well, depth 27 feet, diameter 60 inches; 2 Triplen 5-inch pumps.

Storage: Elevated tank, 20,000 gallons.

Number of customers: 90.

Treatment: None.

Caldwell County

Martindale -- Continued

Analysis of water:

Date of collection: February 9, 1943 Analyzed by J. H. Rowley

| | Parts per million | Equivalents per million |
|---|---|---|
| Silica ($SiO_2$) | 14 | |
| Iron (Fe) | 0.08 | |
| Calcium (Ca) | 90 | 4.49 |
| Magnesium (Mg) | 23 | 1.89 |
| Sodium (Na) | 18 | 0.78 |
| Potassium (K) | 3.4 | 0.09 |
| Bicarbonate ($HCO_3$) | 325 | 5.33 |
| Sulfate ($SO_4$) | 19 | 0.40 |
| Chloride (Cl) | 21 | 0.59 |
| Fluoride (F) | 0.2 | 0.01 |
| Nitrate ($NO_3$) | 57 | 0.92 |
| Dissolved solids | 406 | |
| Total hardness as $CaCO_3$ | 319 | |
| pH | 7.6 | |

Maxwell

Population in 1940: 250.

Source of information: B. E. Scheele, A. R. Hoffman, February 14, 1946

Owners: Upper Terrace Waterworks, Schawe Gin Company. Lower Terrace Waterworks, A. R. Hoffman and O. M. Hoffman.

Source of supply: 2 wells.

Upper Terrace Waterworks. Dug well 1-3/4 miles north of Maxwell, dug in 1916, depth 20 feet, diameter 148 to 60 inches, brick walls; piston-type pump and diesel engine; static water level 12.1 feet below land surface on February 14, 1946; yield 400 gallons a minute.

Lower Terrace Waterworks. Dug well 2 miles southwest of Maxwell, dug in 1925, depth 25 feet, diameter 69 inches, brick and concrete walls; piston- type pump and 10-horsepower electric motor; static water level 8.2 feet below land surface on February 14, 1946; reported yield about 400 gallons a minute with drawdown of 1.5 feet after pumping 24 hours.

Pumpage (estimated): Upper Terrace Waterworks, about 10,000 gallons a day in winter and 30,000 gallons a day in summer; Lower Terrace Waterworks, average about 15,000 gallons a day.

Caldwell County

Maxwell -- Continued

Storage: Upper Terrace Waterworks, concrete ground reservoir, 100,000 gallons; Lower Terrace Waterworks, elevated wooden tank, 20,000 gallons. (Water systems have separate distribution lines).

Number of customers: Upper Terrace, 18; Lower Terrace, 24.

Treatment: None.

Analyses of water:

Date of collection: February 14, 1946 Analyzed by C. B. Cibulka

| | Upper Terrace | | Lower Terrace | |
|---|---|---|---|---|
| | Parts per million | Equivalents per million | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | | | 14 | |
| Iron (Fe) | | | 0.06 | |
| Calcium (Ca) | 122 | 6.09 | 244 | 12.18 |
| Magnesium (Mg) | 5.1 | 0.42 | 28 | 2.30 |
| Sodium & Potassium (Na + K) | 38 | 1.64 | 177 | 7.31 |
| Bicarbonate ($HCO_3$) | 268 | 4.39 | 265 | 4.34 |
| Sulfate ($SO_4$) | 40 | 0.83 | 183 | 3.81 |
| Chloride (Cl) | 81 | 2.28 | 426 | 12.01 |
| Fluoride (F) | | | 0.6 | 0.03 |
| Nitrate ($NO_3$) | 40 | 0.65 | 99 | 1.60 |
| Dissolved solids | 513 | | 1,300 | |
| Total hardness as $CaCO_3$ | 326 | | 724 | |
| pH | | | 7.2 | |

McMahan

Population in 1940: 250.

Owner: J. Chamberlin.

Source of information: J. Chamberlin, owner March 1, 1946

Source of supply: Well located 100 yards north of cotton gin, drilled in 1929 by Mr. Dannelly, depth 231 feet, diameter 5 inches; jet-type pump and 1½-horsepower electric motor; static water level 48 feet below land surface in November 1945; yield 10 gallons a minute with pumping level at 64.8 feet below land surface on March 1, 1946; temperature 73° F.

Storage: Elevated wooden tank, 2,700 gallons.

Number of customers: 15.

Treatment: None.

Caldwell County

McMahan -- Continued

Analysis of water:

Date of collection: March 1, 1946 Analyzed by J. H. Rowley

| | Parts per million | Equivalents per million |
|---|---|---|
| Silica ($SiO_2$) | 22 | |
| Iron (Fe) | 0.19 | |
| Calcium (Ca) | 96 | 4.79 |
| Magnesium (Mg) | 59 | 4.85 |
| Sodium (Na) | 134 | 5.84 |
| Potassium (K) | 16 | 0.41 |
| Bicarbonate ($HCO_3$) | 430 | 7.05 |
| Sulfate ($SO_4$) | 96 | 2.00 |
| Chloride (Cl) | 229 | 6.46 |
| Fluoride (F) | 0.6 | 0.03 |
| Nitrate ($NO_3$) | 22 | 0.35 |
| Dissolved solids | 946 | |
| Total hardness as $CaCO_3$ | 482 | |
| pH | 7.5 | |

Uhland

Population in 1940: 100.

Owner: A. F. Garbrecht.

Source of information: A. F. Garbrecht, owner February 8, 1946

Source of supply: Spring 2-5/8 miles west of Uhland in Hays County, rock walls and concrete cover; 4 miles of 2-inch pipe from spring to Uhland; gravity flow.

Storage: None.

Number of customers: 5.

Treatment: None.

Caldwell County

Uhland -- Continued

Analysis of water:

Date of collection: February 8, 1946 Analyzed by C. B. Cibulka

| | Parts per million | Equivalents per million |
|---|---|---|
| Silica ($SiO_2$) | 14 | |
| Iron (Fe) | 0.03 | |
| Calcium (Ca) | 114 | 5.69 |
| Magnesium (Mg) | 5.9 | 0.49 |
| Sodium (Na) | 9.7 | 0.42 |
| Potassium (K) | 5.0 | 0.13 |
| Bicarbonate ($HCO_3$) | 286 | 4.69 |
| Sulfate ($SO_4$) | 24 | 0.50 |
| Chloride (Cl) | 21 | 0.59 |
| Fluoride (F) | 0.6 | 0.03 |
| Nitrate ($NO_3$) | 57 | 0.92 |
| Dissolved solids | 392 | |
| Total hardness as $CaCO_3$ | 309 | |
| pH | 7.3 | |

Calhoun County

Port Lavaca

Population in 1940: 2,069.

Source of information: T. S. Upchurch, Water Superintendent July 1945

Ownership: Municipal.

Source of supply: 3 wells about 3-1/4 miles northwest of town.

Well 1. Drilled in 1935 by Layne-Texas Company, depth 240 feet, diameter 8 inches; deep-well turbine pump and 5-horsepower electric motor; static water level 14.0 feet below land surface on January 5, 1940; yield 135 gallons a minute with drawdown of 30 feet.

Well 2. About 200 feet southeast of well 1, drilled in 1935 by Layne-Texas Company, depth 240 feet, diameter 8 inches; deep-well turbine pump and 5-horsepower electric motor; yield 135 gallons a minute.

Well 3. About 500 feet northeast of well 1, drilled in 1942 by Layne-Texas Company, depth 242 feet; deep-well turbine pump and 10-horsepower electric motor; yield 300 gallons a minute.

Pumpage:

(Average in gallons a day)

1945

| | | | |
|---|---|---|---|
| January | 160,000 | April | 180,700 |
| February | 175,000 | May | 191,300 |
| March | 183,200 | June | 189,000 |

Storage: Elevated tank, 75,000 gallons, 2 ground reservoirs, 50,000 gallons each.

Number of customers: 604.

Treatment: Chlorination.

Calhoun County

Port Lavaca -- Continued

Analysis of water:

Date of collection: July 1945 Analyzed by J. H. Rowley

| | Well 3 | |
|---|---|---|
| | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 17 | |
| Iron (Fe) | 0.05 | |
| Calcium (Ca) | 40 | 2.00 |
| Magnesium (Mg) | 14 | 1.15 |
| Sodium (Na) | 234 | 10.17 |
| Potassium (K) | 7.7 | 0.20 |
| Bicarbonate ($HCO_3$) | 466 | 7.64 |
| Sulfate ($SO_4$) | 16 | 0.33 |
| Chloride (Cl) | 195 | 5.50 |
| Fluoride (F) | 1.0 | 0.05 |
| Nitrate ($NO_3$) | 0.0 | 0.00 |
| Dissolved solids | 768 | |
| Total hardness as $CaCO_3$ | 158 | |
| pH | 7.4 | |

Seadrift

Population in 1940: 437.

Ownership: Municipal.

Source of information: J. L. Wilson, Water Superintendent July 1945

Source of supply: Well 3 miles southeast of town, drilled in 1939, depth 86 feet, diameter 6 inches; deep-well turbine pump and 3-horsepower electric motor; yield about 70 gallons a minute.

Pumpage (estimated): 2,500 gallons a day.

Storage: Elevated tank, 50,000 gallons.

Number of customers: 129.

Treatment: Aeration and chlorination.

Calhoun County

Seadrift -- Continued

Analysis of water:

Date of collection: July 1945 Analyzed by J. H. Rowley

| | Parts per million | Equivalents per million |
|---|---|---|
| Silica ($SiO_2$) | 19 | |
| Iron (Fe) | 0.08 | |
| Calcium (Ca) | 39 | 1.95 |
| Magnesium (Mg) | 19 | 1.56 |
| Sodium (Na) | 134 | 5.84 |
| Potassium (K) | 6.6 | 0.17 |
| Bicarbonate ($HCO_3$) | 312 | 5.11 |
| Sulfate ($SO_4$) | 26 | 0.54 |
| Chloride (Cl) | 134 | 3.78 |
| Fluoride (F) | 1.4 | 0.07 |
| Nitrate ($NO_3$) | 1.2 | 0.02 |
| Dissolved solids | 536 | |
| Total hardness as $CaCO_3$ | 176 | |
| pH | 7.5 | |

## Cameron County

### Brownsville

Population in 1940: 22,083.

Ownership: Municipal.

Source of information: R. G. Hall, August 3, 1945

Source of supply: Rio Grande.

Pumpage: Maximum 4,300,000 gallons, average 2,500,000 gallons a day.

Storage: Ground reservoirs, 8,000,000 gallons; no elevated tank - operates on high-pressure system with 85 to 90 pounds.

Treatment: Coagulation, sedimentation, rapid sand filtration, pre and post chlorination.

Analysis of water:

Date of collection: August 3, 1945 Analyzed by C. B. Cibulka

| | Finished Water | |
|---|---|---|
| | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 11 | |
| Iron (Fe) | 0.06 | |
| Calcium (Ca) | 87 | 4.34 |
| Magnesium (Mg) | 17 | 1.40 |
| Sodium (Na) | 91 | 3.96 |
| Potassium (K) | 11 | 0.28 |
| Bicarbonate ($HCO_3$) | 128 | 2.10 |
| Sulfate ($SO_4$) | 220 | 4.58 |
| Chloride (Cl) | 114 | 3.22 |
| Fluoride (F) | 0.6 | 0.03 |
| Nitrate ($NO_3$) | 3.2 | 0.05 |
| Dissolved solids | 634 | |
| Total hardness as $CaCO_3$ | 287 | |
| pH | 7.8 | |

### Combes

Population in 1940: 300.

Owner: Mrs. Doris Templeton.

Source of information: C. P. Morgan, pumper, June 13, 1945

Source of supply: 5 wells at southeast corner of town near irrigation canal, depth 32 feet, diameter 7 inches, 3 wells connected to piston suction pump with 5-horsepower electric motor and 2 wells equipped with windmills; static water level 8.5 feet below land surface on June 13, 1945; combined yield about 30 gallons a minute; temperature 75° F.

Combes -- Continued

Pumpage (estimated): Maximum 30,000 gallons a day.

Storage: Steel pressure tank, 10,000 gallons; concrete ground reservoir, 30,000 gallons.

Number of customers: 100.

Treatment: None.

Analysis of water:

Date of collection: June 13, 1945 Analyzed by J. H. Rowley

| | Composite sample | |
|---|---|---|
| | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 32 | |
| Iron (Fe) | 0.11 | |
| Calcium (Ca) | 114 | 5.69 |
| Magnesium (Mg) | 37 | 3.04 |
| Sodium (Na) | 325 | 14.13 |
| Potassium (K) | 8.8 | 0.23 |
| Bicarbonate ($HCO_3$) | 418 | 6.85 |
| Sulfate ($SO_4$) | 356 | 7.41 |
| Chloride (Cl) | 308 | 8.69 |
| Fluoride (F) | 1.0 | 0.05 |
| Nitrate ($NO_3$) | 5.4 | 0.09 |
| Dissolved solids | 1,390 | |
| Total hardness as $CaCO_3$) | 436 | |
| pH | 7.2 | |

Harlingen

Population in 1940: 13,306.

Source of information: E. C. Bennett, Manager Central Power & Light Company June 28, 1945

Owner: Central Power & Light Co.

Source of supply: Canal from Rio Grande.

Cameron County

Harlingen -- Continued

Pumpage:

(Average in gallons a day)

| | 1942 | 1943 | 1944 | 1945 |
|---|---|---|---|---|
| January | 678,000 | 1,068,000 | 1,210,000 | 1,594,000 |
| February | 982,000 | 1,450,000 | 1,534,000 | 1,796,000 |
| March | 866,000 | 1,200,000 | 1,400,000 | 1,776,000 |
| April | 1,092,000 | 1,550,000 | 1,752,000 | 2,200,000 |
| May | 1,016,000 | 1,742,000 | 1,688,000 | 2,128,000 |
| June | 1,322,000 | 1,365,000 | 1,657,000 | 2,282,000 |
| July | 856,000 | 1,563,000 | 1,500,000 | |
| August | 1,155,000 | 2,050,000 | 1,752,000 | |
| September | 1,355,000 | 1,440,000 | 1,579,000 | |
| October | 1,244,000 | 1,085,000 | 1,376,000 | |
| November | 1,185,000 | 1,298,000 | 1,564,000 | |
| December | 1,265,000 | 1,172,000 | | |

Maximum 2,800,000 gallons a day

Storage: Elevated tank, 150,000 gallons; impounding reservoir, 55,000,000 gallons.

Number of customers: 3,026.

Treatment: Aeration, coagulation, sedimentation, rapid sand filtration, pre and post chlorination.

Analysis of water:

Date of collection: August 6, 1945 Analyzed by J. H. Rowley

| | Finished Water | |
|---|---|---|
| | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 12 | |
| Iron (Fe) | 0.19 | |
| Calcium (Ca) | 92 | 4.59 |
| Magnesium (Mg) | 16 | 1.32 |
| Sodium (Na) | 84 | 3.67 |
| Potassium (K) | 7.5 | 0.19 |
| Bicarbonate ($HCO_3$) | 140 | 2.29 |
| Sulfate ($SO_4$) | 198 | 4.12 |
| Chloride (Cl) | 114 | 3.22 |
| Fluoride (F) | 1.8 | 0.09 |
| Nitrate ($NO_3$) | 3.0 | 0.05 |
| Dissolved solids | 660 | |
| Total hardness as $CaCO_3$) | 296 | |
| pH | 7.7 | |

La Feria

Population in 1940: 1,614.

Ownership: Municipal.

Source of information:
O. O. Butcher, City Secretary
H. T. Anderson, Water Sup't.
June 9, 1945

La Feria -- Continued

Source of supply: Well at concrete tank and city hall, drilled in 1929 by Layne-Texas Company, depth 216 feet, diameter 16 to 8 inches, screens at 115 -156 and 192 - 213 feet; deep-well turbine pump and 10-horsepower electric motor; static water level 7 feet below land surface in December 1929 and 9.2 feet after pump had been shut down 20 minutes on June 9, 1945; yield 380 gallons a minute with a drawdown of 21 feet; temperature 78° F.

Pumpage (estimated): Average 50,000 gallons a day.

Storage: Concrete ground reservoir, 45,000 gallons.

Number of customers: 310.

Treatment: None.

Analysis of water:

Date of collection: June 9, 1945 Analyzed by J. H. Rowley

| | Parts per million | Equivalents per million |
|---|---|---|
| Silica ($SiO_2$) | 35 | |
| Iron (Fe) | 2.1 | |
| Calcium (Ca) | 96 | 4.79 |
| Magnesium (Mg) | 48 | 3.95 |
| Sodium (Na) | 462 | 20.06 |
| Potassium (K) | 16 | 0.41 |
| Bicarbonate ($HCO_3$) | 465 | 7.62 |
| Sulfate ($SO_4$) | 460 | 9.58 |
| Chloride (Cl) | 420 | 11.85 |
| Fluoride (F) | 1.2 | 0.06 |
| Nitrate ($NO_3$) | 6.1 | 0.10 |
| Dissolved solids | 1,780 | |
| Total hardness as $CaCO_3$ | 437 | |
| pH | 7.4 | |

Driller's log:

| | Thickness (feet) | Depth (feet) | | Thickness (feet) | Depth (feet) |
|---|---|---|---|---|---|
| Surface soil | 2 | 2 | Sand | 43 | 159 |
| Clay | 30 | 32 | Sand rock | 2 | 161 |
| Sand | 22 | 54 | Clay | 6 | 167 |
| Tough clay | 22 | 76 | Sand and boulders | 15 | 182 |
| Sand | 37 | 113 | Rock | 1 | 183 |
| Clay | 3 | 116 | Clay | 3 | 186 |

Cameron County

Los Fresnos

Population in 1940: 475.

Ownership: Municipal.

Source of information: Hall Palmer, Water Superintendent July 11, 1945

Source of supply: Canal from Rio Grande.

Pumpage: Average 20,000 gallons a day.

Storage: Elevated tank, 25,000 gallons; ground reservoir, 45,000 gallons.

Number of customers: 125.

Treatment: Chlorination.

Analysis of water:

Date of collection: August 6, 1945 Analyzed by J. H. Rowley

| | Finished Water | |
|---|---|---|
| | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 12 | |
| Iron (Fe) | 0.19 | |
| Calcium (Ca) | 92 | 4.59 |
| Magnesium (Mg) | 16 | 1.32 |
| Sodium (Na) | 84 | 3.67 |
| Potassium (K) | 7.5 | 0.19 |
| Bicarbonate ($HCO_3$) | 140 | 2.29 |
| Sulfate ($SO_4$) | 198 | 4.12 |
| Chloride (Cl) | 114 | 3.22 |
| Fluoride (F) | 1.8 | 0.09 |
| Nitrate ($NO_3$) | 3.0 | 0.05 |
| Dissolved solids | 660 | |
| Total hardness as $CaCO_3$ | 296 | |
| pH | 7.7 | |

Port Isabel

Population in 1940: 1,440.

Ownership: Municipal.

Source of information: B. B. Burnell, Mayor July 1945

Source of supply: Rio Grande.

Storage: Elevated tank, 50,000 gallons; impounding reservoirs, 12,000,000 gallons.

Number of customers: 400.

Cameron County

Port Isabel -- Continued

Treatment: Coagulation, sedimentation, rapid sand filtration, and chlorination.

Analysis of water:

Date of collection: August 6, 1945 Analyzed by J. H. Rowley

| | Finished Water | |
|---|---|---|
| | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 12 | |
| Iron (Fe) | 0.19 | |
| Calcium (Ca) | 92 | 4.59 |
| Magnesium (Mg) | 16 | 1.32 |
| Sodium (Na) | 84 | 3.67 |
| Potassium (K) | 7.5 | 0.19 |
| Bicarbonate ($HCO_3$) | 140 | 2.29 |
| Sulfate ($SO_4$) | 198 | 4.12 |
| Chloride (Cl) | 114 | 3.22 |
| Fluoride (F) | 1.8 | 0.09 |
| Nitrate ($NO_3$) | 3.0 | 0.05 |
| Dissolved solids | 669 | |
| Total hardness as $CaCO_3$ | 296 | |
| pH | 7.7 | |

Rio Hondo

Population in 1940: 804.

Source of information: H. E. Mallernee, City Secretary June 30, 1945

Ownership: Municipal.

Source of supply: Canal from Rio Grande.

Pumpage: Maximum 50,000 gallons, average 30,000 gallons a day.

Storage: Elevated tank, 50,000 gallons.

Number of customers: 145.

Treatment: Chlorination.

Cameron County

Rio Hondo -- Continued

Analysis of water:

Date of collection: June 30, 1945 Analyzed by C. B. Cibulka

| | Parts per million | Equivalents per million |
|---|---|---|
| Silica ($SiO_2$) | | |
| Iron (Fe) | | |
| Calcium (Ca) | 82 | 4.09 |
| Magnesium (Mg) | 32 | 2.63 |
| Sodium (Na) ) | | |
| Potassium (K) ) | 153 | 6.64 |
| Bicarbonate ($HCO_3$) | 143 | 2.34 |
| Sulfate ($SO_4$) | 238 | 4.96 |
| Chloride (Cl) | 215 | 6.06 |
| Fluoride (F) | 0 | 0.00 |
| Nitrate ($NO_3$) | 0.2 | 0.00 |
| Dissolved solids | 877 | |
| Total hardness as $CaCO_3$ | 336 | |

San Benito

Population in 1940: 9,501.

Owner: Central Power & Light Co.

Source of information: S. C. Clar, C. P. & L. Co. July 12, 1945

Source of supply: Resaca de los Fresnos and canal from Rio Grande.

Pumpage:

(Average in gallons a day)

| | 1944 | 1945 |
|---|---|---|
| January | 488,000 | 551,000 |
| February | 509,000 | 635,000 |
| March | 570,000 | 590,000 |
| April | 621,000 | 585,000 |
| May | 520,000 | 648,000 |
| June | 492,000 | 575,000 |
| July | 465,000 | |
| August | 487,000 | |
| September | 397,000 | |
| October | 400,000 | |
| November | 400,000 | |
| December | 485,000 | |

Storage: Elevated tank, 150,000 gallons; clear well, 165,000 gallons.

Cameron County

San Benito -- Continued

Number of customers: 1,686.

Treatment: Aeration, coagulation, sedimentation, rapid sand filtration, pre and post chlorination.

Analysis of water:

Date of collection: August 6, 1945 Analyzed by J. H. Rowley

| | Finished Water | |
|---|---|---|
| | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 12 | |
| Iron (Fe) | 0.19 | |
| Calcium (Ca) | 92 | 4.59 |
| Magnesium (Mg) | 16 | 1.32 |
| Sodium (Na) | 84 | 3.67 |
| Potassium (K) | 7.5 | 0.19 |
| Bicarbonate ($HCO_3$) | 140 | 2.29 |
| Sulfate ($SO_4$) | 198 | 4.12 |
| Chloride (Cl) | 114 | 3.22 |
| Fluoride (F) | 1.8 | 0.09 |
| Nitrate ($NO_3$) | 3.0 | 0.05 |
| Dissolved solids | 660 | |
| Total hardness as $CaCO_3$ | 296 | |
| pH | 7.7 | |

Comal County

New Braunfels

Population in 1940: 6,976.

Source of information: C. H. Wimberly, Water Superintendent December 4, 1943

Ownership: Municipal.

Source of supply: 2 wells.

Well 1. Drilled in 1941 by Mr. Cravens, depth 116 feet, diameter 12 inches; centrifugal pump and electric motor; yield 2,300 gallons a minute with drawdown of 7 feet after 12 hours pumping.

Well 2. About 30 feet north of well 1, drilled in 1941, depth 102 feet, diameter 8 inches; centrifugal pump and electric motor; yield 1,200 gallons a minute.

Pumpage:

(Average in gallons a day)

| | 1942 | 1943 |
|---|---|---|
| January | 810,000 | 851,000 |
| February | 830,000 | 1,100,000 |
| March | 940,000 | 1,068,000 |
| April | 990,000 | 1,426,000 |
| May | 890,000 | 1,630,000 |
| June | 1,457,000 | 1,254,000 |
| July | 1,253,000 | 1,677,000 |
| August | 1,230,000 | 1,850,000 |
| September | 1,300,000 | |
| October | 850,000 | |
| November | 1,068,000 | |
| December | 916,000 | |

Storage: 2 standpipes, 1,000,000 gallons and 370,000 gallons.

Number of customers: 2,200.

Treatment: None.

New Braunfels -- Continued

Analyses of water:

Date of collection: December 4, 1943 Analyzed by J. H. Rowley

| | Well 1 | | Well 2 | |
|---|---|---|---|---|
| | Parts per million | Equivalents per million | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 11 | | 11 | |
| Iron (Fe) | 0.08 | | 0.02 | |
| Calcium (Ca) | 73 | 3.64 | 73 | 3.64 |
| Magnesium (Mg) | 17 | 1.40 | 17 | 1.40 |
| Sodium (Na) | 5.1 | 0.22 | 3.9 | 0.17 |
| Potassium (K) | 1.6 | 0.04 | 1.6 | 0.04 |
| Bicarbonate ($HCO_3$) | 263 | 4.31 | 261 | 4.28 |
| Sulfate ($SO_4$) | 24 | 0.50 | 24 | 0.50 |
| Chloride (Cl) | 14 | 0.39 | 13 | 0.37 |
| Fluoride (F) | 0.2 | 0.01 | 0.2 | 0.01 |
| Nitrate ($NO_3$) | 5.8 | 0.09 | 5.5 | 0.09 |
| Dissolved solids | 281 | | 283 | |
| Total hardness as $CaCO_3$ | 252 | | 252 | |
| pH | | 7.2 | | 7.1 |

Driller's log:

Well 1

| | Thickness (feet) | Depth (feet) |
|---|---|---|
| Soil and red clay | 9 | 9 |
| Gravel | 6 | 15 |
| Hard gravel | 13 | 28 |
| Limestone (Georgetown) | 30 | 58 |
| Limestone (Edwards) | 58 | 116 |

DeWitt County

Cuero

Population in 1940: 5,474.

Source of information: J. M. Johnson, Water Superintendent December 22, 1944

Ownership: Municipal.

Source of supply: 6 wells.

Well 1. Northeast of 4 wells at pump station, drilled in 1911, depth 735 feet, diameter 6 inches; flows about 75 gallons a minute; deep-well turbine pump and 10-horsepower electric motor; pump set at 50 feet, yield 400 gallons a minute; temperature 82° F.

Well 2. Southeast of 4 wells at pump station, drilled in 1911, depth 820 feet, diameter 6 inches; flows about 75 gallons a minute, no pump; temperature 84° F.

Well 3. Northwest of 4 wells at pump station, drilled in 1915, depth 1,190 feet, diameter 6 inches; flows about 90 gallons a minute, no pump; temperature 88½° F.

Well 4. Southwest of four wells at pump station, drilled in 1918 by G. C. Witte, depth 1,160 feet, diameter 8 inches; flows about 200 gallons a minute, no pump; temperature 90° F.

Well 5. On west Morgan Avenue about 300 feet southwest of pump station, drilled by Layne-Texas Company, depth 1,173 feet, diameter 12 to 6 inches, screens at 1,072 - 1,134 and 1,149 - 1,170 feet; flows about 325 gallons a minute; deep-well turbine pump and 12½-horsepower electric motor, pump set at 65 feet; yield about 750 gallons a minute; temperature 90° F.

Well 6. Near intersection of French and Hunt Streets, about 3,000 feet northeast of pump station, drilled in 1943 by Layne-Texas Company, depth 1,207 feet, diameter 12-3/4 to 6-5/8 inches, screens at 1,081 - 1,141, 1,146 - 1,203 feet; flows about 325 gallons a minute; water level 19 feet above land surface when completed; deep-well turbine pump and 15-horsepower electric motor, pump set at 90 feet; drawdown 56-1/2 feet while pumping 800 gallons a minute, present yield about 750 gallons a minute; temperature 91° F.

Pumpage (estimated): Maximum 1,250,000; minimum 750,000 gallons a day.

Storage: Ground reservoir, 175,000 gallons; elevated tank, 150,000 gallons.

Treatment: None.

DeWitt County

Cuero -- Continued

Analyses of water:

Date of collection: September 14, 1939 Analyzed by State Health Dep't.

| | Well 1 | | Well 2 | |
|---|---|---|---|---|
| | Parts per million | Equivalents per million | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 15 | | 13 | |
| Iron (Fe) | 0.06 | | 0.05 | |
| Calcium (Ca) | 9 | 0.45 | 8 | 0.40 |
| Magnesium (Mg) | 8 | 0.66 | 6 | 0.49 |
| Sodium (Na) ) | | | | |
| Potassium (K) ) | 236 | 10.26 | 252 | 10.96 |
| Bicarbonate ($HCO_3$) | 393 | 6.44 | 433 | 7.10 |
| Sulfate ($SO_4$) | 44 | 0.92 | 43 | 0.90 |
| Chloride (Cl) | 144 | 4.06 | 137 | 3.86 |
| Fluoride (F) | 0.6 | 0.03 | 1.4 | 0.07 |
| Nitrate ($NO_3$) | 0.0 | 0.00 | 0.0 | 0.00 |
| Dissolved solids | 643 | | 673 | |
| Total hardness as $CaCO_3$ | 56 | | 44 | |
| pH | 8.4 | | 8.2 | |

| | Well 3 | | Well 4 | |
|---|---|---|---|---|
| | Parts per million | Equivalents per million | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 18 | | 20 | |
| Iron (Fe) | 0.17 | | 0.1 | |
| Calcium (Ca) | 10 | 0.50 | 9 | 0.45 |
| Magnesium (Mg) | 5 | 0.41 | 5 | 0.41 |
| Sodium (Na) ) | | | | |
| Potassium (K) ) | 323 | 14.05 | 377 | 16.39 |
| Bicarbonate ($HCO_3$) | 470 | 7.70 | 539 | 8.83 |
| Sulfate ($SO_4$) | 34 | 0.71 | 11 | 0.23 |
| Chloride (Cl) | 231 | 6.51 | 291 | 8.21 |
| Fluoride (F) | 0.8 | 0.04 | 0.6 | 0.03 |
| Dissolved solids | 846 | | 966 | |
| Total hardness as $CaCO_3$ | 46 | | 43 | |
| pH | 8.4 | | 8.2 | |

DeWitt County

Cuero -- Continued

Date of collection: September 14, 1939 Analyzed by State Health Dep't.

| | Well 5 | |
|---|---|---|
| | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 20 | |
| Iron (Fe) | 0.05 | |
| Calcium (Ca) | 8 | 0.40 |
| Magnesium (Mg) | 3 | 0.25 |
| Sodium (Na) ) | 339 | 14.74 |
| Potassium (K) ) | | |
| Bicarbonate ($HCO_3$) | 488 | 8.00 |
| Sulfate ($SO_4$) | 42 | 0.87 |
| Chloride (Cl) | 231 | 6.51 |
| Fluoride (F) | 0.6 | 0.03 |
| Dissolved solids | 875 | |
| Total hardness as $CaCO_3$ | 32 | |
| pH | 8.4 | |

Date of collection: December 22, 1944 Analyzed by J. H. Rowley

| | Well 6 | |
|---|---|---|
| | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 25 | |
| Iron (Fe) | 0.26 | |
| Calcium (Ca) | 8.8 | 0.44 |
| Magnesium (Mg) | 1.4 | 0.12 |
| Sodium (Na) | 408 | 17.73 |
| Potassium (K) | 17 | 0.43 |
| Bicarbonate ($HCO_3$) | 565 | 9.26 |
| Sulfate ($SO_4$) | 1.1 | 0.02 |
| Chloride (Cl) | 334 | 9.42 |
| Fluoride (F) | 0.4 | 0.02 |
| Nitrate ($NO_3$) | 0.2 | 0.00 |
| Dissolved solids | 1,070 | |
| Total hardness as $CaCO_3$ | 28 | |
| pH | 7.8 | |

DeWitt County

Cuero -- Continued

Drillers' logs:

Well 3

| | Thickness (feet) | Depth (feet) | | Thickness (feet) | Depth (feet) |
|---|---|---|---|---|---|
| Surface soil | 32 | 32 | Gumbo and thin rock | 19 | 584 |
| Gravel | 8 | 40 | Gumbo | 87 | 671 |
| Clay | 2 | 42 | Sand and rock | 15 | 686 |
| Clay and sand | 68 | 110 | Blue water sand | 44 | 730 |
| Rock and sand | 90 | 200 | Gumbo | 60 | 790 |
| Sand | 26 | 226 | Red and blue clay | 46 | 836 |
| Clay | 10 | 236 | Water sand and rock | 35 | 871 |
| Sand | 4 | 240 | White and blue clay | 144 | 1015 |
| Shell rock and sand | 8 | 248 | Water sand | 40 | 1055 |
| Sand rock and white lime | 152 | 400 | Red clay | 6 | 1061 |
| | | | Water sand | 6 | 1067 |
| Clay and sand | 40 | 440 | Red, white and blue clay | 33 | 1100 |
| Rock and clay | 99 | 539 | Water sand and thin rock | 65 | 1165 |
| Clay | 11 | 550 | | | |
| Clay and rock | 15 | 565 | | | |

Well 4

| | Thickness (feet) | Depth (feet) | | Thickness (feet) | Depth (feet) |
|---|---|---|---|---|---|
| Surface soil and lime | 32 | 32 | Sand rock | 35 | 475 |
| Gravel, sand and water | 8 | 40 | Gumbo | 75 | 550 |
| | | | Sand | 15 | 565 |
| Red clay | 2 | 42 | Gumbo | 19 | 584 |
| Sand | 8 | 50 | Rock | 6 | 590 |
| Clay | 60 | 110 | Gumbo | 81 | 671 |
| Sand and sand rock | 110 | 220 | Sand rock | 15 | 686 |
| Sand | 6 | 226 | Water sand (flow) | 44 | 730 |
| Clay | 10 | 236 | Gumbo | 106 | 836 |
| Sand rock | 4 | 240 | Water sand (flow) | 35 | 871 |
| Blue shale | 8 | 248 | Gumbo | 144 | 1015 |
| Sand rock | 52 | 300 | Water sand (flow) | 40 | 1055 |
| Gumbo | 60 | 360 | Gumbo | 19 | 1074 |
| Sand and lime | 40 | 400 | Dark-colored sand | 6 | 1080 |
| Gumbo | 40 | 440 | Gumbo | 22 | 1102 |
| | | | Water sand (flow) | 58 | 1160 |

Cuero -- Continued

Well 5

| | Thickness (feet) | Depth (feet) | | Thickness (feet) | Depth (feet) |
|---|---|---|---|---|---|
| Surface sand | 10 | 10 | Loose sand | 25 | 800 |
| Gravel and boulders | 10 | 20 | Shale | 6 | 806 |
| Sand, in hard layers | 43 | 63 | Loose sand | 22 | 828 |
| Clay, in hard layers | 34 | 97 | Shale | 17 | 845 |
| Clay | 20 | 117 | Gumbo | 55 | 900 |
| Sand with hard layers | 28 | 145 | Tough shale | 55 | 955 |
| Clay | 31 | 176 | Gumbo | 47 | 1002 |
| Sandy clay | 40 | 216 | Loose sand | 21 | 1023 |
| Shale and rock | 43 | 259 | Gumbo | 23 | 1046 |
| Rock and shale | 10 | 269 | Sand and sandy shale | 6 | 1052 |
| Sand, in hard layers | 30 | 299 | Gumbo | 19 | 1071 |
| Hard sandy shale | 124 | 423 | Hard sand | 8 | 1079 |
| Tough shale | 12 | 435 | Loose sand | 43 | 1122 |
| Hard sand | 10 | 445 | Sand | 13 | 1135 |
| Sandy shale | 53 | 498 | Hard sand | 5 | 1140 |
| Hard shale | 17 | 515 | Soft shale | 6 | 1146 |
| Packed sand | 20 | 535 | Sand and gravel | 27 | 1173 |
| Gumbo | 63 | 598 | Sandy shale | 79 | 1252 |
| Hard shale | 59 | 657 | Gumbo | 5 | 1257 |
| Loose sand | 15 | 672 | Shale | 82 | 1339 |
| Hard sand | 5 | 677 | Sand, in hard layers | 21 | 1360 |
| Loose sand | 6 | 683 | Shale | 14 | 1374 |
| Hard sand | 16 | 699 | Sand | 6 | 1380 |
| Shale | 14 | 713 | Shale | 117 | 1497 |
| Sand | 37 | 750 | Sand | 10 | 1507 |
| Soft shale | 25 | 775 | Shale | 19 | 1526 |

Well 6

| | Thickness (feet) | Depth (feet) | | Thickness (feet) | Depth (feet) |
|---|---|---|---|---|---|
| Soil and clay | 8 | 8 | Rock and shale | 25 | 280 |
| Sand and gravel | 17 | 25 | Sand and sandy shale | 29 | 309 |
| Sand and boulders | 25 | 50 | Sand | 16 | 325 |
| Sandy clay and boulders | 22 | 72 | Shale (tough) | 27 | 352 |
| Boulders | 7 | 79 | Fine-grained sand and gravel | 26 | 378 |
| Sand | 8 | 87 | Sandy shale | 91 | 469 |
| Sand, lime and gravel | 45 | 132 | Shale | 54 | 523 |
| Rock | 3 | 135 | Sandy shale | 16 | 539 |
| Hard caliche | 14 | 149 | Clay and sand | 50 | 589 |
| Clay | 67 | 216 | Sandy shale | 83 | 672 |
| Hard lime and shale | 39 | 255 | Soft shale | 43 | 715 |

(Continued on next page)

Cuero -- Continued

| | Thickness (feet) | Depth (feet) | | Thickness (feet) | Depth (feet) |
|---|---|---|---|---|---|
| Shale | 31 | 746 | Shale | 12 | 1042 |
| Soft shale | 11 | 757 | Sandy clay and gravel | 8 | 1050 |
| Shale | 27 | 784 | Tough shale | 34 | 1084 |
| Sandy shale | 10 | 794 | Sand | 52 | 1136 |
| Sand (broken) | 52 | 846 | Shale | 6 | 1142 |
| Shale | 24 | 870 | Sand | 12 | 1154 |
| Sticky shale | 104 | 974 | Sandy shale | 13 | 1167 |
| Tough shale | 42 | 1016 | Sand and gravel | 17 | 1184 |
| Sand | 3 | 1019 | Sandy shale, cut good | 20 | 1204 |
| Sand, gravel, and clay breaks | 11 | 1030 | Shale | 3 | 1207 |

Nordheim

Population in 1940: 411.

Ownership: Municipal.

Source of information: E. A. Stuermer, City Secretary December 21, 1944

Source of supply: Well at elevated tank, drilled in 1923, depth 1,320 feet, diameter 8 to 6 inches, casing perforated at 520-530 and 800-815 feet; water level 180 feet below land surface in April 1939; deep-well turbine pump and 10-horsepower electric motor, pump set at 210 feet; yield about 235 gallons a minute; temperature 85° F.

Pumpage (estimated): Maximum 100,000; minimum 50,000 gallons a day.

Storage: Ground reservoir, 50,000 gallons; elevated tank, 50,000 gallons.

Number of customers: 137.

Treatment: None.

DeWitt County

Nordheim -- Continued

Analysis of water:

Date of collection: December 21, 1944 Analyzed by J. H. Rowley

| | Parts per million | Equivalents per million |
|---|---|---|
| Silica ($SiO_2$) | 24 | |
| Iron (Fe) | 0.12 | |
| Calcium (Ca) | 39 | 1.95 |
| Magnesium (Mg) | 7.9 | 0.65 |
| Sodium (Na) | 136 | 5.92 |
| Potassium (K) | 11 | 0.28 |
| Bicarbonate ($HCO_3$) | 341 | 5.59 |
| Sulfate ($SO_4$) | 51 | 1.06 |
| Chloride (Cl) | 76 | 2.14 |
| Fluoride (F) | 0.2 | 0.01 |
| Nitrate ($NO_3$) | 0.0 | 0.00 |
| Dissolved solids | 518 | |
| Total hardness as $CaCO_3$ | 130 | |
| pH | 7.1 | |

Yorktown

Population in 1940: 2,081.

Ownership: Municipal.

Source of information: A. N. Schwarz, Water Superintendent December 21, 1944

Source of supply: Well across street from city hall, drilled in 1939 by Layne-Texas Company, drilled to 2,000 feet and plugged back to 960 feet, diameter 16 to 8 inches; static water level 26 feet below land surface when drilled and 33 feet on December 21, 1944 after pump had been shut off 3 hours; deep-well turbine pump and electric motor, pump set at 76 feet; drawdown 83 feet pumping 508 gallons a minute; temperature 86° F.

Pumpage (estimated): Maximum 150,000; minimum 75,000 gallons a day.

Storage: Ground reservoir, 150,000 gallons; elevated tank, 50,000 gallons.

Number of customers: 369.

Treatment: None.

DeWitt County

Yorktown -- Continued

Analysis of water:

Date of collection: December 21, 1944 Analyzed by J. H. Rowley

| | Parts per million | Equivalents per million |
|---|---|---|
| Silica ($SiO_2$) | 26 | |
| Iron (Fe) | 0.14 | |
| Calcium (Ca) | 47 | 2.35 |
| Magnesium (Mg) | 6.6 | 0.54 |
| Sodium (Na) | 155 | 6.72 |
| Potassium (K) | 18 | 0.46 |
| Bicarbonate ($HCO_3$) | 341 | 5.59 |
| Sulfate ($SO_4$) | 76 | 1.58 |
| Chloride (Cl) | 102 | 2.88 |
| Fluoride (F) | 0.1 | 0.01 |
| Nitrate ($NO_3$) | 0.5 | 0.01 |
| Dissolved solids | 603 | |
| Total hardness as $CaCO_3$ | 144 | |
| pH | 7.7 | |

Drillers' log:

| | Thickness (feet) | Depth (feet) | | Thickness (feet) | Depth (feet) |
|---|---|---|---|---|---|
| Hard clay | 59 | 59 | Shale | 60 | 896 |
| Sand | 45 | 104 | Sand | 27 | 923 |
| Packsand | 1 | 105 | Packsand | 13 | 936 |
| Hard sand and boulders | 24 | 129 | Shale | 623 | 1559 |
| Clay | 67 | 196 | Sand rock | 1 | 1560 |
| Hard sandy clay | 78 | 274 | Hard shale | 48 | 1608 |
| Packsand | 2 | 276 | Hard shale and packsand | 66 | 1674 |
| Sand | 20 | 296 | Sand rock | 1 | 1675 |
| Gumbo | 180 | 476 | Hard shale | 21 | 1696 |
| Hard shale | 119 | 595 | Packsand | 5 | 1701 |
| Sand | 20 | 615 | Hard shale | 68 | 1769 |
| Clay | 11 | 626 | Hard shale and sand rock | 37 | 1806 |
| Sand and layers of shale | 23 | 649 | Rock | 3 | 1809 |
| Sand | 42 | 691 | Hard shale and lime rock | 67 | 1876 |
| Gumbo | 12 | 703 | Hard shale | 124 | 2000 |
| Soft blue shale | 83 | 786 | | | |
| Hard shale | 50 | 836 | | | |

Dimmit County

Asherton

Population in 1940: 1,538.

Owner: Central Power & Light Co.

Source of information: L. P. Butler, Manager May 11, 1945

Source of supply: Well at elevated tank, drilled in 1926 by Layne-Texas Company, depth 640 feet, diameter 12 inches, cased to 352 feet; deep-well turbine pump and 25-horsepower electric motor; static water level 52.5 feet below land surface on June 19, 1927; yield 420 gallons a minute; temperature 84° F.

Storage: Elevated tank, 50,000 gallons; concrete ground reservoir.

Number of customers: 292.

Treatment: None.

Analysis of water:

Date of collection: May 11, 1945 Analyzed by J. H. Rowley

| | Parts per million | Equivalents per million |
|---|---|---|
| Silica ($SiO_2$) | 17 | |
| Iron (Fe) | 0.34 | |
| Calcium (Ca) | 60 | 2.99 |
| Magnesium (Mg) | 15 | 1.23 |
| Sodium (Na) | 158 | 6.88 |
| Potassium (K) | 20 | 0.51 |
| Bicarbonate ($HCO_3$) | 242 | 3.97 |
| Sulfate ($SO_4$) | 200 | 4.16 |
| Chloride (Cl) | 122 | 3.44 |
| Fluoride (F) | 0.8 | 0.04 |
| Nitrate ($NO_3$) | 0.0 | 0.00 |
| Dissolved solids | 716 | |
| Total hardness as $CaCO_3$ | 211 | |
| pH | 7.8 | |

Big Wells

Population in 1940: 866.

Ownership: Municipal.

Source of information: W. Lindenborn, Water Superintendent May 11, 1945

Source of supply: Well one block west of elevated tank, drilled in 1937 by Cribbs and Davidson, depth 1,355 feet, diameter 10 to 8 inches, cased to 800 feet; deep-well turbine pump and 20-horsepower electric motor; static water level reported 54 feet below land surface on May 11, 1945; yield 275 gallons a minute; temperature 94° F.

Dimmit County

Big Wells -- Continued

Pumpage (estimated): Average 25,000 gallons a day.

Storage: Elevated tank, 50,000 gallons; steel ground reservoir, 25,000 gallons.

Number of customers: 178.

Treatment: None.

Analysis of water:

Date of collection: May 11, 1945 Analyzed by J. H. Rowley

| | Parts per million | Equivalents per million |
|---|---|---|
| Silica ($SiO_2$) | 17 | |
| Iron (Fe) | 0.42 | |
| Calcium (Ca) | 4.3 | 0.21 |
| Magnesium (Mg) | 1.6 | 0.13 |
| Sodium (Na) | 223 | 9.71 |
| Potassium (K) | 8.6 | 0.22 |
| Bicarbonate ($HCO_3$) | 361 | 5.92 |
| Sulfate ($SO_4$) | 90 | 1.87 |
| Chloride (Cl) | 85 | 2.40 |
| Fluoride (F) | 1.6 | 0.08 |
| Nitrate ($NO_3$) | 0.2 | 0.00 |
| Dissolved solids | 612 | |
| Total hardness as $CaCO_3$ | 17 | |
| pH | 8.4 | |

Driller's log:

Well 1

| | Thickness (feet) | Depth (feet) | | Thickness (feet) | Depth (feet) |
|---|---|---|---|---|---|
| Yellow clay | 20 | 20 | Red shale | 4 | 400 |
| Blue shale | 140 | 160 | Blue shale | 45 | 445 |
| Water sand | 30 | 190 | Hard gray shale | 20 | 465 |
| Blue shale | 17 | 207 | Brown lignite | 14 | 479 |
| Gray shale | 15 | 222 | Gray sandy shale | 19 | 498 |
| Blue shale | 8 | 230 | Brown shale | 17 | 515 |
| Brown shale | 30 | 260 | Gray shale | 35 | 550 |
| Gray shale | 50 | 310 | Brown shale | 15 | 565 |
| Sandy shale (little water) | 10 | 320 | Gray shale | 15 | 580 |
| | | | Blue shale | 18 | 598 |
| Water sand | 10 | 330 | Gray shale | 8 | 606 |
| Blue shale | 66 | 396 | Water sand | 26 | 632 |

(Continued on next page)

Dimmit County

Big Wells -- Continued

| | Thickness (feet) | Depth (feet) | | Thickness (feet) | Depth (feet) |
|---|---|---|---|---|---|
| Gray shale | 18 | 650 | Sandy shale | 17 | 812 |
| Brown shale | 5 | 655 | Blue shale | 13 | 825 |
| Gray shale | 10 | 665 | Brown shale | 18 | 843 |
| Sandy shale | 5 | 670 | Blue shale | 10 | 853 |
| Water sand | 25 | 695 | Gray gumbo | 42 | 895 |
| Blue shale | 29 | 724 | Broken water sand | 55 | 950 |
| Gray sandy shale | 26 | 750 | Gummy shale | 45 | 995 |
| Brown sandy shale | 8 | 758 | Sandy shale | 15 | 1010 |
| Red shale | 7 | 765 | Brown shale | 160 | 1170 |
| Broken sand | 30 | 795 | Carrizo sand | 90 | 1260 |
| | | | Brown shale | 95 | 1355 |

Brundage

Population in 1940: 50.

Ownership: Municipal.

Source of information: W. H. Duncanson, operator May 11, 1945

Source of supply: Well at elevated tank, drilled by Mr. Wheeler in 1909, depth 1,170 feet, diameter 6 inches; cylinder pump and 8-horsepower gasoline engine.

Pumpage (estimated): Average 4,000 to 5,000 gallons a day.

Storage: Elevated wooden tank, about 10,000 gallons.

Number of customers: 14.

Treatment: None.

Analysis of water:

Date of collection: May 11, 1945 Analyzed by J. H. Rowley

| | Parts per million | Equivalents per million |
|---|---|---|
| Silica ($SiO_2$) | 23 | |
| Iron (Fe) | 0.73 | |
| Calcium (Ca) | 36 | 1.80 |
| Magnesium (Mg) | 11 | 0.90 |
| Sodium (Na) | 112 | 4.87 |
| Potassium (K) | 9.1 | 0.23 |
| Bicarbonate ($HCO_3$) | 323 | 5.29 |
| Sulfate ($SO_4$) | 54 | 1.12 |
| Chloride (Cl) | 47 | 1.33 |
| Fluoride (F) | 1.0 | 0.05 |
| Nitrate ($NO_3$) | 0.8 | 0.01 |
| Dissolved solids | 454 | |
| Total hardness as $CaCO_3$ | 135 | |
| pH | 7.8 | |

Dimmit County

Carrizo Springs

Population in 1940: 2,494.

Source of information: Bert Holmgreen, Water Superintendent May 10, 1945

Ownership: Municipal.

Source of supply: 2 wells.

Well 1. At elevated tank, drilled in 1928 by W. D. Morrison, depth 322 feet, diameter 12-1/2 inches, cased to 123 feet; deep-well turbine pump and 30-horsepower electric motor; static water level 82.4 feet below land surface on March 12, 1930, and reported 105 feet in May 1945; yield 676 gallons a minute.

Well 2. About 300 feet west of well 1, drilled in 1944 by Elmo Owens, depth 338 feet, diameter 16 inches, cased to 123 feet; deep-well submersible pump and 30-horsepower electric motor; static water level reported 105 feet below land surface in May 1945; yield 500 gallons a minute with drawdown of 25 feet; temperature 78° F.

Storage: Elevated tank, 50,000 gallons; concrete ground reservoir, 60,000 gallons.

Number of customers: 508.

Treatment: None.

Analysis of water:

Date of collection: May 10, 1945 Analyzed by J. H. Rowley

| | Well 2 | |
|---|---|---|
| | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 24 | |
| Iron (Fe) | 0.18 | |
| Calcium (Ca) | 58 | 2.89 |
| Magnesium (Mg) | 16 | 1.32 |
| Sodium (Na) | 117 | 5.08 |
| Potassium (K) | 24 | 0.61 |
| Bicarbonate ($HCO_3$) | 221 | 3.62 |
| Sulfate ($SO_4$) | 113 | 2.35 |
| Chloride (Cl) | 136 | 3.84 |
| Fluoride (F) | 0.6 | 0.03 |
| Nitrate ($NO_3$) | 4.0 | 0.06 |
| Dissolved solids | 606 | |
| Total hardness as $CaCO_3$ | 210 | |
| pH | 7.5 | |

Dimmit County

Carrizo Springs -- Continued

Drillers' log:

Well 2

| | Thickness (feet) | Depth (feet) | | Thickness (feet) | Depth (feet) |
|---|---|---|---|---|---|
| Soil and caliche | 20 | 20 | Carrizo sand | 84 | 222 |
| Dry sand | 92 | 112 | Light gray shale | 33 | 255 |
| Brown shale | 3 | 115 | Dark gray tight sand | 15 | 270 |
| Rock | 3 | 118 | Indio sand | 55 | 325 |
| Coarse-grained sand | 20 | 138 | Midway clay | 13 | 338 |

Catarina

Population in 1940: 403.

Source of information: L. D. White, Bookkeeper May 11, 1945

Owner: Catarina Water Supply Co.

Source of supply: Well at elevated tank, drilled in 1926 by Floyd Trim, depth 1,334 feet, diameter 12-1/2 to 10 inches, cased to 1,025 feet; deep-well turbine pump and 50-horsepower electric motor; pump set at 240 feet; static water level 103 feet below land surface on December 22, 1938; yield 600 gallons a minute; temperature 96° F.

Pumpage (estimated): Average 72,000 gallons a day.

Storage: Standpipe, estimated 175,000 gallons.

Number of customers: 53.

Treatment: None.

Analysis of water:

Date of collection: May 11, 1945 Analyzed by J. H. Rowley

| | Parts per million | Equivalents per million |
|---|---|---|
| Silica ($SiO_2$) | 18 | |
| Iron (Fe) | 0.30 | |
| Calcium (Ca) | 16 | 0.80 |
| Magnesium (Mg) | 6.9 | 0.57 |
| Sodium (Na) | 392 | 17.06 |
| Potassium (K) | 25 | 0.64 |
| Bicarbonate ($HCO_3$) | 240 | 3.93 |
| Sulfate ($SO_4$) | 212 | 4.41 |
| Chloride (Cl) | 378 | 10.66 |
| Fluoride (F) | 1.0 | 0.05 |
| Nitrate ($NO_3$) | 1.2 | 0.02 |
| Dissolved solids | 1,170 | |
| Total hardness as $CaCO_3$ | 68 | |
| pH | 7.9 | |

Catarina -- Continued

Driller's log:

Well 1

| | Thickness (feet) | Depth (feet) | | Thickness (feet) | Depth (feet) |
|---|---|---|---|---|---|
| Sand | 5 | 5 | Blue shale | 5 | 735 |
| Sand clay | 25 | 30 | Sand | 35 | 790 |
| Blue shale | 20 | 50 | Blue shale | 15 | 805 |
| Sand and coal | 25 | 75 | Black shale | 45 | 850 |
| Blue shale | 90 | 165 | Hard sand | 15 | 865 |
| Gray shale | 60 | 250 | Red shale | 25 | 890 |
| Gray sand (salt water) | 35 | 285 | Sand | 10 | 900 |
| Blue shale | 5 | 290 | Black shale | 20 | 920 |
| Lime shell | 5 | 295 | Brown shale | 10 | 930 |
| Blue shale | 10 | 305 | Red shale | 40 | 970 |
| Red shale - lignite | 20 | 325 | Hard sand | 10 | 980 |
| Blue shale | 35 | 360 | Sand (fresh water) | 40 | 1020 |
| Sand | 55 | 415 | Red shale | 5 | 1025 |
| Blue shale | 15 | 430 | Sand (artesian water) | 35 | 1060 |
| Sand (salt water) | 35 | 465 | Shale | 10 | 1070 |
| Blue shale | 30 | 495 | Sand (artesian water) | 15 | 1085 |
| Gray sand (salt water) | 15 | 510 | Shale | 5 | 1090 |
| Blue shale | 50 | 560 | Sand (artesian water) | 15 | 1105 |
| Sand (fresh water) | 55 | 615 | Red shale | 10 | 1115 |
| White shale | 25 | 640 | Sand | 15 | 1130 |
| Red shale | 20 | 660 | Red shale | 5 | 1135 |
| Sand (fresh water) | 40 | 700 | Sand (artesian water) | 195 | 1330 |
| Red and blue shale | 50 | 750 | Clay | 4 | 1334 |

Duval County

Benavides

Population in 1940: 3,081.

Ownership: Municipal.

Source of information: A. C. Canales, City Alderman March 7, 1945

Source of supply: 2 wells, 3 blocks south and 3 blocks west of railway depot.

Well 1. Drilled in 1938 by Gus Delaney, depth 328 feet, diameter 8 inches; deep-well submersible turbine pump and 20-horsepower electric motor set at 325 feet; static water level 215 feet below land surface in December 1942; yield about 100 gallons a minute; temperature 81° F.

Well 2. Drilled in 1943 by Layne-Texas Company, depth 615 feet, diameter 12-3/4 to 8-5/8 inches, screens at 209-244, 259-275, 327-356, 450-462 and 483-518 feet; deep-well turbine pump and 10-horsepower electric motor; static water level 87.9 feet below land surface on March 7, 1945; drawdown 28 feet pumping 125 gallons a minute during pump test in October 1943; temperature 80½° F.

Pumpage (estimated): Average 200,000 gallons a day.

Storage: Ground reservoir, 55,000 gallons; elevated steel tank, 55,000 gallons.

Number of customers: 714.

Treatment: None.

Analyses of water:

Date of collection: March 7, 1945 Analyzed by M. L. Begley

| | Well 1 | | Well 2 | |
|---|---|---|---|---|
| | Parts per million | Equivalents per million | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 22 | | 29 | |
| Iron (Fe) | 0.02 | | 0.02 | |
| Calcium (Ca) | 42 | 2.10 | 41 | 2.05 |
| Magnesium (Mg) | 17 | 1.40 | 17 | 1.40 |
| Sodium (Na) | 392 | 17.05 | 364 | 15.81 |
| Potassium (K) | 12 | 0.31 | 12 | 0.31 |
| Bicarbonate ($HCO_3$) | 330 | 5.41 | 297 | 4.87 |
| Sulfate ($SO_4$) | 253 | 5.27 | 231 | 4.81 |
| Chloride (Cl) | 345 | 9.73 | 338 | 9.53 |
| Fluoride (F) | 1.0 | 0.05 | 0.8 | 0.04 |
| Nitrate ($NO_3$) | 25 | 0.40 | 20 | 0.32 |
| Dissolved solids | 1,270 | | 1,200 | |
| Total hardness as $CaCO_3$ | 175 | | 172 | |
| pH | 7.8 | | 7.8 | |

Duval County

Benavides -- Continued

Drillers' log:

Well 2

| | Thickness (feet) | Depth (feet) | | Thickness (feet) | Depth (feet) |
|---|---|---|---|---|---|
| Surface soil | 3 | 3 | Clay | 14 | 369 |
| Sand and hard caliche | 17 | 20 | Sand | 4 | 373 |
| Caliche and sand | 23 | 43 | Clay and sand breaks | 44 | 417 |
| Hard caliche | 17 | 60 | Clay | 13 | 430 |
| Clay and caliche | 24 | 84 | Sandy clay | 20 | 450 |
| Sand | 5 | 89 | Broken sand | 12 | 462 |
| Hard caliche | 14 | 103 | Clay | 21 | 483 |
| Sandy clay | 43 | 146 | Sand | 12 | 495 |
| Clay | 39 | 185 | Sandy clay | 3 | 498 |
| Sandy clay | 25 | 210 | Sand | 19 | 517 |
| Fine-grained sand | 35 | 245 | Tough clay | 28 | 545 |
| Sandy clay | 15 | 260 | Sandy clay | 26 | 571 |
| Sand and sandy clay | 66 | 326 | Tough clay | 44 | 615 |
| Broken sand | 29 | 355 | | | |

Freer

Population in 1940: 2,346.

Owner: Freer Utilities Co. (Jarbee Inc.)

Source of information: J. F. McCalla, Engineer March 6, 1945

Source of supply: 2 wells on Strip lease, three-quarters of a mile south of post office; 1 well on Moody "B" Salt Dome lease, 1-1/4 miles south of post office; 3 wells on Saxet lease, 1-1/2 miles southwest of post office.

Well 1 (Strip lease). Drilled in 1937, depth 450 feet, diameter 7 inches, top of sand at about 365 feet; cylinder pump and rod line from well 2, 10-horsepower electric motor; static water level about 165 feet below land surface; yield 15 gallons a minute; temperature 88½° F.

Well 2 (Strip lease). Drilled in 1938, depth 570 feet, diameter 7 inches, screen at 450-570 feet; cylinder pump and 10-horsepower electric motor; static water level about 165 feet below land surface; yield 30 gallons a minute; temperature 89° F.

Well 1 (Moody "B" lease). Drilled about 1933, depth 700 feet, diameter 7 inches; deep-well turbine pump and 10-horsepower electric motor; static water level 172.4 feet below land surface on March 6, 1945; yield 55 gallons a minute; temperature 81° F.

Well 1 (Saxet lease). Drilled about 1932, depth 600-700 feet, diameter 7 inches; cylinder pump and rod line from oil well power plant, cylinder set at 450 feet; yield 20 gallons a minute; temperature 78° F.

Duval County

Freer -- Continued

Well 2 (Saxet lease). Drilled about 1938, depth 200 ± feet, diameter 7 inches; cylinder pump and rod line from oil well power plant, cylinder set at 180 feet; static water level 140.4 feet below land surface on March 6, 1945; yield 10 gallons a minute.

Well 3 (Saxet lease). Drilled about 1938, depth 200 ± feet, diameter 7 inches; cylinder pump and rod line from oil well power plant, cylinder set at 175 feet; static water level 149.2 feet below land surface; yield 10 gallons a minute.

Pumpage (estimated): Average 100,000 to 120,000 gallons a day.

Storage: Concrete ground reservoir, 120,000 gallons; wood tank on ground, 40,000 gallons; elevated tank, 75,000 gallons.

Treatment: None.

Analyses of water:

Date of collection: March 6, 1945 Analyzed by M. L. Begley

| | Well 1 (Strip lease) | | Well 2 (Strip lease) | |
|---|---|---|---|---|
| | Parts per million | Equivalents per million | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 18 | | 11 | |
| Iron (Fe) | 4.6 | | 0.79 | |
| Calcium (Ca) | 52 | 2.60 | 52 | 2.60 |
| Magnesium (Mg) | 12 | 0.99 | 12 | 0.99 |
| Sodium (Na) | 1,660 | 72.15 | 1,650 | 71.92 |
| Potassium (K) | 32 | 0.82 | 32 | 0.82 |
| Bicarbonate ($HCO_3$) | 322 | 5.28 | 326 | 5.34 |
| Sulfate ($SO_4$) | 7.8 | 0.16 | 6.8 | 0.14 |
| Chloride (Cl) | 2,520 | 71.07 | 2,510 | 70.79 |
| Fluoride (F) | 0.2 | 0.01 | 0.2 | 0.01 |
| Nitrate ($NO_3$) | 2.2 | 0.04 | 3.2 | 0.05 |
| Dissolved solids | 4,460 | | 4,440 | |
| Total hardness as $CaCO_3$ | 180 | | 180 | |
| pH | 7.5 | | 7.4 | |

Duval County

Freer -- Continued

Date of collection: March 6, 1945 Analyzed by M. L. Begley

| | Well 1 (Moody "B" lse.) | | Well 1 (Saxet lease) | |
|---|---|---|---|---|
| | Parts per million | Equivalents per million | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 82 | | 56 | |
| Iron (Fe) | 0.67 | | 0.34 | |
| Calcium (Ca) | 52 | 2.60 | 88 | 4.39 |
| Magnesium (Mg) | 19 | 1.56 | 24 | 1.97 |
| Sodium (Na) | 454 | 19.73 | 921 | 40.03 |
| Potassium (K) | 22 | 0.56 | 29 | 0.74 |
| Bicarbonate ($HCO_3$) | 495 | 8.11 | 353 | 5.79 |
| Sulfate ($SO_4$) | 344 | 7.16 | 191 | 3.98 |
| Chloride (Cl) | 316 | 8.91 | 1,320 | 37.23 |
| Fluoride (F) | 0.8 | 0.04 | 0.4 | 0.02 |
| Nitrate ($NO_3$) | 14 | 0.23 | 7.0 | 0.11 |
| Dissolved solids | 1,550 | | 2,810 | |
| Total hardness as $CaCO_3$ | 208 | | 318 | |
| pH | 7.6 | | 7.4 | |

San Diego

Population in 1940: 2,674.

Ownership: Municipal.

Source of information: A. R. Martinez, Water Superintendent March 6, 1945

Source of supply: 2 wells located 3 blocks south of post office, west of U. S. Highway 59.

Well 1. Drilled in 1937 by Layne-Texas Company, depth 509 feet, diameter 13-3/8 to 6-5/8 inches, screens at 402-468 and 484-505 feet; deep-well turbine pump and 20-horsepower electric motor; static water level 90 feet below land surface on March 11, 1937; yield 225 gallons a minute with drawdown of 90 feet; temperature 81° F.

Well 2. Drilled in 1936 by Layne-Texas Company, depth 565 feet, diameter 13-3/8 to 6-5/8 inches, screens at 390-445 and 468-492 feet; deep-well turbine pump and 20-horsepower electric motor; static water level 98 feet below land surface on March 12, 1937; yield 235 gallons a minute with drawdown of 125 feet; temperature 81° F.

Pumpage (estimated): Maximum 200,000 gallons; minimum 60,000 gallons; average 150,000 gallons a day.

Storage: Steel settling tank, 50,000 gallons; elevated tank, 100,000 gallons.

Number of customers: 725.

Treatment: None.

Duval County

San Diego -- Continued

Analyses of water:

Date of collection: March 6, 1945 Analyzed by M. L. Begley

| | Well 1 | | Well 2 | |
|---|---|---|---|---|
| | Parts per million | Equivalents per million | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 25 | | 22 | |
| Iron (Fe) | 0.09 | | 0.05 | |
| Calcium (Ca) | 29 | 1.45 | 28 | 1.40 |
| Magnesium (Mg) | 12 | 0.99 | 12 | 0.99 |
| Sodium (Na) | 231 | 10.03 | 248 | 10.78 |
| Potassium (K) | 8.0 | 0.20 | 8.2 | 0.21 |
| Bicarbonate ($HCO_3$) | 364 | 5.97 | 370 | 6.06 |
| Sulfate ($SO_4$) | 94 | 1.96 | 109 | 2.27 |
| Chloride (Cl) | 158 | 4.46 | 169 | 4.77 |
| Fluoride (F) | 0.7 | 0.04 | 0.7 | 0.04 |
| Nitrate ($NO_3$) | 15 | 0.24 | 15 | 0.24 |
| Dissolved solids | 754 | | 794 | |
| Total hardness as $CaCO_3$ | 122 | | 120 | |
| pH | 7.8 | | 7.8 | |

Drillers' logs:

Well 1

| | Thickness (feet) | Depth (feet) |
|---|---|---|
| Surface soil | 5 | 5 |
| Sand and caliche | 60 | 65 |
| Red clay and caliche | 48 | 113 |
| Red clay | 110 | 223 |
| Sandy clay | 150 | 373 |
| Hard caliche | 23 | 396 |
| Sand | 18 | 414 |
| Clay | 21 | 435 |
| Sand | 4 | 439 |
| Clay | 36 | 475 |
| Sand | 26 | 501 |
| Tough sand | 8 | 509 |

Well 2

| | Thickness (feet) | Depth (feet) |
|---|---|---|
| Surface soil | 5 | 5 |
| Sand and caliche | 36 | 41 |
| Caliche | 30 | 71 |
| Red clay and caliche | 142 | 213 |
| Sand | 5 | 218 |
| Red clay and sand | 16 | 234 |
| Sand | 4 | 238 |
| Red clay | 32 | 270 |
| White clay and sand | 81 | 351 |
| Sand | 31 | 382 |
| Red clay and sand | 27 | 409 |
| Clay and sand | 30 | 439 |
| Sand | 18 | 457 |
| Hard shale | 87 | 544 |
| Sandy shale | 121 | 565 |

Frio County

Dilley

Population in 1940: 1,244.

Owner: International and Great Northern Railway (operated by City of Dilley)

Source of information: Gertrude Callender, City Secretary May 9, 1945

Source of supply: Well one-fourth mile south of Dilley, drilled in 1924, depth 2,010 feet, diameter 10 inches; deep-well turbine pump and 15-horsepower electric motor, pump set at 80 feet; flowed when drilled, static water level reported 40 feet below land surface in April 1945; yield 240 gallons a minute with drawdown of about 40 feet; temperature 101° F.

Pumpage:

(Average in gallons a day)

| April 1940-41 | April 1941-42 | April 1942-43 | April 1943-44 | April 1944-45 |
|---|---|---|---|---|
| 66,700 | 70,500 | 69,000 | 80,000 | 90,000 |

(Includes water used by railroad)

Storage: Elevated tank, 50,000 gallons; concrete ground reservoir, 50,000 gallons.

Number of customers: 385.

Treatment: None.

Analysis of water:

Date of collection: April 9, 1945 Analyzed by State Health Dept.

| | Parts per million | Equivalents per million |
|---|---|---|
| Silica ($SiO_2$) | 27 | |
| Iron (Fe) | 0.6 | |
| Calcium (Ca) | 31 | 1.55 |
| Magnesium (Mg) | 10 | 0.82 |
| Sodium and Potassium (Na + K) | 89 | 3.87 |
| Bicarbonate ($HCO_3$) | 280 | 4.59 |
| Sulfate ($SO_4$) | 47 | 0.98 |
| Chloride (Cl) | 23 | 0.65 |
| Fluoride (F) | 0.66 | 0.03 |
| Nitrate ($NO_3$) | 0.4 | 0.01 |
| Dissolved solids | 370 | |
| Total hardness as $CaCO_3$ | 119 | |
| pH | 7.9 | |

Dilley -- Continued

Drillers' log:

| | Thickness (feet) | Depth (feet) | | Thickness (feet) | Depth (feet) |
|---|---|---|---|---|---|
| Surface soil | 19 | 19 | Packsand | 14 | 966 |
| Rock | 3 | 22 | Shale and boulders | 89 | 1055 |
| Yellow clay | 16 | 38 | Gumbo and boulders | 81 | 1136 |
| Lignite | 14 | 52 | Sand (water) | 30 | 1166 |
| Packsand | 12 | 64 | Shale | 10 | 1176 |
| Sandstone | 12 | 76 | Hard sand | 19 | 1195 |
| Packsand and boulders | 221 | 297 | Shale and boulders | 163 | 1358 |
| Rock | 1 | 298 | Hard sand | 30 | 1390 |
| Fine-grained sand | 55 | 353 | Shale | 10 | 1400 |
| Packsand | 27 | 380 | Hard sand | 30 | 1430 |
| Rock | 2 | 382 | Gumbo and boulders | 10 | 1440 |
| Shale and boulders | 104 | 486 | Shale and boulders | 30 | 1470 |
| Rock | 2 | 488 | Hard sand | 35 | 1505 |
| Blue gumbo | 38 | 526 | Sandy shale and boulders | 62 | 1567 |
| Rock | 2 | 528 | Shale and boulders | 24 | 1591 |
| Gumbo | 40 | 568 | Sand | 9 | 1600 |
| Gumbo and boulders | 13 | 581 | Shale and boulders | 14 | 1614 |
| Rock | 3 | 584 | Gumbo | 10 | 1624 |
| Gumbo and boulders | 46 | 630 | Sand (water) | 30 | 1654 |
| Rock | 3 | 633 | Sandy shale | 60 | 1714 |
| Gumbo and lime | 17 | 650 | Gumbo | 69 | 1783 |
| Packsand | 38 | 688 | Shale | 25 | 1808 |
| Rock | 2 | 690 | Hard sand | 16 | 1824 |
| Gumbo and boulders | 117 | 807 | Shale | 10 | 1834 |
| "Granite" | 4 | 811 | Fine-grained sand | 16 | 1850 |
| Shale and boulders | 30 | 841 | Shale | 20 | 1870 |
| Shale | 36 | 877 | Sand (water) | 35 | 1905 |
| Rock | 2 | 879 | Lime rock | 18 | 1923 |
| Sand and boulders | 23 | 902 | Sand (water) | 67 | 1990 |
| Shale and boulders | 10 | 912 | Hard shale | 20 | 2010 |
| Rock | 2 | 914 | | | |
| Shale and boulders | 38 | 952 | | | |

Pearsall

Population in 1940: 3,164.

Owner: Central Power & Light Co.

Source of information: K. F. Meyer, Manager May 9, 1945

Source of supply: 2 wells.

Well 1. At power plant one block southwest of railroad depot, drilled in 1926 by Layne-Texas Company, depth 1,303 feet (measured depth 1,216 feet in 1940), diameter 16 to 6 inches, screens at 962-1,066 and 1,132-1,241 feet; deep-well turbine pump and 40-horsepower electric motor, pump set at 135 feet; static water level reported 60 feet below land surface in 1930; yield 625 gallons a minute; temperature 92° F.

Frio County

Pearsall -- Continued

Well 2. About 50 feet northeast of well 1, drilled in 1942 by Layne-Texas Company, depth 1,302 feet, diameter 10-3/4 to 7 inches, screens at 1,135-1,246 and 1,271-1,297 feet; deep-well turbine pump and 30-horsepower electric motor, pump set at 150 feet; static water level 88 feet below land surface on October 23, 1942; yield 640 gallons a minute with drawdown of 124 feet; temperature 93½° F.

Storage: Elevated tank, 50,000 gallons; concrete ground reservoir, 73,000 gallons.

Number of customers: 583.

Treatment: Hypochlorination.

Analyses of water:

Date of collection: February 20, 1943 Analyzed by State Health Dept.

| | Well 1 | |
|---|---|---|
| | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 20 | |
| Iron (Fe) | 0.4 | |
| Calcium (Ca) | 89 | 4.44 |
| Magnesium (Mg) | 16 | 1.32 |
| Sodium and Potassium (Na + K) | 28 | 1.22 |
| Bicarbonate ($HCO_3$) | 299 | 4.90 |
| Sulfate ($SO_4$) | 62 | 1.29 |
| Chloride (Cl) | 28 | 0.79 |
| Fluoride (F) | 0.4 | 0.02 |
| Nitrate ($NO_3$) | 0.4 | 0.01 |
| Dissolved solids | 394 | |
| Total hardness as $CaCO_3$ | 288 | |

Date of collection: May 9, 1945 Analyzed by J. H. Rowley

| | Well 2 | |
|---|---|---|
| | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 18 | |
| Iron (Fe) | 0.62 | |
| Calcium (Ca) | 95 | 4.74 |
| Magnesium (Mg) | 17 | 1.40 |
| Sodium and Potassium (Na + K) | 17 | 0.74 |
| Bicarbonate ($HCO_3$) | 296 | 4.85 |
| Sulfate ($SO_4$) | 62 | 1.29 |
| Chloride (Cl) | 25 | 0.71 |
| Fluoride (F) | 0.6 | 0.03 |
| Nitrate ($NO_3$) | 0.0 | 0.00 |
| Dissolved solids | 391 | |
| Total hardness as $CaCO_3$ | 307 | |
| pH | 7.1 | |

Frio County

Pearsall -- Continued

Drillers' log:

Well 2

| | Thickness (feet) | Depth (feet) | | Thickness (feet) | Depth (feet) |
|---|---|---|---|---|---|
| Sandy clay | 5 | 5 | Rock | 1 | 634 |
| Sand and rock | 30 | 35 | Shale and boulders | 3 | 637 |
| Hard rock | 1 | 36 | Rock | 1 | 638 |
| Sand and hard shale | 58 | 94 | Shale and boulders | 5 | 643 |
| Sand and rock | 1 | 95 | Rock and shale | 15 | 658 |
| Sand and hard shale | 32 | 127 | Shale and layers of sand | 21 | 679 |
| Sand | 21 | 148 | Shale and layers of sand | 10 | 689 |
| Sand and shale layers | 18 | 166 | Shale and sand breaks | 13 | 702 |
| Hard rock | 2 | 168 | Sand | 15 | 717 |
| Sand and rock | 3 | 171 | Shale and boulders | 28 | 745 |
| Sand and hard shale | 20 | 191 | Shale and layers of sand | 11 | 756 |
| Sand and rock | 2 | 193 | Hard sand | 31 | 787 |
| Sand and hard shale | 56 | 249 | Rock | 1 | 788 |
| Rock | 2 | 251 | Shale and boulders | 2 | 790 |
| Hard shale | 15 | 266 | Hard shale | 4 | 794 |
| Shale and rock layers | 4 | 270 | Rock | 1 | 795 |
| Hard shale | 36 | 306 | Shale, sand and boulders | 76 | 871 |
| Sand and boulders | 16 | 322 | Sand and boulders | 21 | 892 |
| Shale and boulders | 4 | 326 | Rock | 1 | 893 |
| Hard shale | 11 | 337 | Shale and boulders | 9 | 902 |
| Hard shale and bouldrs | 39 | 376 | Sand and breaks | 15 | 917 |
| Layers of shale and boulders | 8 | 384 | Sand, shale and breaks | 23 | 940 |
| Hard shale | 4 | 388 | Sandy shale | 14 | 954 |
| Shale and boulders | 4 | 392 | Sand and shale | 47 | 1001 |
| Hard shale | 46 | 438 | Rock | 1 | 1002 |
| Rock | 2 | 440 | Shale and boulders | 63 | 1065 |
| Shale | 21 | 461 | Hard shale | 16 | 1081 |
| Rock and shale layers | 24 | 485 | Hard rock | 2 | 1083 |
| Rock and shale | 11 | 496 | Shale and boulders | 12 | 1095 |
| Hard shale | 30 | 526 | Hard shale | 10 | 1105 |
| Shale and boulders | 34 | 560 | Sand (good) | 23 | 1128 |
| Rock | 2 | 562 | Shale | 11 | 1139 |
| Hard sand and shale | 12 | 574 | Sand and shale | 18 | 1157 |
| Shale and boulders | 41 | 615 | Sand | 90 | 1247 |
| Hard rock | 1 | 616 | Shale | 25 | 1272 |
| Shale and boulders | 10 | 626 | Sand | 5 | 1277 |
| Sand and shale | 7 | 633 | Sandy shale | 25 | 1302 |

Goliad County

## Goliad

Population in 1940: 1,446.

Source of information: Frank Malech, Water Superintendent April 20, 1945

Ownership: Municipal.

Source of supply: 2 wells.

Well 1. On river bank, old well, depth 325 feet, diameter 8 inches; air lift; yield 500 gallons a minute; standby well; temperature 75° F.

Well 2. At pump station, drilled in 1936 by Layne-Texas Company, depth 461 feet, diameter 8 to 6 inches, screens at 390-403 and 412-460 feet; deep-well turbine pump and 25-horsepower electric motor, pump set at 156 feet; static water level 59 feet below land surface and yield 261 gallons a minute with drawdown of 46 feet on November 6, 1936; present static water level reported 60 feet; yield 175 gallons a minute; temperature 78° F.

Pumpage: Maximum 200,000 gallons; average 100,000 gallons a day.

Storage: Standpipe, 85,000 gallons; concrete ground reservoir, 80,000 gallons.

Number of customers: 263.

Treatment: Chlorination.

Analyses of water:

Date of collection: April 20, 1945 Analyzed by J. H. Rowley

| | Well 1 | | Well 2 | |
|---|---|---|---|---|
| | Parts per million | Equivalents per million | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 53 | | 31 | |
| Iron (Fe) | 8.4 | | 0.44 | |
| Calcium (Ca) | 70 | 3.49 | 112 | 5.59 |
| Magnesium (Mg) | 20 | 1.64 | 31 | 2.55 |
| Sodium (Na) | 90 | 3.93 | 92 | 4.02 |
| Potassium (K) | 7.0 | 0.18 | 9.8 | 0.25 |
| Bicarbonate ($HCO_3$) | 335 | 5.49 | 336 | 5.51 |
| Sulfate ($SO_4$) | 38 | 0.79 | 35 | 0.73 |
| Chloride (Cl) | 102 | 2.88 | 217 | 6.12 |
| Fluoride (F) | 0.6 | 0.03 | 0.6 | 0.03 |
| Nitrate ($NO_3$) | 2.8 | 0.05 | 1.2 | 0.02 |
| Dissolved solids | 557 | | 805 | |
| Total hardness as $CaCO_3$ | 256 | | 407 | |
| pH | 7.4 | | 7.4 | |

Goliad County

Goliad -- Continued

Drillers' log:

Well 2

| | Thickness (feet) | Depth (feet) | | Thickness (feet) | Depth (feet) |
|---|---|---|---|---|---|
| Surface soil | 2 | 2 | Hard sticky shale | 122 | 343 |
| Caliche | 3 | 5 | Sand, broken with shale | 10 | 353 |
| Caliche and hard sand | 12 | 17 | Sticky shale | 22 | 375 |
| Caliche and clay | 13 | 30 | Sandy lime | 7 | 382 |
| Hard caliche and sand | 22 | 52 | Sand, broken with shale | 20 | 402 |
| Sand | 20 | 72 | Sticky shale | 5 | 407 |
| Sand and clay | 25 | 97 | Sand, broken with shale | 50 | 457 |
| Sticky shale | 38 | 135 | Sticky shale | 4 | 461 |
| Hard sticky shale | 71 | 206 | | | |
| Sand | 15 | 221 | | | |

## Gonzales County

### Gonzales

Population in 1940: 4,722.

Source of information: Lewis Nix, Water Superintendent December 20, 1944

Ownership: Municipal.

Source of supply: Guadalupe River.

Pumpage:

(Average in gallons a day)

1944

| | |
|---|---|
| January | 256,500 |
| February | 257,800 |
| March | 269,100 |
| April | 347,300 |
| May | 288,300 |
| June | 429,200 |
| July | 525,900 |
| August | 469,700 |
| September | 530,100 |
| October | 290,000 |
| November | 290,000 |

Storage: Elevated tank, 100,000 gallons.

Number of customers: 1,163.

Treatment: Coagulation, sedimentation, rapid sand filtration, and pre and post chlorination.

Analysis of water:

Date of collection: December 20, 1944 Analyzed by J. H. Rowley

| | Raw Water | |
|---|---|---|
| | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 7.2 | |
| Iron (Fe) | 0.19 | |
| Calcium (Ca) | 86 | 4.29 |
| Magnesium (Mg) | 24 | 1.97 |
| Sodium (Na) | 76 | 3.30 |
| Potassium (K) | 9.5 | 0.24 |
| Bicarbonate ($HCO_3$) | 236 | 3.87 |
| Sulfate ($SO_4$) | 47 | 0.98 |
| Chloride (Cl) | 173 | 4.88 |
| Fluoride (F) | 0.2 | 0.01 |
| Nitrate ($NO_3$) | 4.0 | 0.06 |
| Dissolved solids | 583 | |
| Total hardness as $CaCO_3$ | 313 | |
| pH | 7.8 | |

## Gonzales County

### Nixon

Population in 1940: 1,835.

Owner: Terrell Bartlett Co.

Source of information: Mayor
December 22, 1944

Source of supply: Well at elevated tank, drilled in 1929, depth about 1,400 feet, diameter 10 inches; centrifugal pump and electric motor, flows; static water level 15 feet above land surface in 1942 and 12.5 feet in 1944; yield, when pumped, about 150 gallons a minute.

Storage: Elevated tank, 75,000 gallons.

Treatment: None.

Analysis of water:

Date of collection: December 22, 1944 Analyzed by J. H. Rowley

| | Parts per million | Equivalents per million |
|---|---|---|
| Silica ($SiO_2$) | 16 | |
| Iron (Fe) | 0.2 | |
| Calcium (Ca) | 44 | 2.196 |
| Magnesium (Mg) | 7.2 | 0.592 |
| Sodium (Na) | 29 | 1.269 |
| Potassium (K) | 5.8 | 0.148 |
| Bicarbonate ($HCO_3$) | 168 | 2.754 |
| Sulfate ($SO_4$) | 30 | 0.625 |
| Chloride (Cl) | 29 | 0.818 |
| Fluoride (F) | 0.0 | 0.000 |
| Nitrate ($NO_3$) | 0.5 | 0.008 |
| Dissolved solids | 249 | |
| Total hardness as $CaCO_3$ | 139 | |
| pH | 7.9 | |

### Waelder

Population in 1940: 1,018.

Ownership: Municipal.

Source of information: A. E. Bost, Water Superintendent
December 20, 1944.

Source of supply: Well drilled in 1926 by Bost Brothers, depth 511 feet; deep-well turbine pump and 15-horsepower electric motor, pump set at 210 feet; reported static water level 50 feet below land surface; drawdown 126 feet after pumping 150 gallons a minute for 3 weeks; temperature 79° F.

Gonzales County

Waelder -- Continued

Pumpage: Maximum 156,000; minimum 72,000; average 108,000 gallons a day.

Storage: Elevated tank, 60,000 gallons.

Number of customers: 287.

Treatment: None.

Analysis of water:

Date of collection: December 20, 1944 Analyzed by J. H. Rowley

| | Parts per million | Equivalents per million |
|---|---|---|
| Silica ($SiO_2$) | 19 | |
| Iron (Fe) | 0.31 | |
| Calcium (Ca) | 49 | 2.45 |
| Magnesium (Mg) | 20 | 1.64 |
| Sodium (Na) | 103 | 4.47 |
| Potassium (K) | 16 | 0.41 |
| Bicarbonate ($HCO_3$) | 208 | 3.41 |
| Sulfate ($SO_4$) | 142 | 2.96 |
| Chloride (Cl) | 91 | 2.57 |
| Fluoride (F) | 0.1 | 0.01 |
| Nitrate ($NO_3$) | 1.5 | 0.02 |
| Dissolved solids | 544 | |
| Total hardness as $CaCO_3$ | 204 | |
| pH | 7.9 | |

Guadalupe County

## Marion

Population in 1940: 373.

Ownership: Municipal.

Source of information: E. C. Schulz, City Secretary July 28, 1945

Source of supply: Well 4-1/2 miles north of Marion, drilled in 1933, depth 50 feet, diameter 8 inches; deep-well turbine pump and 7-1/2-horsepower electric motor; static water level 3.0 feet below land surface on July 28, 1944 after pump had been shut off 20 hours; yield 80 gallons a minute with drawdown of about 2 feet after one hour pumping; temperature 71° F.

Pumpage (estimated): Maximum 25,000 gallons; minimum 10,000 gallons; average 15,000 gallons a day.

Storage: Elevated tank, 50,000 gallons.

Number of customers: 96.

Treatment: Chlorination.

Analysis of water:

Date of collection: July 28, 1945 Analyzed by J. H. Rowley

| | Parts per million | Equivalents per million |
|---|---|---|
| Silica ($SiO_2$) | 18 | |
| Iron (Fe) | 0.10 | |
| Calcium (Ca) | 140 | 6.99 |
| Magnesium (Mg) | 15 | 1.23 |
| Sodium (Na) | 67 | 2.90 |
| Potassium (K) | 4.8 | 0.12 |
| Bicarbonate ($HCO_3$) | 353 | 5.79 |
| Sulfate ($SO_4$) | 99 | 2.06 |
| Chloride (Cl) | 80 | 2.26 |
| Fluoride (F) | 0.9 | 0.05 |
| Nitrate ($NO_3$) | 67 | 1.08 |
| Dissolved solids | 685 | |
| Total hardness as $CaCO_3$ | 411 | |
| pH | 7.3 | |

## Seguin

Population in 1940: 7,006.

Ownership: Municipal.

Source of information: P. B. Roessler, Plant Superintendent July 28, 1944

Source of supply: Guadalupe River.

Guadalupe County

Seguin -- Continued

Pumpage:

(Average in gallons a day)

| | 1941 | 1942 | 1943 | 1944 |
|---|---|---|---|---|
| January | 476,290 | 660,806 | 584,741 | 503,000 |
| February | 477,143 | 618,982 | 640,250 | 511,206 |
| March | 499,000 | 794,000 | 700,451 | 511,110 |
| April | 586,666 | 667,766 | 902,500 | 741,060 |
| May | 720,000 | 878,709 | 1,098,516 | 778,322 |
| June | 822,433 | 1,258,533 | 1,041,660 | 1,090,100 |
| July | 1,245,796 | 1,053,387 | 1,102,516 | |
| August | 1,277,161 | 1,036,580 | 1,398,000 | |
| September | 917,900 | 839,800 | 842,466 | |
| October | 620,090 | 632,322 | 705,870 | |
| November | 653,200 | 585,733 | 659,833 | |
| December | 588,490 | 579,451 | 540,806 | |

Storage: Elevated tank, 100,000 gallons; standpipe, 290,000 gallons.

Number of customers: 1,900.

Treatment: Coagulation, sedimentation, rapid sand filtration, and chlorination.

Analysis of water:

Date of collection: July 28, 1944 Analyzed by J. H. Rowley

| | Raw Water | |
|---|---|---|
| | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 12 | |
| Iron (Fe) | 0.15 | |
| Calcium (Ca) | 56 | 2.80 |
| Magnesium (Mg) | 20 | 1.64 |
| Sodium and Potassium (Na + K) | 18 | 0.77 |
| Bicarbonate ($HCO_3$) | 260 | 4.26 |
| Sulfate ($SO_4$) | 22 | 0.46 |
| Chloride (Cl) | 15 | 0.42 |
| Fluoride (F) | 0.2 | 0.01 |
| Nitrate ($NO_3$) | 3.8 | 0.06 |
| Dissolved solids | 280 | |
| Total hardness as $CaCO_3$ | 222 | |
| pH | 7.9 | |

Hays County

Buda

Population in 1940: 300.
Owner: John Howe and W. M. Moore.

Source of information: John Howe, Co-owner January 28, 1946

Source of supply: Well 100 yards east of depot by water tower, drilled in 1941 by Mr. Tyler, depth 325 feet, diameter 10 inches, cased to about 200 feet; deep-well Hi-Lift pump and 5-horsepower electric motor; static water level reported 100 feet below land surface when drilled; yield 22 gallons a minute; temperature 66° F.

Pumpage (estimated): Average 10,000 gallons a day.

Storage: Elevated tank, 10,000 gallons.

Number of customers: 100.

Treatment: None.

Analysis of water:

Date of collection: January 28, 1946 Analyzed by J. H. Rowley

| | Parts per million | Equivalents per million |
|---|---|---|
| Silica ($SiO_2$) | 10 | |
| Iron (Fe) | 0.05 | |
| Calcium (Ca) | 58 | 2.89 |
| Magnesium (Mg) | 33 | 2.71 |
| Sodium (Na) | 3.0 | 0.13 |
| Potassium (K) | 3.0 | 0.008 |
| Bicarbonate ($HCO_3$) | 280 | 4.59 |
| Sulfate ($SO_4$) | 38 | 0.79 |
| Chloride (Cl) | 12 | 0.34 |
| Fluoride (F) | 1.8 | 0.09 |
| Nitrate ($NO_3$) | 0.0 | 0.00 |
| Dissolved solids | 301 | |
| Total hardness as $CaCO_3$ | 280 | |
| pH | 8.2 | |

Kyle

Population in 1940: 874.
Ownership: Municipal.

Source of information: J. D. Scott, Water Superintendent November 2, 1945

Source of supply: Well on extension of Goforth street approximately 640 feet east of property line of U. S. Highway 81, drilled in 1939, depth 595 feet, diameter 10 inches; deep-well turbine pump and 15-horsepower electric motor; static water level reported 130 feet below land surface in January 1939; yield 75 gallons a minute with pumping level at 300 feet.

Hays County

Kyle -- Continued

Pumpage (master meter): Minimum 30,000 gallons, maximum 60,000 gallons a day.

Storage: Elevated steel tank, 50,000 gallons.

Number of customers: 208.

Treatment: None.

Analysis of water:

Date of collection: November 2, 1945 Analyzed by J. H. Rowley

| | Parts per million | Equivalents per million |
|---|---|---|
| Silica ($SiO_2$) | 17 | |
| Iron (Fe) | 1.1 | |
| Calcium (Ca) | 80 | 3.99 |
| Magnesium (Mg) | 45 | 3.70 |
| Sodium (Na) | 35 | 1.51 |
| Potassium (K) | 17 | 0.43 |
| Bicarbonate ($HCO_3$) | 278 | 4.56 |
| Sulfate ($SO_4$) | 172 | 3.58 |
| Chloride (Cl) | 46 | 1.30 |
| Fluoride (F) | 3.6 | 0.19 |
| Nitrate ($NO_3$) | 0.2 | 0.00 |
| Dissolved solids | 591 | |
| Total hardness as $CaCO_3$ | 384 | |
| pH | 7.4 | |

Drillers' log:

Well 1

| | Thickness (feet) | Depth (feet) | | Thickness (feet) | Depth (feet) |
|---|---|---|---|---|---|
| Surface soil | 5 | 5 | Buda lime | 44 | 258 |
| Hard Taylor marl | 13 | 18 | Del Rio clay | 52 | 310 |
| Hard cap rock | 4 | 22 | Georgetown limestone | 30 | 340 |
| Austin chalk | 160 | 182 | Edwards limestone | 255 | 595 |
| Eagle Ford shale | 32 | 214 | | | |

San Marcos

Population in 1940: 6,006.

Ownership: Municipal.

Source of information: W. N. Joiner, Water Superintendent November 11, 1945

Hays County

San Marcos -- Continued

Source of supply: 2 wells.

Well 1. Drilled in 1914 by Walter Payne, depth 115 feet, diameter 8 inches, (in 1941 well was lined with 6-1/2 inch casing); 4 horizontal centrifugal pumps in 9-foot cistern, capacity of pumps - 1,000, 750, 700, and 400 gallons a minute, total capacity of pumps- 2,900 gallons a minute. Both wells 1 and 2 are connected to this series of pumps. About 1,000 gallons a minute is obtained from well 1, with a drawdown of about 3 feet; static water level near the surface of the pump house floor.

Well 2. Drilled in 1941 by J. R. Johnson, depth 115 feet, diameter 12 inches; connected in conjunction with well 1 to horizontal centrifugal pumps.

Pumpage:

(Average in gallons a day)

| | 1943 | 1944 |
|---|---|---|
| January | | 600,000 |
| February | | 640,000 |
| March | | 680,000 |
| April | | 720,000 |
| May | | 760,000 |
| June | | 800,000 |
| July | 350,000 | 850,000 |
| August | 400,000 | 920,000 |
| September | 450,000 | |
| October | 490,000 | |
| November | 520,000 | |
| December | 560,000 | |

Storage: Concrete reservoir on hill 200 feet above pumping station, 365,000 gallons.

Number of customers: 1,500.

Treatment: Chlorination.

Hays County

San Marcos -- Continued

Analysis of water:

Date of collection: November 11, 1945 Analyzed by J. H. Rowley and C. B. Cibulka

| | Composite sample Wells 1 and 2 | |
|---|---|---|
| | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 12 | |
| Iron (Fe) | 0.05 | |
| Calcium (Ca) | 88 | 4.39 |
| Magnesium (Mg) | 18 | 1.48 |
| Sodium (Na) | 7.4 | 0.32 |
| Potassium (K) | 5.8 | 0.15 |
| Bicarbonate ($HCO_3$) | 314 | 5.15 |
| Sulfate ($SO_4$) | 23 | 0.48 |
| Chloride (Cl) | 22 | 0.62 |
| Fluoride (F) | 0.4 | 0.02 |
| Nitrate ($NO_3$) | 4.3 | 0.07 |
| Dissolved solids | 337 | |
| Total hardness as $CaCO_3$ | 294 | |
| pH | 7.0 | |

Driller's log:

Well 2

| | Thickness (feet) | Depth (feet) | | Thickness (feet) | Depth (feet) |
|---|---|---|---|---|---|
| Surface soil | 16 | 16 | Solid limestone | 33 | 90 |
| Yellow clay | 20 | 36 | Flint boulders | 6 | 96 |
| Yellow limestone | 18 | 54 | Honeycomb, yellow limestone (very porous | 19 | 115 |
| Broken limestone (very cavey) | 3 | 57 | | | |

Hidalgo County

Alamo

Population in 1940: 1,944.

Source of information: T. D. Jones, Water Superintendent August 6, 1945

Ownership: Municipal.

Source of supply: Rio Grande, pumping station located 2-1/2 blocks south of the post office.

Pumpage:

(Average in gallons a day)

| | 1941 | 1942 | 1943 | 1944 | 1945 |
|---|---|---|---|---|---|
| January | 73,000 | 60,000 | 69,000 | 71,000 | 97,000 |
| February | 55,000 | 70,000 | 90,000 | 91,000 | 101,000 |
| March | 53,000 | 82,000 | 92,000 | 94,000 | 152,000 |
| April | 52,000 | 86,000 | 70,000 | 98,000 | 119,000 |
| May | 37,000 | 67,000 | 76,000 | 80,000 | 120,000 |
| June | 36,000 | 79,000 | 64,000 | 72,000 | 116,000 |
| July | 48,000 | 50,000 | 89,000 | 81,000 | 123,000 |
| August | 53,000 | 57,000 | 74,000 | 82,000 | |
| September | 48,000 | 63,000 | 46,000 | 57,000 | |
| October | 52,000 | 65,000 | 52,000 | 83,000 | |
| November | 55,000 | 73,000 | 50,000 | 93,000 | |
| December | 50,000 | 73,000 | 53,000 | 104,000 | |

Storage: Elevated tank, 100,000 gallons; concrete ground storage, 100,000 gallons.

Number of customers: 450.

Treatment: Coagulation, sedimentation, rapid sand filtration, and chlorination.

Hidalgo County

Alamo -- Continued

Analyses of water:

Date of collection: August 6, 1945 — Analyzed by J. H. Rowley and C. B. Cibulka

| | Raw Water | | Finished Water | |
|---|---|---|---|---|
| | Parts per million | Equivalents per million | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | | | 16 | |
| Iron (Fe) | | | 0.09 | |
| Calcium (Ca) | 88 | 4.39 | 84 | 4.19 |
| Magnesium (Mg) | 19 | 1.32 | 16 | 1.56 |
| Sodium (Na) | | ) | 89 | 3.85 |
| Potassium (K) | 87 | 3.80 ) | 6.5 | 0.17 |
| Bicarbonate ($HCO_3$) | 162 | 2.66 | 150 | 2.46 |
| Sulfate ($SO_4$) | 193 | 4.02 | 192 | 4.00 |
| Chloride (Cl) | 107 | 3.02 | 106 | 2.99 |
| Fluoride (F) | | | 0.6 | 0.03 |
| Nitrate ($NO_3$) | 3.0 | 0.05 | 3.2 | 0.05 |
| Dissolved solids | 648 | | 602 | |
| Total hardness as $CaCO_3$ | 298 | | 276 | |
| pH | | | 7.4 | |

Donna

Population in 1940: 4,712.

Ownership: Municipal.

Source of information: E. L. Badeaux, Water Superintendent August 6, 1945

Source of supply: Rio Grande, pumping station located 3 blocks from post office.

Pumpage (estimated): Maximum 850,000 gallons a day; minimum 350,000 gallons a day; average 650,000 gallons a day.

Storage: Elevated tank, 120,000 gallons; concrete ground reservoir, 100,000 gallons.

Number of customers: 851.

Treatment: Coagulation, sedimentation, rapid sand filtration, and chlorination.

Hidalgo County

Donna -- Continued

Analyses of water:

Date of collection: August 6, 1945 — Analyzed by J. H. Rowley and C. B. Cibulka

| | Raw Water | | Finished Water | |
|---|---|---|---|---|
| | Parts per million | Equivalents per million | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | | | 12 | |
| Iron (Fe) | | | 0.19 | |
| Calcium (Ca) | 78 | 3.89 | 78 | 3.89 |
| Magnesium (Mg) | 20 | 1.64 | 19 | 1.56 |
| Sodium (Na) | | ) | 105 | 4.56 |
| Potassium (K) | 115 | 5.01 ) | 8.0 | 0.20 |
| Bicarbonate ($HCO_3$) | 149 | 2.45 | 125 | 2.05 |
| Sulfate ($SO_4$) | 212 | 4.41 | 209 | 4.35 |
| Chloride (Cl) | 130 | 3.67 | 131 | 3.69 |
| Fluoride (F) | | | 2.0 | 0.11 |
| Nitrate ($NO_3$) | 0.8 | 0.01 | 0.8 | 0.01 |
| Dissolved solids | 678 | | 676 | |
| Total hardness as $CaCO_3$ | 276 | | 272 | |
| pH | | | 7.6 | |

Ed Couch

Population in 1940: 1,758.

Ownership: Municipal.

Source of information: C. C. Moore, City Secretary August 3, 1945

Source of supply: Rio Grande, pumping plant located 3 blocks west and 3 blocks south of post office.

Pumpage (estimated): Average 125,000 gallons a day.

Storage: Elevated tank, 50,000 gallons.

Number of customers: 285.

Treatment: Coagulation, sedimentation, and chlorination.

Hidalgo County

Ed Couch -- Continued

Analyses of water:

Date of collection: August 3, 1945 Analyzed by C. B. Cibulka

| | Raw Water | | Finished Water | |
|---|---|---|---|---|
| | Parts per million | Equivalents per million | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | | | 8.0 | |
| Iron (Fe) | | | 0.54 | |
| Calcium (Ca) | 89 | 4.44 | 94 | 4.69 |
| Magnesium (Mg) | 16 | 1.32 | 17 | 1.40 |
| Sodium (Na) | | ) | 96 | 4.16 |
| Potassium (K) | 107 | 4.66 ) | 7.4 | 0.19 |
| Bicarbonate ($HCO_3$) | 105 | 1.72 | 94 | 1.54 |
| Sulfate ($SO_4$) | 256 | 5.33 | 262 | 5.45 |
| Chloride (Cl) | 119 | 3.36 | 118 | 3.33 |
| Fluoride (F) | | | 2.0 | 0.11 |
| Nitrate ($NO_3$) | 0.4 | 0.01 | 0.8 | 0.01 |
| Dissolved solids | | | 700 | |
| Total hardness as $CaCO_3$ | | | 304 | |
| pH | | | 7.5 | |

Edinburg

Population in 1940: 8,718.

Owner: Central Power & Light Co.

Source of information: T. J. Blane, Chief Operator August 3, 1945

Source of supply: Rio Grande, plant located 2 blocks south and 4 blocks east of the courthouse.

Pumpage:

(Average in gallons a day)

| | 1939 | 1940 | 1941 | 1942 | 1943 | 1944 | 1945 |
|---|---|---|---|---|---|---|---|
| January | 402,000 | 429,000 | 421,000 | 411,000 | 428,000 | 582,000 | 703,000 |
| February | 436,000 | 539,000 | 429,000 | 436,000 | 594,000 | 731,000 | 691,000 |
| March | 544,000 | 445,000 | 423,000 | 555,000 | 565,000 | 721,000 | 829,000 |
| April | 423,000 | 436,000 | 402,000 | 542,000 | 542,000 | 725,000 | 674,000 |
| May | 411,000 | 370,000 | 328,000 | 493,000 | 586,000 | 723,000 | 840,000 |
| June | 451,000 | 433,000 | 352,000 | 542,000 | 705,000 | 647,000 | 968,000 |
| July | 412,000 | 473,000 | 357,000 | 342,000 | 841,000 | 709,000 | 969,000 |
| August | 374,000 | 529,000 | 412,000 | 416,000 | 829,000 | 737,000 | |
| September | 346,000 | 386,000 | 338,000 | 408,000 | 456,000 | 487,000 | |
| October | 376,000 | 392,000 | 329,000 | 410,000 | 432,000 | 646,000 | |
| November | 409,000 | 337,000 | 373,000 | 510,000 | 468,000 | 664,000 | |
| December | 400,000 | 351,000 | 347,000 | 543,000 | 491,000 | 652,000 | |

Hidalgo County

Edinburg -- Continued

Storage: Elevated tank, 70,000 gallons; concrete ground reservoir, 140,000 gallons.

Number of customers: 1,719.

Treatment: Aeration, coagulation, sedimentation, rapid sand filtration, and chlorination.

Analyses of water:

Date of collection: August 3, 1945 Analyzed by C. B. Cibulka

| | Raw Water | | Finished Water | |
|---|---|---|---|---|
| | Parts per million | Equivalents per million | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | | | 15 | |
| Iron (Fe) | | | 0.11 | |
| Calcium (Ca) | 83 | 4.14 | 85 | 4.24 |
| Magnesium (Mg) | 17 | 1.40 | 16 | 1.32 |
| Sodium (Na) | | ) | 88 | 3.81 |
| Potassium (K) | 92 | 3.98) | 7.4 | 0.19 |
| Bicarbonate ($HCO_3$) | 161 | 2.64 | 149 | 2.44 |
| Sulfate ($SO_4$) | 186 | 3.87 | 193 | 4.02 |
| Chloride (Cl) | 106 | 2.99 | 108 | 3.05 |
| Fluoride (F) | | | 0.4 | 0.02 |
| Nitrate ($NO_3$) | 1.2 | 0.02 | 1.8 | 0.03 |
| Dissolved solids | 574 | | 615 | |
| Total hardness as $CaCO_3$ | 277 | | 278 | |
| pH | | | 7.4 | |

Elsa

Population in 1940: 1,006.

Source of information: Warren Turberville, City Secretary August 3, 1945

Ownership: Municipal.

Source of supply: Rio Grande, through canal, plant located one-half mile west of post office.

Pumpage (estimated): Maximum 165,000 gallons a day; minimum 120,000 gallons a day.

Storage: Elevated tank and open ground settling tank, 1,500,000 gallons.

Treatment: Coagulation, sedimentation, and chlorination.

Hidalgo County

Elsa -- Continued

Analyses of water:

Date of collection: August 3, 1945 Analyzed by J. H. Rowley

| | Raw Water | | Finished Water | |
|---|---|---|---|---|
| | Parts per million | Equivalents per million | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | | | 12 | |
| Iron (Fe) | | | 0.31 | |
| Calcium (Ca) | 90 | 4.49 | 86 | 4.29 |
| Magnesium (Mg) | 19 | 1.56 | 17 | 1.40 |
| Sodium (Na) | | ) | 92 | 3.98 |
| Potassium (K) | 86 | 3.76 ) | 8.5 | 0.22 |
| Bicarbonate ($HCO_3$) | 122 | 2.00 | 117 | 1.92 |
| Sulfate ($SO_4$) | 210 | 4.37 | 219 | 4.56 |
| Chloride (Cl) | 119 | 3.36 | 116 | 3.27 |
| Fluoride (F) | | | 2.2 | 0.12 |
| Nitrate ($NO_3$) | 4.8 | 0.08 | 1.2 | 0.02 |
| Dissolved solids | 640 | | 659 | |
| Total hardness as $CaCO_3$ | 302 | | 284 | |
| pH | | | 7.3 | |

McAllen

Population in 1940: 11,822.

Ownership: Municipal.

Source of information: W. M. Harris, General Manager August 7, 1945

Source of supply: Rio Grande, pumping plant located 14 blocks east and 5 blocks north of post office.

Pumpage:

(Average in thousands of gallons a day)

| | 1939 | 1940 | 1941 | 1942 | 1943 | 1944 | 1945 |
|---|---|---|---|---|---|---|---|
| January | 716 | 945 | 785 | 829 | 960 | 1,347 | 708 |
| February | 815 | 1,162 | 704 | 900 | 1,314 | 1,597 | 1,440 |
| March | 972 | 1,024 | 670 | 1,084 | 1,192 | 1,461 | 1,308 |
| April | 881 | 958 | 750 | 1,060 | 1,247 | 1,652 | 1,525 |
| May | 904 | 807 | 656 | 1,026 | 1,367 | 1,638 | 1,855 |
| June | 912 | 896 | 716 | 1,097 | 1,458 | 1,465 | 2,054 |
| July | 1,060 | 813 | 916 | 719 | 1,588 | 1,632 | 1,898 |
| August | 1,028 | 1,116 | 939 | 905 | 1,574 | 1,395 | |
| September | 812 | 801 | 759 | 896 | 989 | 891 | |
| October | 773 | 725 | 698 | 803 | 1,068 | 1,114 | |
| November | 806 | 651 | 643 | 1,019 | 1,036 | 1,353 | |
| December | 899 | 671 | 705 | 1,020 | 1,214 | 1,330 | |

Storage: Elevated tank, 150,000 gallons; earthen reservoir, 10,000,000 gallons; concrete ground storage, 210,000 gallons.

Hidalgo County

McAllen -- Continued

Number of customers: 3,000.

Treatment: Aeration, coagulation, sedimentation, rapid sand filtration, and chlorination.

Analyses of water:

Date of collection: August 7, 1945 Analyzed by J. H. Rowley

| | Raw Water | | Finished Water | |
|---|---|---|---|---|
| | Parts per million | Equivalents per million | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | | | 16 | |
| Iron (Fe) | | | 0.13 | |
| Calcium (Ca) | 86 | 4.29 | 88 | 4.39 |
| Magnecium (Mg) | 18 | 1.48 | 17 | 1.40 |
| Sodium (Na) | | ) | 88 | 3.84 |
| Potassium (K) | 88 | 3.82 ) | 7.4 | 0.19 |
| Bicarbonate ($HCO_3$) | 158 | 2.60 | 134 | 2.20 |
| Sulfate ($SO_4$) | 190 | 3.96 | 212 | 4.41 |
| Chloride (Cl) | 106 | 2.99 | 111 | 3.13 |
| Fluoride (F) | | | 0.8 | 0.04 |
| Nitrate ($NO_3$) | 2.5 | 0.04 | 2.2 | 0.04 |
| Dissolved solids | 650 | | 634 | |
| Total hardness as $CaCO_3$ | 288 | | 290 | |
| pH | | | 7.4 | |

Mercedes

Population in 1940: 7,624.

Owner: Central Power & Light Co.

Source of information: E. L. Park, local manager August 4, 1945

Source of supply: Rio Grande, pumping plant 3 blocks east of post office.

Pumpage:

(Average in gallons a day)

| | 1943 | 1944 | 1945 |
|---|---|---|---|
| January | | | 569,000 |
| February | 603,500 | 398,200 | 830,000 |
| March | | 413,400 | 774,000 |
| April | 520,766 | 510,000 | 866,000 |
| May | 469,300 | 330,000 | 727,000 |
| June | 263,800 | 404,000 | 764,000 |
| July | 331,000 | 328,000 | 423,000 |
| August | | 528,000 | |
| September | | 413,000 | |
| October | | 444,000 | |
| November | | 643,800 | |

Hidalgo County

Mercedes -- Continued

Storage: Standpipe, 80,000 gallons; concrete ground reservoir, 180,000 gallons; concrete ground reservoir, 70,000 gallons.

Number of customers: 1,236.

Treatment: Coagulation, sedimentation, rapid sand filtration, pre and post chlorination.

Analyses of water:

Date of collection: August 4, 1945 Analyzed by J. H. Rowley and C. B. Cibulka

| | Raw Water | | Finished Water | |
|---|---|---|---|---|
| | Parts per million | Equivalents per million | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | | | 13 | |
| Iron (Fe) | | | 0.09 | |
| Calcium (Ca) | 80 | 3.99 | 83 | 4.14 |
| Magnesium (Mg) | 16 | 1.32 | 16 | 1.32 |
| Sodium (Na) | | ) | 75 | 3.25 |
| Potassium (K) | 89 | 3.86 ) | 9.3 | 0.24 |
| Bicarbonate ($HCO_3$) | 152 | 2.50 | 119 | 1.95 |
| Sulfate ($SO_4$) | 179 | 3.73 | 190 | 3.96 |
| Chloride (Cl) | 103 | 2.90 | 103 | 2.90 |
| Fluoride (F) | | | 1.8 | 0.09 |
| Nitrate ($NO_3$) | 2.5 | 0.04 | 2.8 | 0.05 |
| Dissolved solids | 594 | | 602 | |
| Total hardness as $CaCO_3$ | 266 | | 273 | |
| pH | | | 7.6 | |

Mission

Population in 1940: 5,982.

Ownership: Municipal.

Source of information: C. E. Langston, Water Superintendent August 7, 1945

Source of supply: Rio Grande, pumping plant 4 blocks south and 2-1/2 blocks west of post office.

Hidalgo County

Mission -- Continued

Pumpage:

(Average in thousands of gallons a day)

| | 1939 | 1940 | 1941 | 1942 | 1943 | 1944 | 1945 |
|---|---|---|---|---|---|---|---|
| January | 379 | 382 | 423 | 456 | 523 | 920 | 958 |
| February | 417 | 444 | 346 | 525 | 682 | 1,057 | 918 |
| March | 544 | 430 | 330 | 622 | 624 | 891 | 1,100 |
| April | 497 | 462 | 409 | 571 | 647 | 886 | 841 |
| May | 450 | 438 | 353 | 493 | 769 | 859 | 1,050 |
| June | 435 | 499 | 411 | 633 | 730 | 758 | 1,059 |
| July | 604 | 426 | 488 | 418 | 826 | 785 | |
| August | 556 | 651 | 584 | 435 | 898 | 812 | |
| September | 383 | 482 | 419 | 398 | 546 | 524 | |
| October | 410 | 456 | 387 | 556 | 486 | 670 | |
| November | 363 | 333 | 412 | 680 | 600 | 775 | |
| December | 386 | 352 | 347 | 640 | 628 | 805 | |

Storage: Elevated tank, 100,000 gallons; concrete ground reservoir, 50,000 gallons; earthen settling basin, 7,000,000 gallons.

Number of customers: 1,355.

Treatment: Aeration, coagulation, sedimentation, rapid sand filtration, pre and post chlorination.

Analyses of water:

Date of collection: August 7, 1945 Analyzed by C. B. Cibulka

| | Raw Water | | Finished Water | |
|---|---|---|---|---|
| | Parts per million | Equivalents per million | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | | | 15 | |
| Iron (Fe) | | | 0.22 | |
| Calcium (Ca) | 84 | 4.19 | 76 | 3.79 |
| Magnesium (Mg) | 18 | 1.48 | 15 | 1.23 |
| Sodium (Na) | | ) | 102 | 4.45 |
| Potassium (K) | 82 | 3.57 ) | 6.5 | 0.17 |
| Bicarbonate ($HCO_3$) | 150 | 2.46 | 131 | 2.15 |
| Sulfate ($SO_4$) | 183 | 3.81 | 212 | 4.41 |
| Chloride (Cl) | 104 | 2.93 | 106 | 2.99 |
| Fluoride (F) | | | 0.8 | 0.04 |
| Nitrate ($NO_3$) | 2.5 | 0.04 | 2.8 | 0.05 |
| Dissolved solids | 617 | | 623 | |
| Total hardness as $CaCO_3$ | 284 | | 251 | |
| pH | | | 7.4 | |

Hidalgo County

## Pharr

Population in 1940: 4,784.

Ownership: Municipal.

Source of information: L. M. Flowers, City Secretary August 7, 1945

Source of supply: Rio Grande, pumping plant three-fourths mile south of post office.

Pumpage:

(Average in gallons a day)

| | 1941 | 1942 | 1943 | 1944 | 1945 |
|---|---|---|---|---|---|
| January | 312,000 | 250,000 | 240,000 | 323,000 | 382,000 |
| February | 340,000 | 280,000 | 340,000 | 446,000 | 443,000 |
| March | 270,000 | 326,000 | 379,000 | 438,000 | 568,000 |
| April | 250,000 | 337,000 | 338,000 | 491,000 | 468,000 |
| May | 180,000 | 368,000 | 332,000 | 442,000 | 479,000 |
| June | 150,000 | 265,000 | 305,000 | 347,000 | 492,000 |
| July | 180,000 | 140,000 | 350,000 | 463,000 | 389,000 |
| August | 200,000 | 180,000 | 346,000 | 375,000 | |
| September | 160,000 | 170,000 | 191,000 | 195,000 | |
| October | 140,000 | 160,000 | 179,000 | 296,000 | |
| November | 140,000 | 220,000 | 204,000 | 300,000 | |
| December | 180,000 | 230,000 | 234,000 | 345,000 | |

Storage: Elevated tank, 100,000 gallons; concrete ground reservoir, 100,000 gallons.

Number of customers: 1,100.

Treatment: Coagulation, sedimentation, rapid sand filtration, pre and post chlorination.

Analyses of water:

Date of collection: August 7, 1945 — Analyzed by J. H. Rowley and C. B. Cibulka

| | Raw Water | | Finished Water | |
|---|---|---|---|---|
| | Parts per million | Equivalents per million | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | | | 15 | |
| Iron (Fe) | | | 0.26 | |
| Calcium (Ca) | 93 | 4.64 | 86 | 4.29 |
| Magnesium (Mg) | 19 | 1.56 | 16 | 1.32 |
| Sodium (Na) | | ) | 92 | 4.00 |
| Potassium (K) | 90 | 3.91 ) | 7.2 | 0.18 |
| Bicarbonate ($HCO_3$) | 174 | 2.86 | 139 | 2.28 |
| Sulfate ($SO_4$) | 199 | 4.14 | 203 | 4.23 |
| Chloride (Cl) | 108 | 3.05 | 113 | 3.19 |
| Fluoride (F) | | | 0.8 | 0.04 |
| Nitrate ($NO_3$) | 3.8 | 0.06 | 3.0 | 0.05 |
| Dissolved solids | 693 | | 631 | |
| Total hardness as $CaCO_3$ | 310 | | 280 | |
| pH | | | 7.4 | |

Hidalgo County

San Juan

Population in 1940: 2,264.

Ownership: Municipal.

Source of information: Mrs. Viola Hewitt, City Clerk August 6, 1945

Source of supply: Rio Grande, plant 1-1/2 blocks south of post office.

Pumpage (estimated): Maximum 100,000 gallons a day; average 80,000 gallons a day.

Storage: Elevated tank, 55,000 gallons; concrete ground reservoir, 100,000 gallons.

Treatment: Aeration, coagulation, sedimentation, rapid sand filtration, pre and post chlorination.

Analyses of water:

Date of collection: August 6, 1945 Analyzed by J. H. Rowley

| | Raw Water | | Finished Water | |
|---|---|---|---|---|
| | Parts per million | Equivalents per million | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | | | 12 | |
| Iron (Fe) | | | 0.19 | |
| Calcium (Ca) | 92 | 4.59 | 92 | 4.59 |
| Magnesium (Mg) | 18 | 1.48 | 16 | 1.32 |
| Sodium (Na) | | ) | 84 | 3.67 |
| Potassium (K) | 86 | 3.67 ) | 7.5 | 0.19 |
| Bicarbonate ($HCO_3$) | 178 | 2.92 | 140 | 2.29 |
| Sulfate ($SO_4$) | 185 | 3.85 | 198 | 4.12 |
| Chloride (Cl) | 108 | 3.05 | 114 | 3.22 |
| Fluoride (F) | | | 1.8 | 0.09 |
| Nitrate ($NO_3$) | 0.5 | 0.01 | 3.0 | 0.05 |
| Dissolved solids | 664 | | 660 | |
| Total hardness as $CaCO_3$ | 304 | | 296 | |
| pH | | | 7.7 | |

Weslaco

Population in 1940: 6,883.

Ownership: Municipal.

Source of information: V. C. Thompson, City Manager August 6, 1945

Source of supply: Rio Grande, plant 1-1/2 miles north of post office.

Hidalgo County

Weslaco -- Continued

Pumpage:

(Average in gallons a day)

| | 1942 | 1943 | 1944 | 1945 |
|---|---|---|---|---|
| January | 597,000 | 835,000 | 980,000 | 1,043,000 |
| February | 661,000 | 1,238,000 | 1,181,000 | 1,017,000 |
| March | 802,000 | 894,000 | 1,110,000 | 1,236,000 |
| April | 765,000 | 835,000 | 1,187,000 | 1,155,000 |
| May | 665,000 | 820,000 | 976,000 | 1,057,000 |
| June | 651,000 | 724,000 | 696,000 | 906,000 |
| July | 450,000 | 818,000 | 663,000 | 996,000 |
| August | 380,000 | 830,000 | 605,000 | |
| September | 425,000 | 489,000 | 382,000 | |
| October | 430,000 | | 584,000 | |
| November | 650,000 | | 632,000 | |
| December | 790,000 | 760,000 | 798,000 | |

Storage: Elevated concrete tank, 300,000 gallons; concrete ground storage, 85,000 gallons.

Number of customers: 1,300.

Treatment: Coagulation, sedimentation, rapid sand filtration, pre and post chlorination.

Analyses of water:

Date of collection: August 6, 1945 Analyzed by J. H. Rowley and C. B. Cibulka

| | Raw Water | | Finished Water | |
|---|---|---|---|---|
| | Parts per million | Equivalents per million | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | | | 12 | |
| Iron (Fe) | | | 0.14 | |
| Calcium (Ca) | 78 | 3.89 | 84 | 4.19 |
| Magnesium (Mg) | 17 | 1.40 | 16 | 1.32 |
| Sodium (Na) | | ) | 73 | 3.17 |
| Potassium (K) | 86 | 3.75 ) | 7.7 | 0.20 |
| Bicarbonate ($HCO_3$) | 145 | 2.38 | 119 | 1.95 |
| Sulfate ($SO_4$) | 178 | 3.71 | 186 | 3.87 |
| Chloride (Cl) | 103 | 2.90 | 104 | 2.93 |
| Fluoride (F) | | | 1.8 | 0.09 |
| Nitrate ($NO_3$) | 2.8 | 0.05 | 2.5 | 0.04 |
| Dissolved solids | 595 | | 591 | |
| Total hardness as $CaCO_3$ | 264 | | 276 | |
| pH | | | 7.6 | |

Jim Hogg County

## Hebbronville

Population in 1940: 2,400. Source of information: W. A. Donnelly, Owner
Owner: Hebbronville Utilities, Inc. August 8, 1945

Source of supply: 3 wells.

Well 1. One block east and 4 blocks south of post office, drilled in 1936 by Layne-Texas Company, depth 1,198 feet, diameter 8 to 6 inches; deep-well turbine pump and 20-horsepower electric motor, pump set at 169 feet; well flowing when drilled; static water level 35 feet below land surface on August 8, 1945; yield 135 gallons a minute.

Well 2. Six blocks north and 5 blocks west of post office, drilled in 1939 by Layne-Texas Company, depth 992 feet, diameter 10-3/4 to 6-5/8 inches; deep-well turbine pump and 15-horsepower electric motor, pump set at 164 feet; static water level 38.1 feet below land surface on August 8, 1945; yield 50 gallons a minute.

Well 3. Six blocks north and 5 blocks west of post office, drilled in 1944 by Layne-Texas Company, depth 970 feet, diameter 12-3/4 to 5 inches; deep-well turbine pump and 40-horsepower electric motor, pump set at 240 feet; static water level 39.0 feet below land surface on August 8, 1945; yield 200 gallons a minute.

Pumpage:

(Average in gallons a day)

| | 1944 | 1945 |
|---|---|---|
| January | | 76,483 |
| February | | 104,653 |
| March | 51,422 | 118,777 |
| April | 164,470 | 177,152 |
| May | 118,880 | 197,440 |
| June | 96,053 | 119,845 |
| July | 119,738 | |
| August | 188,474 | |
| September | 52,436 | |
| October | 59,497 | |
| November | 45,357 | |
| December | 78,916 | |

Treatment: None.

Jim Hogg County

Hebbronville -- Continued

Analysis of water:

Date of collection: August 8, 1945 Analyzed by C. B. Cibulka

| | Well 1 | |
|---|---|---|
| | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 38 | |
| Iron (Fe) | 0.17 | |
| Calcium (Ca) | 18 | 0.90 |
| Magnesium (Mg) | 3.7 | 0.30 |
| Sodium (Na) | 342 | 14.86 |
| Potassium (K) | 12 | 0.31 |
| Bicarbonate ($HCO_3$) | 198 | 3.25 |
| Sulfate ($SO_4$) | 131 | 2.73 |
| Chloride (Cl) | 361 | 10.18 |
| Fluoride (F) | 0.4 | 0.02 |
| Nitrate ($NO_3$) | 12 | 0.19 |
| Dissolved solids | 1020 | |
| Total hardness as $CaCO_3$ | 60 | |
| pH | 7.7 | |

Drillers' log:

Well 1

| | Thickness (feet) | Depth (feet) | | Thickness (feet) | Depth (feet) |
|---|---|---|---|---|---|
| Sandy soil | 1 | 1 | Hard shale | 94 | 461 |
| Caliche and sand | 7 | 8 | Sandy lime | 16 | 477 |
| Fine sand and caliche | 7 | 15 | Hard shale, sand and gravel | 11 | 488 |
| Caliche | 31 | 46 | Sandy lime and shale | 20 | 508 |
| Hard caliche | 2 | 48 | Sticky shale | 4 | 512 |
| Hard sand and caliche rock | 14 | 62 | Shale | 45 | 557 |
| Hard rock | 2 | 64 | Sandy shale | 25 | 582 |
| Hard sand and caliche rock | 4 | 68 | Hard shale - sand streaks | 16 | 598 |
| Hard rock | 2 | 70 | Shale | 14 | 612 |
| Hard sand and caliche | 25 | 95 | Gumbo | 8 | 620 |
| Clay | 10 | 105 | Shale | 29 | 649 |
| Hard, dry, sandy clay | 164 | 269 | Sandy lime | 15 | 664 |
| Sand and gravel | 14 | 283 | Shale | 123 | 787 |
| Hard shale | 8 | 291 | Sand | 22 | 809 |
| Sand and gravel | 11 | 302 | Shale | 59 | 868 |
| Hard sand and boulders | 3 | 305 | Gumbo | 51 | 919 |
| Shale | 7 | 312 | Sand | 4 | 923 |
| Sandy shale | 4 | 316 | Shale | 43 | 966 |
| Hard sand | 8 | 324 | Sand and gravel | 14 | 980 |
| Hard shale | 2 | 326 | Shale | 61 | 1041 |
| Hard sand | 31 | 357 | Sandy lime | 11 | 1052 |
| Hard sand and gravel | 10 | 367 | Shale | 146 | 1198 |

Jim Hogg County

Hebbronville -- Continued

Well 2

| | Thickness (feet) | Depth (feet) | | Thickness (feet) | Depth (feet) |
|---|---|---|---|---|---|
| Surface soil | 7 | 7 | Sandy shale | 31 | 557 |
| Caliche | 6 | 13 | Hard shale | 11 | 568 |
| Sand | 7 | 20 | Sand and shale | 17 | 585 |
| Caliche | 11 | 31 | Sand, shale layers | 9 | 594 |
| Hard sand and cahlche | 5 | 36 | Sand | 5 | 599 |
| Sand, rock and caliche | 22 | 58 | Hard shale | 10 | 609 |
| Sand, rock | 2 | 60 | Shale | 5 | 614 |
| Sand and caliche | 6 | 66 | Sand and shale | 5 | 619 |
| Sand, rock | 5 | 71 | Shale | 1 | 620 |
| Caliche | 27 | 98 | Sand | 5 | 625 |
| Sand and caliche | 11 | 109 | Sand and shale | 7 | 632 |
| Hard clay | 8 | 117 | Shale | 7 | 639 |
| Sand | 12 | 129 | Sticky shale | 7 | 646 |
| Hard clay | 36 | 165 | Sand and shale | 3 | 649 |
| Hard shale | 6 | 171 | Sandy shale | 57 | 706 |
| Hard clay | 40 | 211 | Blue shale and shells | 33 | 739 |
| Hard sand, clay | 8 | 219 | Sand | 10 | 749 |
| Hard sand | 5 | 224 | Sand and shale | 10 | 759 |
| Hard clay | 7 | 231 | Sand, shale and shells | 20 | 779 |
| Sand, gravel, shells | 7 | 238 | Shale and sand | 8 | 787 |
| Hard clay | 15 | 253 | Sand and shale | 15 | 802 |
| Sand and gravel | 23 | 276 | Shale and sand | 18 | 820 |
| Clay | 3 | 279 | Sand | 6 | 826 |
| Sand and gravel | 52 | 331 | Sandstone | 3 | 829 |
| Hard clay | 24 | 355 | Sand, hard | 11 | 840 |
| Soft clay | 19 | 374 | Shale and shell | 36 | 876 |
| Hard clay | 5 | 379 | Hard sand and gravel | 21 | 897 |
| Sand | 7 | 386 | Hard shale | 3 | 900 |
| Sandy clay | 13 | 399 | Hard sand and gravel | 5 | 905 |
| Hard sand | 5 | 404 | Shale | 12 | 917 |
| Sandy clay | 15 | 419 | Sand and shale | 2 | 919 |
| Hard sand and lignite | 44 | 463 | Shale, hard layers | 1 | 920 |
| Hard brown shale | 14 | 477 | Sand and shale | 3 | 923 |
| Sandy shale | 7 | 484 | Hard sand and gravel | 3 | 926 |
| Hard sand | 8 | 492 | Hard sand | 9 | 935 |
| Shale | 18 | 510 | Shale | 3 | 938 |
| Sandy shale | 5 | 515 | Sand and shale | 14 | 952 |
| Shale | 11 | 526 | Hard sand and gravel | 19 | 971 |
| | | | Shale | 21 | 992 |

Jim Hogg County

Hebbronville -- Continued

Well 3

| | Thickness (feet) | Depth (feet) | | Thickness (feet) | Depth (feet) |
|---|---|---|---|---|---|
| Surface soil | 3 | 3 | Shale and sand breaks | 19 | 563 |
| Caliche | 2 | 5 | Sand | 8 | 571 |
| Sand | 12 | 17 | Sand and shale breaks | 15 | 586 |
| Hard caliche | 8 | 25 | Hard sand | 10 | 596 |
| Hard caliche and sand | 12 | 37 | Hard shale | 8 | 604 |
| Sand, rock and caliche | 15 | 52 | Shale | 13 | 617 |
| Sand, rock | 3 | 55 | Sandy shale | 14 | 631 |
| Sand and caliche | 11 | 66 | Hard shale | 10 | 641 |
| Hard sand, rock | 5 | 71 | Shale | 24 | 665 |
| Caliche and sand breaks | 36 | 107 | Sandy shale | 26 | 691 |
| Clay | 10 | 117 | Shale and hard layers | 40 | 731 |
| Sand | 12 | 129 | Sand | 10 | 741 |
| Clay and hard layers | 76 | 205 | Sand and shale | 19 | 760 |
| Sandy clay | 11 | 216 | Sand | 19 | 779 |
| Sand and clay | 14 | 230 | Shale | 5 | 784 |
| Sand and shells | 7 | 237 | Sand | 11 | 795 |
| Clay | 15 | 252 | Hard shale and lime | 14 | 809 |
| Sand, gravel, caliche | 54 | 306 | Sand and shale breaks | 20 | 829 |
| Sand and gravel | 28 | 334 | Sand and gravel | 11 | 840 |
| Clay | 39 | 373 | Hard shale | 8 | 848 |
| Clay and sand breaks | 10 | 383 | Shale | 24 | 872 |
| Hard sandy clay | 14 | 397 | Hard sand and gravel | 26 | 898 |
| Sand | 8 | 405 | Shale | 12 | 910 |
| Sandy clay | 14 | 419 | Sand and shale | 11 | 921 |
| Hard sand | 31 | 450 | Sand | 8 | 929 |
| Sand and hard layers | 11 | 461 | Sand and gravel | 6 | 935 |
| Shale | 5 | 466 | Shale | 3 | 938 |
| Shale and hard layers | 15 | 481 | Gravel and shale | 12 | 950 |
| Sand and shale breaks | 11 | 492 | Sand and gravel | 17 | 967 |
| Shale and hard layers | 52 | 544 | Shale | 3 | 970 |

Jim Wells County

Alice

Population in 1940: 7,792.

Source of information: R. W. Manning, Water Superintendent May 8, 1945

Ownership: Municipal.

Source of supply: 5 wells.

Well 1. Center well at waterworks, drilled in 1928 by Layne-Texas Company, drilled to 2,068 feet and plugged back to 992 feet, diameter 16 to 8 inches, screens from 837 to 867 and 945 to 986 feet; submersible turbine pump and 30-horsepower electric motor; static water level 55.5 feet below land surface on February 28, 1928, 58.5 feet on January 2, 1934, and 110 feet on May 8, 1945; yield 375 gallons a minute; temperature 86° F.

Well 2. At city waterworks, drilled in 1938 by Frank Whitson, depth 622 feet, diameter 5 inches; deep-well turbine pump and 20-horsepower electric motor; static water level reported 149 feet below land surface in 1945; yield 110 gallons a minute; temperature 84-1/2° F.

Well 3. Two blocks northeast of city waterworks, drilled in 1940 by A. E. Fawcett, depth 647 feet, diameter 10 inches; submersible turbine pump and electric motor; static water level reported 192 feet below land surface in 1945; yield 325 gallons a minute; temperature 82-1/2° F.

Well 4. At city waterworks, drilled in 1944 by Carl Vickers, depth 550 feet, diameter 10 inches, 42 feet of screen at bottom; deep-well turbine pump and 30-horsepower electric motor; static water level reported 152 feet below land surface in 1945; yield 167 gallons a minute; temperature 81° F.

Well 5. On 5th Street between Texas Avenue and South Woodlawn Drive, drilled in 1945 by Layne-Texas Company, depth 900 feet, diameter 16 to 8 inches; static water level reported 150 feet below land surface in 1945; yield 430 gallons a minute with drawdown of 250 feet after 15 days pumping during test; well not in use.

Pumpage: Maximum 1,100,000 gallons a day; minimum 800,000 gallons a day; average 1,000,000 gallons a day.

Storage: Elevated concrete tank, 85,000 gallons; 4 concrete ground reservoirs, combined capacity 980,000 gallons.

Number of customers: 2,065.

Treatment: None.

Jim Wells County

Alice -- Continued

Analyses of water:

Date of collection: March 5, 1945 Analyzed by J. H. Rowley

| | Well 1 | | Well 2 | |
|---|---|---|---|---|
| | Parts per million | Equivalents per million | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 29 | | 22 | |
| Iron (Fe) | 0.02 | | 0.03 | |
| Calcium (Ca) | 23 | 1.15 | 20 | 1.00 |
| Magnesium (Mg) | 8.8 | 0.72 | 8.1 | 0.67 |
| Sodium (Na) | 333 | 14.49 | 290 | 12.59 |
| Potassium (K) | 11 | 0.28 | 9.9 | 0.25 |
| Bicarbonate ($HCO_3$) | 345 | 5.65 | 353 | 5.79 |
| Sulfate ($SO_4$) | 196 | 4.08 | 117 | 2.44 |
| Chloride (Cl) | 237 | 6.68 | 214 | 6.04 |
| Fluoride (F) | 1.0 | 0.05 | 0.9 | 0.05 |
| Nitrate ($NO_3$) | 11 | 0.18 | 12 | 0.19 |
| Dissolved solids | 1,020 | | 876 | |
| Total hardness as $CaCO_3$ | 94 | | 84 | |
| pH | 7.2 | | 7.4 | |

| | Well 3 | | Well 4 | |
|---|---|---|---|---|
| | Parts per million | Equivalents per million | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 18 | | 25 | |
| Iron (Fe) | 0.05 | | 0.05 | |
| Calcium (Ca) | 43 | 2.15 | 42 | 2.10 |
| Magnesium (Mg) | 23 | 1.89 | 22 | 1.81 |
| Sodium (Na) | 398 | 17.29 | 313 | 13.60 |
| Potassium (K) | 12 | 0.31 | 11 | 0.28 |
| Bicarbonate ($HCO_3$) | 315 | 5.16 | 362 | 5.93 |
| Sulfate ($SO_4$) | 165 | 3.44 | 115 | 2.39 |
| Chloride (Cl) | 448 | 12.64 | 325 | 9.17 |
| Fluoride (F) | 0.9 | 0.05 | 2.1 | 0.11 |
| Nitrate ($NO_3$) | 22 | 0.35 | 12 | 0.19 |
| Dissolved solids | 1,290 | | 1,050 | |
| Total hardness as $CaCO_3$ | 202 | | 196 | |
| pH | 7.4 | | 7.4 | |

Jim Wells County

Alice -- Continued

Date of collection: September 27, 1945 Analyzed by J. H. Rowley

| | Well 5 | |
|---|---|---|
| | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 18 | |
| Iron (Fe) | 0.04 | |
| Calcium (Ca) | 30 | 1.50 |
| Magnesium (Mg) | 17 | 1.40 |
| Sodium (Na) | 317 | 13.77 |
| Potassium (K) | 10 | 0.26 |
| Bicarbonate ($HCO_3$) | 358 | 5.87 |
| Sulfate ($SO_4$) | 128 | 2.66 |
| Chloride (Cl) | 289 | 8.15 |
| Fluoride (F) | 1.2 | 0.06 |
| Nitrate ($NO_3$) | 12 | 0.19 |
| Dissolved solids | 999 | |
| Total hardness as $CaCO_3$ | 145 | |
| pH | 7.8 | |

Drillers' log:

Well 1

| | Thickness (feet) | Depth (feet) | | Thickness (feet) | Depth (feet) |
|---|---|---|---|---|---|
| Surface soil | 4 | 4 | Sand | 19 | 678 |
| Clay | 6 | 10 | Shale | 20 | 698 |
| Sand | 15 | 25 | Gumbo | 22 | 720 |
| Clay and gravel | 59 | 84 | Shale and sand | 92 | 812 |
| Rock | 6 | 90 | Gumbo | 15 | 837 |
| Caliche | 66 | 156 | Sand | 24 | 861 |
| Clay and gravel | 43 | 199 | Shale and sand | 88 | 949 |
| Clay | 194 | 393 | Sand | 43 | 992 |
| Rock | 1 | 394 | Gumbo | 91 | 1083 |
| Clay | 9 | 403 | Sand | 59 | 1142 |
| Sand | 20 | 423 | Gumbo | 135 | 1277 |
| Clay | 73 | 496 | Sand | 52 | 1329 |
| Sand | 39 | 535 | Gumbo | 46 | 1375 |
| Gumbo | 3 | 538 | Sand | 10 | 1385 |
| Sand | 15 | 553 | Gumbo | 62 | 1447 |
| Rock | 1 | 554 | Gumbo and sand layers | 111 | 1558 |
| Clay | 41 | 595 | Sand | 22 | 1580 |
| Sand | 27 | 622 | Gumbo | 73 | 1653 |
| Gumbo | 4 | 626 | Sand | 14 | 1667 |
| Rock | 1 | 627 | Gumbo | 214 | 1881 |
| Sand | 18 | 645 | Shale | 81 | 1962 |
| Gumbo | 14 | 659 | Sand | 23 | 1985 |
| | | | Sand and shale | 83 | 2068 |

Jim Wells County

## Orange Grove

Population in 1940: 906.

Source of information: Richard Riedesel, Water Superintendent June 2, 1945

Ownership: Municipal.

Source of supply: 2 wells.

Well 1. In Orange Grove, drilled in 1936 by Mr. Jackson, depth 288 feet, diameter 8 inches, deep-well turbine pump and 5-1/2-horsepower electric motor; static water level reported 120 feet below land surface in 1945; yield 75 gallons a minute; temperature 78-1/2° F.

Well 2. In Orange Grove, drilled in 1942 by Ed. Juergens, depth 520 feet, diameter 8 inches, 50 feet of screen at bottom; deep-well turbine pump and 7-1/2-horsepower electric motor; static water level reported 120 feet below land surface in 1945; yield 100 gallons a minute; temperature 81-1/2° F.

Pumpage: Average 75,000 gallons a day.

Storage: Elevated tank, 50,000 gallons; concrete ground reservoir, 50,000 gallons.

Number of customers: 174.

Treatment: None.

Analyses of water:

Date of collection: June 2, 1945 Analyzed by J. H. Rowley

| | Well 1 | | Well 2 | |
|---|---|---|---|---|
| | Parts per million | Equivalents per million | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 20 | | 22 | |
| Iron (Fe) | 3.2 | | 2.0 | |
| Calcium (Ca) | 70 | 3.49 | 40 | 2.00 |
| Magnesium (Mg) | 27 | 2.22 | 17 | 1.40 |
| Sodium (Na) | | ) | 259 | 11.28 |
| Potassium (K) | 297 | 12.93 ) | 9.3 | 0.24 |
| Bicarbonate ($HCO_3$) | 389 | 6.38 | 423 | 6.93 |
| Sulfate ($SO_4$) | 124 | 2.58 | 121 | 2.52 |
| Chloride (Cl) | 332 | 9.36 | 188 | 5.30 |
| Fluoride (F) | 1.2 | 0.06 | 0.6 | 0.03 |
| Nitrate ($NO_3$) | 16 | 0.26 | 8.5 | 0.14 |
| Dissolved solids | 1,080 | | 890 | |
| Total hardness as $CaCO_3$ | 286 | | 170 | |
| pH | 7.6 | | 7.6 | |

Jim Wells County

Premont

Population in 1940: 1,080.

Source of information: John W. Duerksen, City Secretary February 8, 1945

Ownership: Municipal.

Source of supply: Two wells, on city lot at elevated tank in Premont.

Well 1. Drilled in 1939 by Fourifoy and Patterson, depth 520 feet, diameter 8 inches; deep-well turbine pump and electric motor; static water level 78.7 feet below land surface on January 2, 1945; pumping level 86.75 feet; yield 120 gallons a minute.

Well 2. Drilled in 1945, depth 506 feet; deep-well turbine pump and electric motor.

Pumpage: Estimated maximum 125,000 gallons a day; average 50,000 gallons a day.

Storage: Ground reservoir, 50,000 gallons; elevated tank, 50,000 gallons.

Number of customers: 230.

Treatment: None.

Analyses of water:

Date of collection: Well 1 - October 14, 1943 Analyzed by J. H. Rowley
Well 2 - June 1945

| | Well 1 | | Well 2 | |
|---|---|---|---|---|
| | Parts per million | Equivalents per million | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 14 | | 41 | |
| Iron (Fe) | 0.08 | | 0.10 | |
| Calcium (Ca) | 52 | 2.60 | 58 | 2.89 |
| Magnesium (Mg) | 19 | 1.56 | 21 | 1.73 |
| Sodium (Na) | 181 | 7.87 | 184 | 7.98 |
| Potassium (K) | 25 | 0.64 | 9.0 | 0.23 |
| Bicarbonate ($HCO_3$) | 284 | 4.66 | 289 | 4.74 |
| Sulfate ($SO_4$) | 67 | 1.39 | 69 | 1.44 |
| Chloride (Cl) | 224 | 6.32 | 222 | 6.26 |
| Fluoride (F) | 0.5 | 0.03 | 1.0 | 0.05 |
| Nitrate ($NO_3$) | 17 | 0.27 | 21 | 0.34 |
| Dissolved solids | 764 | | 783 | |
| Total hardness as $CaCO_3$ | 208 | | 231 | |
| pH | 7.5 | | 7.4 | |

Jim Wells County

Premont -- Continued

Driller's log:

Well 1

| | Thickness (feet) | Depth (feet) |
|---|---|---|
| Caliche | 16 | 16 |
| Caliche with sand streaks | 234 | 250 |
| Sandy red shale | 160 | 410 |
| Sand | 110 | 520 |

Karnes County

## Falls City

Population in 1940: 500.

Owner: F. P. Moczygemba.

Source of information: F. P. Moczygemba, Owner April 17, 1945

Source of supply: San Antonio River; centrifugal pump and 20-horsepower electric motor; capacity 250 gallons a minute.

Pumpage: Maximum 50,000 gallons, minimum 5,000 gallons a day (water is not sold for drinking purposes).

Storage: Elevated tank, 40,000 gallons.

Number of customers: 60.

Treatment: None.

Analysis of water:

Date of collection: April 17, 1945 Analyzed by J. H. Rowley

| | Raw Water | |
|---|---|---|
| | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 13 | |
| Iron (Fe) | 0.81 | |
| Calcium (Ca) | 90 | 4.49 |
| Magnesium (Mg) | 21 | 1.73 |
| Sodium (Na) | 19 | 0.81 |
| Potassium (K) | 6.6 | 0.17 |
| Bicarbonate ($HCO_3$) | 270 | 4.42 |
| Sulfate ($SO_4$) | 59 | 1.23 |
| Chloride (Cl) | 47 | 1.33 |
| Fluoride (F) | 0.6 | 0.03 |
| Nitrate ($NO_3$) | 12 | 0.19 |
| Dissolved solids | 428 | |
| Total hardness as $CaCO_3$ | 311 | |
| pH | 8.1 | |

## Gillett

Population in 1940: 200.

Owner: J. M. Golson.

Source of information: J. M. Golson, Owner April 17, 1945

Source of supply: Well just east of Modern Garage, drilled in 1927 by J. M. McCuller, depth 165 feet, diameter 4 inches; cylinder pump and one-half-horsepower electric motor, cylinder set at 80 feet; static water level 58.0 feet below land surface on April 17, 1945; yield about 3 gallons a minute.

Storage: Elevated tank, 1,500 gallons.

Karnes County

Gillett -- Continued

Number of customers: 19.

Treatment: None.

Analysis of water:

Date of collection: April 17, 1945 Analyzed by J. H. Rowley

| | Parts per million | Equivalents per million |
|---|---|---|
| Silica ($SiO_2$) | 11 | |
| Iron (Fe) | 1.2 | |
| Calcium (Ca) | 280 | 13.98 |
| Magnesium (Mg) | 73 | 6.00 |
| Sodium (Na) | 440 | 19.15 |
| Potassium (K) | 60 | 1.53 |
| Bicarbonate ($HCO_3$) | 337 | 5.52 |
| Sulfate ($SO_4$) | 891 | 18.55 |
| Chloride (Cl) | 585 | 16.50 |
| Fluoride (F) | 0.6 | 0.03 |
| Nitrate ($NO_3$) | 4.0 | 0.06 |
| Dissolved solids | 2,510 | |
| Total hardness as $CaCO_3$ | 999 | |
| pH | 7.5 | |

Karnes City

Population in 1940: 1,571.

Ownership: Municipal.

Source of information: Alvin Salge, City clerk April 17, 1945

Source of supply: 2 wells.

Well 1. At pump station, drilled in 1922, depth 860 feet, diameter 12 inches; deep-well turbine pump and 20-horsepower electric motor, pump set at 300 feet; yield 175 gallons a minute with drawdown of 30 feet; temperature 92° F.

Well 2. About 100 feet west of well 1, drilled in 1922, depth 860 feet, diameter 10 inches; Hi-Life pump and 7-1/2-horsepower electric motor, pump set at 300 feet; yield 60 gallons a minute; static water level reported 185 feet below land surface on March 31, 1937.

Storage: Elevated tank, 50,000 gallons; concrete ground reservoir, 60,000 gallons.

Number of customers: 315.

Treatment: Occasional chlorination.

Karnes City -- Continued

Analysis of water:

Date of collection: April 17, 1945 Analyzed by J. H. Rowley

| | Well 1 | |
|---|---|---|
| | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 72 | |
| Iron (Fe) | 0.03 | |
| Calcium (Ca) | 6.7 | 0.33 |
| Magnesium (Mg) | 0.6 | 0.05 |
| Sodium (Na) | 433 | 18.84 |
| Potassium (K) | 21 | 0.54 |
| Bicarbonate ($HCO_3$) | 292 | 5.49 |
| Sulfate ($SO_4$) | 109 | 2.27 |
| Chloride (Cl) | 420 | 11.85 |
| Fluoride (F) | 2.2 | 0.12 |
| Nitrate ($NO_3$) | 1.8 | 0.03 |
| Dissolved solids | 1,230 | |
| Total hardness as $CaCO_3$ | 19 | |
| pH | 8.2 | |

Kenedy

Population in 1940: 2,891.

Ownership: Municipal.

Source of information: F. E. Moses, Water Superintendent April 18, 1945

Source of supply: 3 wells.

Well 1. About 400 feet west of pump station, drilled in 1926 by Layne-Texas Company, depth 402 feet, diameter 16 inches, 60 feet of screen at bottom; deep-well turbine pump and 20-horsepower electric motor, pump set at 140 feet; static water level reported 38 feet below land surface and yield 345 gallons a minute with drawdown of 57 feet after pumping 24 hours on March 30, 1937; water level 89 feet and yield 277 gallons a minute with drawdown of 40 feet in July 1943; present yield 275 gallons a minute; temperature 79° F.

Well 2. At pump station, drilled in 1929 by Layne-Texas Company, depth 419 feet, diameter 16 inches; deep-well turbine pump and 20-horsepower electric motor, pump set at 140 feet; static water level reported 38 feet below land surface on March 30, 1937; yield 277 gallons a minute in July 1943.

Karnes County

Kenedy -- Continued

Well 3. About 400 feet south of pump station, drilled in 1943 by Layne-Texas Company, depth 400 feet, diameter 13-3/8 to 6-5/8 inches, under-reamed and gravel walled, screen from 334 to 396 feet; deep-well turbine pump and 25-horsepower electric motor, pump set at 170 feet; static water level 90 feet below land surface and yield 375 gallons a minute with drawdown of 75 feet on July 25, 1943 (wells 1 and 2 pumping when test was made); temperature 79° F.

Pumpage: Maximum 675,000 gallons, average 500,000 gallons a day.

Storage: 2 elevated tanks, 100,000 and 50,000 gallons; ground reservoir, 200,000 gallons.

Number of customers: 644.

Treatment: None.

Analyses of water:

Date of collection: April 18, 1945 Analyzed by J. H. Rowley

| | Well 1 | | Well 2 | |
|---|---|---|---|---|
| | Parts per million | Equivalents per million | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 47 | | 48 | |
| Iron (Fe) | 0.20 | | 0.34 | |
| Calcium (Ca) | 101 | 5.04 | 92 | 4.59 |
| Magnesium (Mg) | 15 | 1.23 | 12 | 0.99 |
| Sodium (Na) | 364 | 15.81 | 401 | 17.44 |
| Potassium (K) | 34 | 0.87 | 35 | 0.90 |
| Bicarbonate ($HCO_3$) | 381 | 6.25 | 400 | 6.56 |
| Sulfate ($SO_4$) | 108 | 2.25 | 156 | 3.25 |
| Chloride (Cl) | 505 | 14.24 | 495 | 13.96 |
| Fluoride (F) | 1.2 | 0.06 | 1.0 | 0.05 |
| Nitrate ($NO_3$) | 9.6 | 0.15 | 6.5 | 0.10 |
| Dissolved solids | 1,370 | | 1,440 | |
| Total hardness as $CaCO_3$ | 314 | | 279 | |
| pH | 7.4 | | 7.4 | |

Karnes County

Kenedy -- Continued

Date of collection: April 18, 1945 Analyzed by J. H. Rowley

| | Well 3 | |
|---|---|---|
| | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 46 | |
| Iron (Fe) | 0.18 | |
| Calcium (Ca) | 68 | 3.39 |
| Magnesium (Mg) | 9.4 | 0.77 |
| Sodium (Na) | 341 | 14.82 |
| Potassium (K) | 31 | 0.79 |
| Bicarbonate ($HCO_3$) | 428 | 7.02 |
| Sulfate ($SO_4$) | 112 | 2.33 |
| Chloride (Cl) | 365 | 10.29 |
| Fluoride (F) | 1.0 | 0.05 |
| Nitrate ($NO_3$) | 5.0 | 0.08 |
| Dissolved solids | 1,190 | |
| Total hardness as $CaCO_3$ | 208 | |
| pH | 7.4 | |

Drillers' logs:

Well 1

| | Thickness (feet) | Depth (feet) | | Thickness (feet) | Depth (feet) |
|---|---|---|---|---|---|
| Surface soil | 5 | 5 | Gumbo | 35 | 170 |
| Hard sandy clay | 10 | 15 | Clay | 30 | 200 |
| Sand | 20 | 35 | Sand | 15 | 215 |
| Clay | 40 | 75 | Hard dry gumbo | 125 | 340 |
| Sand | 20 | 95 | Sand | 60 | 400 |
| Clay | 40 | 135 | Gumbo | 2 | 402 |

Well 3

| | Thickness (feet) | Depth (feet) | | Thickness (feet) | Depth (feet) |
|---|---|---|---|---|---|
| Surface soil | 8 | 8 | Tough sticky shale | 68 | 202 |
| Clay | 12 | 20 | Sand | 17 | 219 |
| Sand | 19 | 39 | Shale | 127 | 346 |
| Clay | 39 | 78 | Sand | 51 | 397 |
| Sand | 30 | 108 | Tough sticky shale | 3 | 400 |
| Hard shale | 26 | 134 | | | |

Karnes County

Runge

Population in 1940: 1,001.

Owner: Central Power & Light Co.

Source of information: V. D. Goehring, Manager April 18, 1945

Source of supply: 2 wells.

Well 1. At pump station, drilled in 1914 by city of Runge, depth 156 feet; cylinder pump and 15-horsepower electric motor; static water level reported 96 feet below land surface on March 16, 1945; yield 100 gallons a minute; standby well.

Well 2. At elevated tank, drilled in 1935 by Layne-Texas Company, depth 212 feet, diameter 10 inches, screen from 156 to 190 feet; deep-well turbine pump and 10-horsepower electric motor, pump set at 169 feet; static water level reported 95 feet below land surface on March 31, 1935; yield 132 gallons a minute with drawdown of 26 feet after 14 hours pumping on August 18, 1935; water level 97 feet and yield 150 gallons a minute on March 16, 1945.

Pumpage: Average 26,500 gallons a day.

Storage: Elevated tank, 50,000 gallons; concrete ground reservoir, 49,400 gallons.

Number of customers: 232.

Treatment: Chlorination.

Analysis of water:

Date of collection: April 18, 1945 Analyzed by J. H. Rowley

| | Well 2 | |
|---|---|---|
| | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 20 | |
| Iron (Fe) | 0.19 | |
| Calcium (Ca) | 130 | 6.49 |
| Magnesium (Mg) | 36 | 2.96 |
| Sodium (Na) | 98 | 4.27 |
| Potassium (K) | 27 | 0.69 |
| Bicarbonate ($HCO_3$) | 282 | 4.62 |
| Sulfate ($SO_4$) | 36 | 0.75 |
| Chloride (Cl) | 315 | 8.88 |
| Fluoride (F) | 1.0 | 0.05 |
| Nitrate ($NO_3$) | 6.7 | 0.11 |
| Dissolved solids | 962 | |
| Total hardness as $CaCO_3$ | 472 | |
| pH | 7.1 | |

Karnes County

Runge -- Continued

Drillers' log:

Well 2

| | Thickness (feet) | Depth (feet) |
|---|---|---|
| Surface soil | 4 | 4 |
| Hard yellow clay | 62 | 66 |
| Rock | 1 | 67 |
| Hard clay | 29 | 96 |
| Clay and boulders | 20 | 116 |
| Clay | 20 | 136 |
| Hard clay and boulders | 18 | 154 |
| Sand | 34 | 188 |
| Clay | 24 | 212 |

Kendall County

Boerne

Population in 1940: 1,271.

Source of information: A. C. Richter, Manager of Utilities, November 2, 1945

Ownership: Municipal.

Source of supply: 2 wells.

Well 1. Drilled about 1929, depth 40 feet, diameter 10 inches; deep-well turbine pump and 15-horsepower electric motor; static water level 31 feet below land surface; yield 178 gallons a minute.

Well 2. About 10 feet from well 1, drilled in 1945 by Lewis Berkman, depth 40 feet, diameter 10 inches; deep-well turbine pump and 20-horsepower electric motor; yield 210 gallons a minute.

Pumpage: Summer average 195,000 gallons; winter average 98,000 gallons a day.

Storage: Elevated tank.

Number of customers: 428.

Treatment: Chlorination.

Analysis of water:

Date of collection: November 2, 1945 — Analyzed by J. H. Rowley and C. B. Cibulka

| | Well 1 | |
|---|---|---|
| | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 12 | |
| Iron (Fe) | 0.04 | |
| Calcium (Ca) | 104 | 5.19 |
| Magnesium (Mg) | 18 | 1.48 |
| Sodium (Na) | 8.3 | 0.36 |
| Potassium (K) | 2.6 | 0.07 |
| Bicarbonate ($HCO_3$) | 300 | 4.92 |
| Sulfate ($SO_4$) | 69 | 1.44 |
| Chloride (Cl) | 20 | 0.56 |
| Fluoride (F) | 0.4 | 0.02 |
| Nitrate ($NO_3$) | 10 | 0.16 |
| Dissolved solids | 415 | |
| Total hardness as $CaCO_3$ | 334 | |
| pH | 6.8 | |

Kinney County

## Brackettville

Population in 1940: 2,653.

Ownership: U. S. Government and Municipal.

Source of information: O. F. Seargeant, Water Superintendent November 2, 1945

Source of supply: Los Moras Spring at Fort Clark, 2 blocks south of the city hall.

Pumpage (estimated): 25,000 gallons a day in summer; 13,000 gallons a day in winter.

Storage: Elevated tank, 75,000 gallons.

Number of customers: 650.

Treatment: Chlorination.

Analysis of water:

Date of collection: November 2, 1945 — Analyzed by J. H. Rowley and C. B. Cibulka

| | Parts per million | Equivalents per million |
|---|---|---|
| Silica ($SiO_2$) | 11 | |
| Iron (Fe) | 0.08 | |
| Calcium (Ca) | 66 | 3.29 |
| Magnesium (Mg) | 6.8 | 0.56 |
| Sodium (Na) | 20 | 0.86 |
| Potassium (K) | 4.2 | 0.11 |
| Bicarbonate ($HCO_3$) | 255 | 4.18 |
| Sulfate ($SO_4$) | 6.7 | 0.14 |
| Chloride (Cl) | 14 | 0.39 |
| Fluoride (F) | 0.6 | 0.03 |
| Nitrate ($NO_3$) | 4.8 | 0.08 |
| Dissolved solids | 262 | |
| Total hardness as $CaCO_3$ | 192 | |
| Ph | 7.4 | |

Kleberg County

## Kingsville

Population in 1940: 7,782.

Ownership: Municipal.

Source of information: P. H. Barnhill June 6, 1945

Source of supply: 4 wells.

Well 2. Drilled in 1935 by Layne-Texas Company, depth 730 feet, diameter 12 inches; deep-well turbine pump and 30-horsepower electric motor; yield on test 634 gallons a minute on June 20, 1935, and 499 gallons a minute on April 13, 1945; temperature 85° F.

Well 3. Drilled in 1939 by A. H. Masarian, depth 725 feet, diameter 8 inches; deep-well turbine pump and 15-horsepower electric motor; yield 148 gallons a minute on April 13, 1945.

Well 4. Drilled in 1939 by Otto Caster, depth 725 feet, diameter 8 inches; deep-well turbine pump and 20-horsepower electric motor; yield 260 gallons a minute on April 13, 1945.

Well 5. Drilled in 1943 by Layne-Texas Company, depth 737 feet, diameter 16 to 8 inches; deep-well turbine pump and 50-horsepower electric motor; static water level 105 feet below pump base on June 30, 1943; yield 850 gallons a minute with a pumping level of 148 feet on June 30, 1943, and 774 gallons a minute on April 13, 1945; temperature 85° F.

Pumpage:

(Average in gallons a day)

| | 1940 | 1941 | 1942 | 1943 | 1944 |
|---|---|---|---|---|---|
| January | 615,000 | 659,000 | 649,000 | 966,000 | 730,000 |
| February | 707,000 | 620,000 | 705,000 | 1,080,000 | 627,000 |
| March | 809,000 | 603,000 | 869,000 | 1,241,000 | 865,000 |
| April | 961,000 | 771,000 | 1,256,000 | 1,778,000 | 1,276,000 |
| May | 965,000 | 660,000 | 1,451,000 | 2,046,000 | 1,465,000 |
| June | 756,000 | 632,000 | 1,649,000 | 1,604,000 | 1,347,000 |
| July | 1,173,000 | 925,000 | 1,240,000 | 1,973,000 | 1,466,000 |
| August | 1,432,000 | 1,110,000 | 1,503,000 | 1,849,000 | 1,867,000 |
| September | 904,000 | 1,035,000 | 1,106,000 | 1,324,000 | 1,242,000 |
| October | 792,000 | 768,000 | 1,129,000 | 1,329,000 | 1,481,000 |
| November | 629,000 | 881,000 | 1,318,000 | 945,000 | 1,373,000 |
| December | 563,000 | 1,112,000 | 1,125,000 | 653,000 | 1,241,000 |

Storage: Ground storage reservoir and elevated tank.

Number of customers: 2,995.

Treatment: Periodic chlorination.

Kleberg County

Kingsville -- Continued

Analyses of water:

Date of collection: March 16, 1945 Analyzed by J. H. Rowley

| | Well 2 | | Well 5 | |
|---|---|---|---|---|
| | Parts per million | Equivalents per million | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 14 | | 17 | |
| Iron (Fe) | 0.02 | | 0.03 | |
| Calcium (Ca) | 22 | 1.10 | 21 | 1.05 |
| Magnesium (Mg) | 8.6 | 0.71 | 7.5 | 0.62 |
| Sodium (Na) | 305 | 13.27 | 308 | 13.37 |
| Potassium (K) | 14 | 0.36 | 12 | 0.31 |
| Bicarbonate ($HCO_3$) | 307 | 5.04 | 315 | 5.17 |
| Sulfate ($SO_4$) | 162 | 3.37 | 162 | 3.37 |
| Chloride (Cl) | 242 | 6.83 | 235 | 6.63 |
| Fluoride (F) | 0.9 | 0.05 | 0.5 | 0.03 |
| Nitrate ($NO_3$) | 9.0 | 0.15 | 9.2 | 0.15 |
| Dissolved solids | 956 | | 951 | |
| Total hardness as $CaCO_3$ | 90 | | 84 | |
| pH | 8.0 | | 7.9 | |

Date of collection: February 5, 1943 Analyzed by J. H. Rowley

| | Well 3 | | Well 4 | |
|---|---|---|---|---|
| | Parts per million | Equivalents per million | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 16 | | 11 | |
| Iron (Fe) | 0.08 | | 0.02 | |
| Calcium (Ca) | 33 | 1.65 | 24 | 1.20 |
| Magnesium (Mg) | 11 | 0.90 | 9.6 | 0.79 |
| Sodium (Na) | | ) | | ) |
| Potassium (K) | 358 | 15.56 ) | 317 | 13.78 ) |
| Bicarbonate ($HCO_3$) | 267 | 4.38 | 304 | 4.98 |
| Sulfate ($SO_4$) | 270 | 5.62 | 163 | 3.39 |
| Chloride (Cl) | 278 | 7.84 | 255 | 7.19 |
| Fluoride (F) | 0.2 | 0.01 | 0.4 | 0.02 |
| Nitrate ($NO_3$) | 16 | 0.26 | 12 | 0.19 |
| Dissolved solids | 1,114 | | 959 | |
| Total hardness as $CaCO_3$ | 128 | | 100 | |
| pH | 8.3 | | 8.2 | |

Kleberg County

Kingsville -- Continued

Drillers' log:

Well 5

| | Thickness (feet) | Depth (feet) |
|---|---|---|
| Surface soil | 6 | 6 |
| White clay | 26 | 32 |
| Fine-grained sand | 4 | 36 |
| White clay | 50 | 86 |
| Shale and layers of fine sand | 53 | 139 |
| Hard shale | 20 | 159 |
| Fine-grained sand | 34 | 193 |
| Soft shale | 39 | 232 |
| Sand | 15 | 247 |
| Shale | 7 | 254 |
| Fine-grained sand | 32 | 286 |
| Shale | 16 | 302 |
| Sand | 12 | 314 |
| Sand | 82 | 396 |
| Sand and layers of shale | 38 | 434 |
| Shale | 23 | 457 |
| Sand | 10 | 467 |
| Shale | 7 | 474 |
| Shale and layers of sand | 108 | 582 |
| Sand | 155 | 737 |

La Salle County

## Cotulla

Population in 1940: 3,633.

Source of information: John Wildenthal, Water Superintendent May 11, 1945

Ownership: Municipal.

Source of supply: 2 wells.

Well 1. At elevated tank, drilled in 1916 by F. M. Burkett, depth 2,300 feet, diameter 6 inches, screen from 2,188 to 2,300 feet; reported natural flow 240 gallons a minute; centrifugal pump; yield about 400 gallons a minute; temperature 104° F.

Well 2. Located about one mile northwest of well 1, drilled in 1940 to a depth of 6,366 feet and plugged back to 2,483 feet, diameter 10-3/4 inches, cemented from 2,483 to surface, gun perforated from 2,100 to 2,483 feet; natural flow 165 gallons a minute 3 feet above land surface on October 22, 1942; reported yield with test pump 516 gallons a minute with drawdown of 98 feet below land surface (total drawdown about 150 feet); temperature 107° F.

Pumpage (estimated): Maximum 400,000 gallons, minimum 150,000 gallons, average about 250,000 to 300,000 gallons a day.

Storage: Elevated tank, 100,000 gallons; concrete ground reservoir, 125,000 gallons.

Number of customers: 566.

Treatment: None.

Analyses of water:

Date of collection: Well 1, September 15, 1942
Well 2, October 21, 1942 Analyzed by W. W. Hastings

| | Well 1 | | Well 2 | |
|---|---|---|---|---|
| | Parts per million | Equivalents per million | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 26 | | 19 | |
| Iron (Fe) | 0.02 | | 0.04 | |
| Calcium (Ca) | 2.2 | 0.11 | 2.3 | 0.11 |
| Magnesium (Mg) | 1.1 | 0.09 | 1.6 | 0.13 |
| Sodium and Potassium (Na + K) | 214 | 9.32 | 230 | 9.98 |
| Bicarbonate ($HCO_3$) | 341 | 5.59 | 380 | 6.23 |
| Sulfate ($SO_4$) | 79 | 1.64 | 84 | 1.75 |
| Chloride (Cl) | 81 | 2.28 | 78 | 2.20 |
| Fluoride (F) | 0.1 | 0.01 | 0.7 | 0.04 |
| Nitrate ($NO_3$) | 0.0 | 0.00 | 0.0 | 0.00 |
| Dissolved solids | 571 | | 614 | |
| Total hardness as $CaCO_3$ | 10 | | 12 | |
| pH | 8.4 | | 8.3 | |

La Salle County

Cotulla -- Continued

Drillers' logs:

Well 1

| | Thickness (feet) | Depth (feet) | | Thickness (feet) | Depth (feet) |
|---|---|---|---|---|---|
| Gravel and clay | 20 | 20 | Blue mud | 41 | 1051 |
| Soft sandstone | 41 | 61 | Sandstone (flowing water) | 55 | 1106 |
| Blue sandstone (water) | 55 | 116 | Blue mud and shale | 65 | 1171 |
| Hard sandstone with boulders | 12 | 128 | Hard sandstone | 13 | 1184 |
| Soft sandstone (water) | 20 | 148 | Blue mud | 22 | 1206 |
| Shale | 57 | 205 | Hard rock | 4 | 1210 |
| Soft sandstone | 15 | 220 | Sandstone | 16 | 1226 |
| Blue shale | 24 | 244 | Blue mud and shale | 43 | 1269 |
| Sandstone (water) | 36 | 280 | Hard sandstone | 13 | 1282 |
| Blue mud | 35 | 315 | Soft sandstone | 19 | 1301 |
| Sandstone (water) | 15 | 330 | Blue mud, shale and hard rock | 126 | 1427 |
| Dark-colored mud | 43 | 373 | Sandstone | 35 | 1462 |
| Soft sandstone | 14 | 387 | Blue mud | 26 | 1488 |
| Light blue mud | 22 | 409 | Sandstone | 10 | 1498 |
| Dark-colored mud | 28 | 437 | Gray mud | 11 | 1509 |
| Blue mud | 13 | 450 | Hard sandstone | 19 | 1538 |
| Soft sand | 16 | 466 | Blue mud | 7 | 1545 |
| Brown, blue and white mud | 172 | 638 | Sandstone | 27 | 1572 |
| Sand and shale | 9 | 647 | Pink mud | 13 | 1585 |
| Light blue and brown mud | 39 | 686 | Sandstone | 28 | 1613 |
| Hard rock | 2 | 688 | Brown mud | 17 | 1630 |
| Brown mud | 23 | 711 | Hard sandstone | 40 | 1670 |
| Hard sandstone | 9 | 720 | Mud, shale and hard rock | 89 | 1759 |
| Dark-colored mud | 27 | 747 | Sandstone (flowing water) | 35 | 1794 |
| Hard rock | 6 | 753 | Hard sandstone | 100 | 1894 |
| Dark-colored mud | 6 | 759 | Gray mud | 6 | 1900 |
| Hard rock | 16 | 775 | Sand (water) | 45 | 1945 |
| Dark-colored mud | 13 | 788 | Blue mud | 5 | 1950 |
| Soft sandstone | 27 | 815 | Hard sandstone | 19 | 1969 |
| Black shale | 5 | 820 | Light shale | 13 | 1982 |
| Lignite | 4 | 824 | Hard shale | 6 | 1988 |
| Mud, dark-colored shale and rock | 86 | 910 | Sandstone (water) | 39 | 2027 |
| Black shale | 4 | 914 | Dark-colored shale | 51 | 2078 |
| Coal | 1 | 915 | Hard sandstone | 40 | 2118 |
| Sandstone (water) | 25 | 940 | Soft sandstone (water) | 11 | 2129 |
| Blue mud | 13 | 953 | Dark-colored shale | 26 | 2155 |
| Sandstone | 20 | 973 | Hard sandstone | 11 | 2166 |
| Blue mud | 29 | 1002 | Blue shale | 22 | 2188 |
| Sand | 8 | 1010 | Sandstone (flowing water) | 12 | 2200 |
| | | | Sandstone | 100 | 2300 |

La Salle County

Cotulla -- Continued

Well 2

| | Thickness (feet) | Depth (feet) | | Thickness (feet) | Depth (feet) |
|---|---|---|---|---|---|
| Rotary floor | 16 | 16 | Shale with streaks of sand | 194 | 1288 |
| Hard rock | 98 | 114 | Medium hard sand | 20 | 1308 |
| Unreported | 19 | 133 | Shale with hard sand streaks | 50 | 1358 |
| Broken sand | 192 | 325 | Hard broken sand | 68 | 1426 |
| Hard sand and broken shale | 240 | 565 | Shale with some sand | 492 | 1918 |
| Sticky shale | 36 | 601 | Sticky shale with streaks of hard sand | 44 | 1962 |
| Hard sand | 7 | 608 | Broken sand | 29 | 1991 |
| Sandy shale | 56 | 664 | Hard sand lime streaks | 35 | 2026 |
| Hard sand | 3 | 667 | Hard sand | 79 | 2105 |
| Sandy shale | 23 | 690 | Soft sand | 105 | 2210 |
| Hard sand | 8 | 698 | Broken sand | 60 | 2270 |
| Sticky shale | 8 | 706 | Hard sand | 15 | 2285 |
| Hard sand | 48 | 754 | Shale with hard sand streaks | 60 | 2345 |
| Shale with streaks of lignite | 31 | 785 | Hard sand | 70 | 2415 |
| Soft sand | 24 | 809 | Soft sand | 57 | 2472 |
| Shale with streaks of hard sand | 86 | 695 | Hard sand | 58 | 2530 |
| Sand | 11 | 906 | Shale | 650 | 3180 |
| Sticky shale with streaks of sand | 56 | 962 | Hard sand | 30 | 3210 |
| Hard sand | 22 | 984 | Soft sand | 2 | 3212 |
| Shale | 66 | 1050 | Shale | 280 | 3492 |
| Hard sand | 44 | 1094 | | | |

Fowlerton

Population in 1940: 600.

Ownership: Municipal.

Source of information: O. W. Herman, Storekeeper May 11, 1945

Source of supply: Well in northwest part of town, drilled in 1912 by Fowlerton Brothers, depth about 1,700 feet, diameter 8 inches; natural flow into mains; quantity, pressure, and temperature unknown.

Storage: None - flows directly into main.

Number of customers: 50.

Treatment: None.

La Salle County

Fowlerton -- Continued

Analysis of water:

Date of collection: May 11, 1945 Analyzed by J. H. Rowley

| | Parts per million | Equivalents per million |
|---|---|---|
| Silica ($SiO_2$) | 37 | |
| Iron (Fe) | 0.63 | |
| Calcium (Ca) | 3.1 | 0.15 |
| Magnesium (Mg) | 0.7 | 0.06 |
| Sodium (Na) | 933 | 40.58 |
| Potassium (K) | 13 | 0.33 |
| Bicarbonate ($HCO_3$) | 1530 | 24.97 |
| Sulfate ($SO_4$) | 192 | 4.00 |
| Chloride (Cl) | 422 | 11.90 |
| Fluoride (F) | 4.4 | 0.23 |
| Nitrate ($NO_3$) | 1.0 | 0.02 |
| Dissolved solids | 2,360 | |
| Total hardness as $CaCO_3$ | 10 | |
| pH | 8.0 | |

Live Oak County

George West

Population in 1940: 1,250.

Owner: George West Utilities Co.

Source of information: Walter E. Lamm, Co-owner April 19, 1945

Source of supply: Well at ice plant, drilled in 1914, depth 500 feet, diameter 10 inches; deep-well turbine pump and 10-horsepower electric motor; static water level 38.4 feet below land surface in August 1934; yield 235 gallons a minute with drawdown of 45 feet after several hours pumping; temperature 81° F.

Pumpage: Maximum 100,000 gallons, average 60,000 gallons a day.

Storage: Elevated tank, 50,000 gallons; concrete ground reservoir, 55,000 gallons.

Number of customers: 150.

Treatment: None.

Analysis of water:

Date of collection: April 19, 1945 Analyzed by J. H. Rowley

| | Parts per million | Equivalents per million |
|---|---|---|
| Silica ($SiO_2$) | 30 | |
| Iron (Fe) | 0.56 | |
| Calcium (Ca) | 74 | 3.69 |
| Magnesium (Mg) | 20 | 1.64 |
| Sodium (Na) | 300 | 13.06 |
| Potassium (K) | 55 | 1.41 |
| Bicarbonate ($HCO_3$) | 343 | 5.62 |
| Sulfate ($SO_4$) | 316 | 6.58 |
| Chloride (Cl) | 267 | 7.53 |
| Fluoride (F) | 1.4 | 0.07 |
| Nitrate ($NO_3$) | 0.0 | 0.00 |
| Dissolved solids | 1,230 | |
| Total hardness as $CaCO_3$ | 266 | |
| pH | 7.4 | |

Live Oak County

Three Rivers

Population in 1940: 1,337.

Ownership: Municipal.

Source of information: Bryan Boyd, City Secretary April 19, 1945

Source of supply: Frio River (part of supply is obtained from 2 dug wells on river bank).

Pumpage: Maximum 150,000 gallons a day.

Storage: Elevated tank, 50,000 gallons; concrete ground reservoir, 550,000 gallons.

Number of customers: 350.

Treatment: Chlorination.

Analyses of water:

Date of collection: April 19, 1945 Analyzed by J. H. Rowley

| | Well | | Frio River (Raw) | |
|---|---|---|---|---|
| | Parts per million | Equivalents per million | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 51 | | 14 | |
| Iron (Fe) | 0.14 | | 0.48 | |
| Calcium (Ca) | 226 | 11.28 | 69 | 3.44 |
| Magnesium (Mg) | 17 | 1.40 | 11 | 0.90 |
| Sodium (Na) | 106 | 4.63 | | ) |
| Potassium (K) | 33 | 0.84 | 88 | 3.84 ) |
| Bicarbonate ($HCO_3$) | 481 | 7.88 | 227 | 3.72 |
| Sulfate ($SO_4$) | 130 | 2.71 | 66 | 1.37 |
| Chloride (Cl) | 266 | 7.50 | 108 | 3.05 |
| Fluoride (F) | 0.2 | 0.01 | 0.2 | 0.01 |
| Nitrate ($NO_3$ | 3.0 | 0.05 | 1.8 | 0.03 |
| Dissolved solids | 1,070 | | 481 | |
| Total hardness as $CaCO_3$ | 634 | | 217 | |
| pH | 7.0 | | 7.7 | |

Maverick County

## Eaglo Pass

Population in 1940: 6,459.

Source of information: J. A. Slaughter, Local Manager May 10, 1945

Owner: Central Power & Light Co.

Source of supply: Rio Grande through 5 dug wells in river bed.

Pumpage: Maximum 1,300,000 gallons, minimum 600,000 gallons, average 800,000 to 900,000 gallons a day.

Storage: Elevated tank, 20,000 gallons; concrete ground reservoir, 500,000 gallons.

Number of customers: 1,352.

Treatment: Chlorination.

Analysis of water:

Date of collection: May 10, 1945 Analyzed by J. H. Rowley

| | Composite sample from 5 wells | |
|---|---|---|
| | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 18 | |
| Iron (Fe) | 0.71 | |
| Calcium (Ca) | 116 | 5.79 |
| Magnesium (Mg) | 32 | 2.63 |
| Sodium (Na) | 174 | 7.56 |
| Potassium (K) | 11 | 0.28 |
| Bicarbonate ($HCO_3$) | 219 | 3.59 |
| Sulfate ($SO_4$) | 272 | 5.66 |
| Chloride (Cl) | 245 | 6.91 |
| Fluoride (F) | 1.2 | 0.06 |
| Nitrate ($NO_3$) | 2.2 | 0.04 |
| Dissolved solids | 980 | |
| Total hardness as $CaCO_3$ | 421 | |
| pH | 7.3 | |

Medina County

Devine

Population in 1940: 1,398.

Source of information: R. L. Connely, Water Superintendent February 19, 1946

Ownership: Municipal.

Source of supply: 2 wells.

Well 1. Located 3 blocks north and 2 blocks east of post office, drilled about 1938, depth 350 feet; deep-well turbine pump and 10-horsepower electric motor, pump set at 190 feet; yield 125 gallons a minute.

Well 2. Drilled about 1928, depth 250 feet; deep-well turbine pump and 10-horsepower electric motor, pump set at 190 feet; yield 125 gallons a minute.

Pumpage: Maximum 100,000 gallons, minimum 50,000 gallons, average 70,000 gallons a day.

Storage: Elevated tank, 50,000 gallons; concrete ground reservoir, 50,000 gallons.

Number of customers: 325.

Treatment: None.

Analyses of water:

Date of collection: February 19, 1946 Analyzed by C. B. Cibulka

| | Well 1 | | Well 2 | |
|---|---|---|---|---|
| | Parts per million | Equivalents per million | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 11 | | 13 | |
| Iron (Fe) | 0.83 | | 2.5 | |
| Calcium (Ca) | 70 | 3.49 | 63 | 3.14 |
| Magnesium (Mg) | 16 | 1.32 | 15 | 1.23 |
| Sodium (Na) | 111 | 4.82 | 98 | 4.25 |
| Potassium (K) | 15 | 0.38 | 10 | 0.26 |
| Bicarbonate ($HCO_3$) | 388 | 6.36 | 346 | 5.67 |
| Sulfate ($SO_4$) | 76 | 1.58 | 77 | 1.60 |
| Chloride (Cl) | 71 | 2.00 | 56 | 1.58 |
| Fluoride (F) | 0.6 | 0.03 | 0.6 | 0.03 |
| Nitrate ($NO_3$) | 2.5 | 0.04 | 0.0 | 0.00 |
| Dissolved solids | 564 | | 503 | |
| Total hardness as $CaCO_3$ | 240 | | 218 | |
| pH | 7.6 | | 7.7 | |

Medina County

## Hondo

Population in 1940: 2,500.

Source of information: Homer Wilson, Water Superintendent November 2, 1945

Ownership: Municipal.

Source of supply: 2 wells.

Well 1. At elevated tank, drilled in 1900, depth 1,450 feet, diameter 8 to 6 inches, cased to 1,400 feet; deep-well turbine pump and 40-horsepower electric motor; static water level 165 feet below land surface; yield 400 gallons a minute with drawdown of 75 feet.

Well 2. About 50 feet from well 1, drilled in 1910, depth 1,460 feet, diameter 10 to 6 inches; deep-well turbine pump and 40-horsepower electric motor; yield 500 gallons a minute with drawdown of 55 feet.

Pumpage: Summer peak, 1,080,000 gallons; winter average, 360,000 gallons a day.

Storage: Elevated tank, 50,000 gallons.

Number of customers: 800.

Treatment: None.

Analyses of water:

Date of collection: November 2, 1945 — Analyzed by J. H. Rowley and C. B. Cibulka

| | Well 1 | | Well 2 | |
|---|---|---|---|---|
| | Parts per million | Equivalents per million | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 14 | | 13 | |
| Iron (Fe) | 0.08 | | 0.05 | |
| Calcium (Ca) | 66 | 3.29 | 64 | 3.19 |
| Magnesium (Mg) | 16 | 1.32 | 16 | 1.32 |
| Sodium (Na) | 4.8 | 0.21 | 7.1 | 0.31 |
| Potassium (K) | 3.4 | 0.09 | 4.4 | 0.11 |
| Bicarbonate ($HCO_3$) | 244 | 4.00 | 255 | 4.18 |
| Sulfate ($SO_4$) | 16 | 0.33 | 14 | 0.29 |
| Chloride (Cl) | 18 | 0.51 | 14 | 0.39 |
| Fluoride (F) | 0.2 | 0.01 | 0.2 | 0.01 |
| Nitrate ($NO_3$) | 3.8 | 0.06 | 3.5 | 0.06 |
| Dissolved solids | 263 | | 262 | |
| Total hardness as $CaCO_3$ | 230 | | 226 | |
| pH | 7.0 | | 7.2 | |

Nueces County

## Agua Dulce

Population in 1940: 750.

Ownership: Municipal.

Source of information: Frank Whitson, Well driller July 18, 1945

Source of supply: Well at elevated tank, drilled in 1940 by Frank Whitson, depth 596 feet, diameter 8 to 4 inches, 40 feet of 4 inch screen; deep-well turbine pump and electric motor; static water level reported 80 feet below land surface; yield 30 gallons a minute.

Pumpage (estimated): 35,000 gallons a day in summer; 30,000 gallons a day in winter.

Storage: Elevated tank, 50,000 gallons; ground reservoir, 50,000 gallons.

Number of customers: 110.

Treatment: Aeration, sedimentation, filtration, and chlorination.

Analysis of water:

Date of collection: July 18, 1945 Analyzed by J. H. Rowley

| | Parts per million | Equivalents per million |
|---|---|---|
| Silica ($SiO_2$) | 8 | |
| Iron (Fe) | 0.02 | |
| Calcium (Ca) | 28 | 1.40 |
| Magnesium (Mg) | 12 | 0.99 |
| Sodium (Na) | 511 | 22.20 |
| Potassium (K) | 24 | 0.61 |
| Bicarbonate ($HCO_3$) | 298 | 4.89 |
| Sulfate ($SO_4$) | 231 | 4.81 |
| Chloride (Cl) | 535 | 15.09 |
| Fluoride (F) | 0.4 | 0.02 |
| Nitrate ($NO_3$) | 24 | 0.39 |
| Dissolved solids | 1,520 | |
| Total hardness as $CaCO_3$ | 150 | |
| pH | 8.0 | |

Agua Dulce -- Continued

Drillers' log:

Well

| | Thickness (feet) | Depth (feet) |
|---|---|---|
| Shale | 312 | 312 |
| Sand | 15 | 327 |
| Shale | 30 | 357 |
| Sand | 18 | 375 |
| Shale | 45 | 420 |
| Sand | 25 | 445 |
| Shale | 30 | 475 |
| Sand | 65 | 540 |
| Shale | 18 | 558 |
| Sand | 38 | 596 |

Bishop

Population in 1940: 1,329.

Source of information: W. L. Johnson, City Secretary July 1945

Ownership: Municipal.

Source of supply: 2 wells at elevated tank in Bishop.

Well 1. Drilled about 1910, depth about 760 feet, diameter 6 inches; pumped by air; yield 75 gallons a minute.

Well 2. About 300 feet from well 1, drilled in 1939 by Layne-Texas Company, depth 782 feet, diameter 8-5/8 to 5-1/2 inches, screen from 715 to 781 feet; deep-well turbine pump and 5-horsepower electric motor, pump lowered from 90 to 130 feet in 1941; static water level 28 feet below land surface on June 30, 1939 and 36 feet below land surface in 1941; yield 42 gallons a minute with drawdown of 38 feet on June 30, 1939; present yield 100 gallons a minute.

Pumpage: 125,000 gallons a day in summer; 72,000 gallons a day in winter.

Storage: Elevated tank, 50,000 gallons; ground reservoir, 65,000 gallons.

Number of customers: 355.

Treatment: Hypochlorination.

Nueces County

Bishop -- Continued

Analyses of water:

Date of collection: July 1945 Analyzed by J. H. Rowley

| | Well 1 | | Well 2 | |
|---|---|---|---|---|
| | Parts per million | Equivalents per million | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 10 | | 8.5 | |
| Iron (Fe) | 0.03 | | 0.03 | |
| Calcium (Ca) | 19 | 0.95 | 18 | 0.90 |
| Magnesium (Mg) | 6.8 | 0.56 | 6.2 | 0.51 |
| Sodium (Na) | 358 | 15.58 | | ) |
| Potassium (K) | 17 | 0.43 | 368 | 15.98 ) |
| Bicarbonate ($HCO_3$) | 311 | 5.11 | 313 | 5.14 |
| Sulfate ($SO_4$) | 192 | 4.00 | 188 | 3.91 |
| Chloride (Cl) | 290 | 8.18 | 288 | 8.12 |
| Fluoride (F) | 1.0 | 0.05 | 0.8 | 0.04 |
| Nitrate ($NO_3$) | 11 | 0.18 | 11 | 0.18 |
| Dissolved solids | 1,060 | | 1,040 | |
| Total hardness as $CaCO_3$ | 76 | | 70 | |
| pH | 8.0 | | 7.9 | |

Drillers' log:

Well 2

| | Thickness (feet) | Depth (feet) | | Thickness (feet) | Depth (feet) |
|---|---|---|---|---|---|
| Clay | 12 | 12 | Sand, hard layers | 3 | 541 |
| Sand and muck | 4 | 16 | Sand | 11 | 552 |
| Clay | 9 | 25 | Clay | 28 | 580 |
| Sand | 10 | 35 | Sand | 14 | 594 |
| Clay | 288 | 323 | Clay | 10 | 604 |
| Sand | 9 | 332 | Shale and clay | 22 | 626 |
| Clay | 92 | 424 | Shale | 22 | 648 |
| Sand | 33 | 457 | Shale and sand streaks | 22 | 670 |
| Clay | 30 | 487 | Shale | 21 | 691 |
| Hard sand | 12 | 499 | Shale and sand | 22 | 713 |
| Clay | 35 | 534 | Brown sand | 45 | 758 |
| Sand | 4 | 538 | Brown hard sand | 22 | 780 |

Corpus Christi

Population in 1940: 57,301.

Ownership: Municipal.

Source of information: John Cunningham, Water Superintendent July 1945

Nueces County

Corpus Christi -- Continued

Source of supply: Storage reservoir on Nueces River near Mathis; original capacity 66,000 acre-feet. Water fed to low-water reservoir at Calallen by Nueces River. Filtration plant at Calallen; reservoir capacity, 175,000,000 gallons. Water pumped 16 miles to Corpus Christi; pumping capacity 35 to 40 million gallons a day. Also supplies Naval Bases, Clarkwood and Nueces Water Improvement District 1.

Pumpage:

(Average in gallons a day)

| | 1937 | 1938 | 1939 | 1940 |
|---|---|---|---|---|
| January | 3,138,710 | 3,317,094 | 3,901,613 | 4,681,613 |
| February | 3,910,714 | 4,564,286 | 4,645,178 | 5,283,965 |
| March | 3,040,968 | 4,300,000 | 4,129,032 | 4,836,290 |
| April | 3,951,612 | 4,866,666 | 5,079,833 | 5,515,000 |
| May | 4,262,666 | 4,387,096 | 5,173,870 | 5,442,741 |
| June | 4,229,333 | 5,346,666 | 4,967,833 | 5,484,433 |
| July | 4,073,710 | 5,302,903 | 5,673,645 | 5,824,709 |
| August | 4,841,935 | 5,970,161 | 6,300,806 | 7,165,483 |
| September | 5,096,666 | 4,259,666 | 5,515,666 | 7,106,666 |
| October | 4,256,935 | 4,369,516 | 4,740,806 | 5,731,290 |
| November | 3,951,166 | 4,441,833 | 5,432,833 | 5,398,000 |
| December | 3,670,323 | 4,101,935 | 4,789,838 | 4,895,161 |

| | 1941 | 1942 | 1943 | 1944 |
|---|---|---|---|---|
| January | 5,110,000 | 7,162,096 | 10,268,870 | 10,707,967 |
| February | 5,920,000 | 8,060,714 | 11,816,785 | 12,219,896 |
| March | 4,670,000 | 7,094,193 | 10,172,903 | 10,693,258 |
| April | 6,070,000 | 8,844,333 | 11,963,000 | 13,125,266 |
| May | 6,010,000 | 8,533,225 | 12,190,322 | 14,763,064 |
| June | 7,079,333 | 10,827,166 | 11,699,666 | 18,243,766 |
| July | 7,806,451 | 9,550,483 | 11,467,741 | 19,885,193 |
| August | 9,952,903 | 11,185,806 | 12,419,032 | 22,545,000 |
| September | 10,445,666 | 11,116,500 | 11,518,333 | 17,702,933 |
| October | 7,577,096 | 10,874,193 | 9,753,548 | 16,357,741 |
| November | 7,672,833 | 10,879,677 | 10,394,666 | 17,636,033 |
| December | 6,870,000 | 10,190,967 | 10,601,290 | 14,455,967 |

Storage: Elevated tank, 750,000 gallons; 2 ground reservoirs, 10,000,000 gallons each.

Treatment: Coagulation, sedimentation, aeration, rapid sand filtration, pre and post chlorination.

Nueces County

Corpus Christi -- Continued

Analyses of water:

Date of collection: July 1945 Analyzed by J. H. Rowley

| | Raw Water | | Finished Water | |
|---|---|---|---|---|
| | Parts per million | Equivalents per million | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 19 | | 13 | |
| Iron (Fe) | 0.09 | | 0.05 | |
| Calcium (Ca) | 56 | 2.80 | 39 | 1.95 |
| Magnesium (Mg) | 6.5 | 0.53 | 7.4 | 0.61 |
| Sodium (Na) | 56 | 2.42 | 59 | 2.55 |
| Potassium (K) | 9.0 | 0.23 | 9.6 | 0.25 |
| Bicarbonate ($HCO_3$) | 180 | 2.95 | 91 | 1.49 |
| Sulfate ($SO_4$) | 43 | 0.90 | 66 | 1.37 |
| Chloride (Cl) | 74 | 2.09 | 88 | 2.48 |
| Fluoride (F) | 0.6 | 0.03 | 0.4 | 0.02 |
| Nitrate ($NO_3$) | 0.4 | 0.01 | 0.0 | 0.00 |
| Dissolved solids | 370 | | 342 | |
| Total hardness as $CaCO_3$ | 166 | | 128 | |
| pH | 7.8 | | 7.3 | |

Port Aransas

Population in 1940: 495.

Source of information: Boone Walker, Manager

Owner: Mustang Island Industries. July 17, 1945

Source of supply: 36 wells, all 2 inch driven well points, about 18 feet deep; wells are in 4 batteries of 9 wells each, and each battery of wells is pumped by direct suction pumps.

Storage: 3 wooden elevated tanks, about 3,000 gallons each.

Number of customers: About 300 during summer months.

Treatment: Hypochlorination.

Port Aransas -- Continued

Analysis of water:

Date of collection: July 17, 1945 Analyzed by J. H. Rowley

| | Composite sample | |
|---|---|---|
| | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 4.0 | |
| Iron (Fe) | 1.1 | |
| Calcium (Ca) | 106 | 5.29 |
| Magnesium (Mg) | 69 | 5.67 |
| Sodium (Na) | 498 | 21.66 |
| Potassium (K) | 44 | 1.13 |
| Bicarbonate ($HCO_3$) | 304 | 4.98 |
| Sulfate ($SO_4$) | 123 | 2.56 |
| Chloride (Cl) | 925 | 26.09 |
| Fluoride (F) | 0.6 | 0.03 |
| Nitrate ($NO_3$) | 5.5 | 0.09 |
| Dissolved solids | 1,930 | |
| Total hardness as $CaCO_3$ | 548 | |
| pH | 7.8 | |

Robstown

Population in 1940: 6,780.

Owner: Nueces County Water Improvement District 3.

Source of information: W. B. Messer, Manager July 18, 1945 .

Source of supply: Nueces River. Diversion plant about 5 miles north of Robstown. Water fed by canal to filtration plant at Robstown.

Pumpage:

(Average in gallons a day)

| | 1943 | 1944 | 1945 |
|---|---|---|---|
| January | 405,000 | 462,000 | 583,000 |
| February | 432,000 | 552,000 | 623,000 |
| March | 535,000 | 597,000 | 700,000 |
| April | 648,000 | 638,000 | 646,000 |
| May | 678,000 | 546,000 | 741,000 |
| June | 464,000 | 585,000 | 723,000 |
| July | 680,000 | 776,000 | |
| August | 774,000 | 739,000 | |
| September | 580,000 | 567,000 | |
| October | 431,000 | 517,000 | |
| November | 453,000 | 543,000 | |
| December | 431,000 | 497,000 | |

Nueces County

Robstown -- Continued

Storage: Elevated tank, 100,000 gallons; ground reservoir, 7,000,000 gallons; treated ground storage, 150,000 gallons.

Number of customers: 1,960.

Treatment: Aeration, coagulation, sedimentation, rapid sand filtration, and pre and post chlorination.

Analyses of water:

Date of collection: July 18, 1945 Analyzed by J. H. Rowley

| | Raw water | | Finished water | |
|---|---|---|---|---|
| | Parts per million | Equivalents per million | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 16 | | 12 | |
| Iron (Fe) | 0.15 | | 1.15 | |
| Calcium (Ca) | 62 | 3.09 | 67 | 3.34 |
| Magnesium (Mg) | 7.2 | 0.59 | 7.6 | 0.62 |
| Sodium (Na) | 45 | 1.97 | 47 | 2.05 |
| Potassium (K) | 9.6 | 0.25 | 9.5 | 0.24 |
| Bicarbonate ($HCO_3$) | 177 | 2.90 | 172 | 2.82 |
| Sulfate ($SO_4$) | 44 | 0.92 | 61 | 1.27 |
| Chloride (Cl) | 73 | 2.06 | 76 | 2.14 |
| Fluoride (F) | 0.4 | 0.02 | 0.4 | 0.02 |
| Nitrate ($NO_3$) | 0.0 | 0.00 | 0.0 | 0.00 |
| Dissolved solids | 362 | | 379 | |
| Total hardness as $CaCO_3$ | 184 | | 198 | |
| pH | 7.9 | | 7.7 | |

Refugio County

**Austwell**

Population in 1940: 301.

Source of information: Mrs. Marie Bailey, City Secretary July 1945

Ownership: Municipal.

Source of supply: Well, drilled in 1938 by C. E. Enton, depth 361 feet, diameter 6 inches; deep-well double-action cylinder pump and electric motor; yield 20 to 30 gallons a minute.

Storage: 13,500 gallons.

Number of customers: 60.

Treatment: None.

Analysis of water:

Date of collection: July 1945 Analyzed by J. H. Rowley

| | Parts per million | Equivalents per million |
|---|---|---|
| Silica ($SiO_2$) | 12 | |
| Iron (Fe) | 0.98 | |
| Calcium (Ca) | 36 | 1.80 |
| Magnesium (Mg) | 18 | 1.48 |
| Sodium (Na) | 248 | 10.80 |
| Potassium (K) | 9.9 | 0.25 |
| Bicarbonate ($HCO_3$) | 381 | 6.25 |
| Sulfate ($SO_4$) | 89 | 1.85 |
| Chloride (Cl) | 220 | 6.20 |
| Fluoride (F) | 0.6 | 0.03 |
| Nitrate ($NO_3$) | 0.0 | 0.00 |
| Dissolved solids | 833 | |
| Total hardness as $CaCO_3$ | 164 | |
| pH | 7.8 | |

Drillers' log:

Well 1

| | Thickness (feet) | Depth (feet) | | Thickness (feet) | Depth (feet) |
|---|---|---|---|---|---|
| Surface soil | 4 | 4 | Sand streaked, fine and coarse grained | 10 | 245 |
| Clay | 66 | 70 | Shale | 19 | 264 |
| Sand | 5 | 75 | Sand | 14 | 278 |
| Clay | 49 | 124 | Shale | 26 | 304 |
| Sand | 22 | 146 | Sand | 9 | 313 |
| Shale and sand | 62 | 208 | Shale | 8 | 321 |
| Sand | 10 | 218 | Sand and gravel | 40 | 361 |
| Shale | 17 | 235 | | | |

Refugio County

## Refugio

Population in 1940: 4,077.

Source of information: I. C. Williams, Water Superintendent July 1945

Ownership: Municipal.

Source of supply: 2 wells.

Well 1. About a quarter of a mile northeast of the courthouse in Refugio, drilled in 1930 by Layne-Texas Company, original depth 960 feet, under-reamed and new screen installed in 1943, depth 886 feet, diameter 10 to 5-1/2 inches; deep-well turbine pump and 30-horsepower electric motor, pump set at 119 feet; flowing well; pump yield 330 gallons a minute with pumping level at 111 feet below land surface after being repaired in 1943.

Well 2. About 140 feet from well 1, drilled in 1937 by Layne-Texas Company, depth 875 feet, diameter 13-3/8 to 6-5/8 inches; deep-well turbine pump and 8-cylinder gasoline engine, pump set at 100 feet; flowing well; pump yield 660 gallons a minute with pumping level at 83 feet below land surface.

Pumpage: 400,000 gallons a day in summer, 200,000 gallons a day in winter.

Storage: Elevated tank, 100,000 gallons; ground reservoir, 50,000 gallons.

Number of customers: 715.

Treatment: Chlorination.

Analyses of water:

Date of collection: July 1945 Analyzed by J. H. Rowley

| | Well 1 | | Well 2 | |
|---|---|---|---|---|
| | Parts per million | Equivalents per million | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 13 | | 16 | |
| Iron (Fe) | 0.12 | | 0.04 | |
| Calcium (Ca) | 5.8 | 0.29 | 5.9 | 0.29 |
| Magnesium (Mg) | 2.7 | 0.22 | 2.7 | 0.22 |
| Sodium (Na) | 371 | 16.11 | 365 | 15.88 |
| Potassium (K) | 11 | 0.28 | 7.2 | 0.18 |
| Bicarbonate ($HCO_3$) | 411 | 6.75 | 418 | 6.87 |
| Sulfate ($SO_4$) | 57 | 1.19 | 53 | 1.10 |
| Chloride (Cl) | 315 | 8.88 | 302 | 8.52 |
| Fluoride (F) | 1.4 | 0.07 | 1.4 | 0.07 |
| Nitrate ($NO_3$) | 0.8 | 0.01 | 0.8 | 0.01 |
| Dissolved solids | 994 | | 963 | |
| Total hardness as $CaCO_3$ | 26 | | 26 | |
| pH | 8.1 | | 8.5 | |

Refugio -- Continued

Drillers' log:

Well 1

| | Thickness (feet) | Depth (feet) | | Thickness (feet) | Depth (feet) |
|---|---|---|---|---|---|
| Clay | 58 | 58 | Sand, hard | 35 | 579 |
| Sand | 8 | 66 | Shale | 9 | 588 |
| Shale | 129 | 195 | Sand | 83 | 671 |
| Sand | 12 | 207 | Shale and boulders | 28 | 699 |
| Shale | 38 | 245 | Sand | 10 | 709 |
| Sand | 8 | 253 | Rock | 1 | 710 |
| Rock | 1 | 254 | Sand | 7 | 717 |
| Sand | 18 | 272 | Rock | 3 | 720 |
| Shale | 8 | 280 | Sand | 12 | 732 |
| Sand | 7 | 287 | Rock | 2 | 734 |
| Shale | 33 | 320 | Shale, sticky | 61 | 795 |
| Sand | 12 | 332 | Sand, good | 24 | 819 |
| Shale | 57 | 389 | Shale | 10 | 829 |
| Sand | 16 | 405 | Sand, good | m 10 | 839 |
| Shale | 11 | 416 | Rock | 2 | 841 |
| Sand | 25 | 441 | Shale | 16 | 857 |
| Shale | 19 | 460 | Sand, good | 20 | 877 |
| Sand | 8 | 468 | Shale | 16 | 893 |
| Shale | 20 | 488 | Rock sand | 5 | 898 |
| Sand | 22 | 510 | Shale | 22 | 920 |
| Shale | 34 | 544 | | | |

Woodsboro

Population in 1940: 1,426.

Source of information: Edward Mason, Water Superintendent, July 1945

Ownership: Municipal.

Source of supply: Well at elevated tank, drilled in 1935 by A. E. Fawcett, Jr., depth 203 feet, under-reamed and cased to 140 feet, diameter 12 inches; deep-well turbine pump and 10-horsepower electric motor, pump set at 91 feet; static water level 32 feet below land surface on August 12, 1935; yield 270 gallons a minute with drawdown of 40 feet on test, present yield 250 gallons a minute.

Pumpage: 85,000 gallons a day in summer, 40,000 gallons a day in winter.

Storage: Elevated tank, 75,000 gallons; ground storage, 50,000 gallons.

Number of customers: 270.

Treatment: None.

Refugio County

Woodsboro -- Continued

Analysis of water:

Date of collection: July 1945 Analyzed by J. H. Rowley

| | Parts per million | Equivalents per million |
|---|---|---|
| Silica ($SiO_2$) | 12 | |
| Iron (Fe) | 0.04 | |
| Calcium (Ca) | 56 | 2.80 |
| Magnesium (Mg) | 27 | 2.22 |
| Sodium (Na) | 288 | 12.51 |
| Potassium (K) | 13 | 0.33 |
| Bicarbonate ($HCO_3$) | 382 | 6.26 |
| Sulfate ($SO_4$) | 95 | 1.98 |
| Chloride (Cl) | 340 | 9.59 |
| Fluoride (F) | 0.4 | 0.02 |
| Nitrate ($NO_3$) | 0.8 | 0.01 |
| Dissolved solids | 1,020 | |
| Total hardness as $CaCO_3$ | 251 | |
| pH | 7.6 | |

Drillers' log:

Well 1

| | Thickness (feet) | Depth (feet) |
|---|---|---|
| Surface soil | 2 | 2 |
| Clay | 28 | 30 |
| Sand and clay | 30 | 60 |
| Sand and hard streaks | 35 | 95 |
| Dense clay | 10 | 105 |
| Sand | 35 | 140 |
| Clay | 12 | 152 |
| Sand and shale | 35 | 187 |
| Fine-grained sand | 16 | 203 |

San Patricio County

## Aransas Pass

Population in 1940: 4,095.

Source of information: C. H. Cavitt, Water Superintendent July 17, 1945

Ownership: Municipal.

Source of supply: 10 wells at 2 well fields; well field no. 1 at elevated tank near center of city, well field no. 2 in south part of city about one mile from well field no. 1.

Well field no. 1

Well 1. Drilled about 1914, depth 60 feet, diameter 8 inches; deep-well cylinder and pump jack driven by 3-horsepower electric motor; static water level reported 27 feet below land surface.

Well 2. Drilled in 1930 by Marvin Baker, depth 60 feet, diameter 10 inches; deep-well cylinder and pump jack driven by 3-horsepower electric motor.

Well 3. Drilled in 1930 by Marvin Baker, depth 60 feet, diameter 8 inches; deep-well cylinder and pump jack driven by 3-horsepower electric motor.

Well 4. Drilled in 1932 by W. R. Erwin, depth 60 feet, diameter 12 inches; deep-well turbine pump driven by 2-horsepower electric motor; yield 50 gallons a minute.

Well 5. Drilled in 1930 by Marvin Baker, depth 60 feet, diameter 10 inches; deep-well cylinder and pump jack driven by 10-horsepower electric motor.

Well 6. Drilled in 1933 by Marvin Baker, depth 60 feet, diameter 8 inches; deep-well turbine pump driven by 2-horsepower electric motor; yield 50 gallons a minute.

Well 7. Drilled in 1940 by Marvin Baker, depth 60 feet, diameter 8 inches; deep-well turbine pump driven by 5-horsepower electric motor.

Note: All 7 wells center around the ground storage reservoir and elevated tank. Wells 1, 2, 3, and 4 are about 200 feet from the nearest well; wells 5 and 6 are about 300 feet from the nearest well; and well 7 is about 500 feet from the nearest well.

Well field no. 2

Well 1. Drilled in 1940 by Lloyd Richardson, depth 60 feet, diameter 10 inches; deep-well turbine pump driven by 2-horsepower electric motor; static water level 6 feet below land surface; yield 50 gallons a minute.

San Patricio County

Aransas Pass -- Continued

Well 2. About 500 feet from well 1; drilled in 1940 by Lloyd Richardson, depth 60 feet, diameter 10 inches; deep-well turbine pump driven by 2-horsepower electric motor.

Well 3. About 700 feet from well 2; drilled in 1941 by Marvin Baker, depth 60 feet, diameter 8 inches; deep-well turbine pump driven by 3-horsepower electric motor.

Pumpage (estimated): 2,000 gallons a day.

Storage: Elevated tank, 60,000 gallons; concrete ground reservoir, 84,000 gallons; wood ground tank, 18,000 gallons.

Number of customers: 900.

Treatment: None.

Analyses of water:

Date of collection: July 1945 Analyzed by J. H. Rowley

| | Wells 1, 2 and 3 | | Well 6 | |
|---|---|---|---|---|
| | Parts per million | Equivalents per million | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 37 | | 21 | |
| Iron (Fe) | 1.0 | | 0.40 | |
| Calcium (Ca) | 53 | 2.65 | 65 | 3.24 |
| Magnesium (Mg) | 4.0 | 0.33 | 15 | 1.23 |
| Sodium (Na) | 56 | 2.45 | 124 | 5.40 |
| Potassium (K) | 4.9 | 0.13 | 8.7 | 0.22 |
| Bicarbonate ($HCO_3$) | 199 | 3.26 | 280 | 4.59 |
| Sulfate ($SO_4$) | 4.2 | 0.09 | 3.5 | 0.07 |
| Chloride (Cl) | 78 | 2.20 | 192 | 5.42 |
| Fluoride (F) | 0.0 | 0.00 | 0.2 | 0.01 |
| Nitrate ($NO_3$) | 0.8 | 0.01 | 0.2 | 0.00 |
| Dissolved solids | 337 | | 593 | |
| Total hardness as $CaCO_3$ | 156 | | 234 | |
| pH | 7.8 | | 7.4 | |

Mathis

Population in 1940: 1,950.

Source of information: E. T. Gidlett, Water Superintendent July 1945

Ownership: Municipal.

Source of supply: 2 wells.

Well 1. At water tank; drilled in 1939, depth 319 feet; deep-well turbine pump; yield 280 gallons a minute.

Mathis -- Continued

Well 2. At water tank one block from well 1; drilled in 1943 by A. H. Masiran, depth 480 feet, drilled to 617 feet and plugged back to 480 feet; yield 280 gallons a minute.

Storage: Elevated tank, 100,000 gallons; ground storage, 50,000 gallons.

Number of customers: 591.

Treatment: None.

Analyses of water:

Date of collection: July 1945 Analyzed by J. H. Rowley

| | Well 1 | | Well 2 | |
|---|---|---|---|---|
| | Parts per million | Equivalents per million | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 13 | | 14 | |
| Iron (Fe) | 0.61 | | 0.22 | |
| Calcium (Ca) | 27 | 1.35 | 18 | 0.90 |
| Magnesium (Mg) | 8.7 | 0.72 | 6.7 | 0.55 |
| Sodium (Na) | 347 | 15.10 | 358 | 15.57 |
| Potassium (K) | 9.9 | 0.25 | 11 | 0.28 |
| Bicarbonate ($HCO_3$) | 351 | 5.75 | 345 | 5.66 |
| Sulfate ($SO_4$) | 43 | 0.90 | 33 | 0.69 |
| Chloride (Cl) | 378 | 10.66 | 385 | 10.86 |
| Fluoride (F) | 1.0 | 0.05 | 1.0 | 0.05 |
| Nitrate ($NO_3$) | 2.8 | 0.05 | 2.2 | 0.04 |
| Dissolved solids | 1,000 | | 999 | |
| Total hardness as $CaCO_3$ | 116 | | 86 | |
| pH | 8.0 | | 7.8 | |

Odem

Population in 1940: 1,147.

Source of information: Walter Heinsholm, Water Superintendent July 1945

Ownership: Municipal.

Source of supply: 3 wells.

Well 1. At elevated tank, used as standby well; drilled about 1930, depth about 125 feet, diameter 6 inches; deep-well cylinder and pump jack driven by electric motor; yield 20 gallons a minute.

Well 2. At elevated tank; drilled in 1936 by Layne-Texas Company, depth 126 feet, diameter 10 inches; deep-well turbine pump driven by 7½-horsepower electric motor, pump set at 87 feet; static water level 60 feet below land surface; yield 60 gallons a minute.

San Patricio County

Odem -- Continued

Well 3. One-half mile north of Odem; drilled in 1940 by Masarin and Vickers, depth 133 feet, diameter 8 inches; deep-well turbine pump driven by 5-horsepower electric motor; yield 20 gallons a minute.

Pumpage: Maximum 60,000 gallons a day; average 40,000 gallons a day.

Storage: Elevated tank, 50,000 gallons; ground reservoir, 100,000 gallons.

Number of customers: 211.

Treatment: Aeration, sedimentation, and chlorination.

Analysis of water:

Date of collection: July 1945 — Analyzed by J. H. Rowley

| | Well 2 | |
|---|---|---|
| | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 55 | |
| Iron (Fe) | 0.16 | |
| Calcium (Ca) | 119 | 5.94 |
| Magnesium (Mg) | 50 | 4.11 |
| Sodium (Na) | 829 | 36.03 |
| Potassium (K) | 21 | 0.54 |
| Bicarbonate ($HCO_3$) | 510 | 8.37 |
| Sulfate ($SO_4$) | 58 | 1.21 |
| Chloride (Cl) | 1,310 | 36.95 |
| Fluoride (F) | 0.8 | 0.04 |
| Nitrate ($NO_3$) | 2.8 | 0.05 |
| Dissolved solids | 2,700 | |
| Total hardness as $CaCO_3$ | 530 | |
| pH | 7.7 | |

Sinton

Population in 1940: 3,770.

Source of information: J. P. Hall, Water Superintendent July 19, 1945

Ownership: Municipal.

Source of supply: 5 wells.

Well 1. At fire station; drilled about 1912, depth 936 feet, diameter 4 inches; flows 50 gallons a minute.

Well 2. In city park; drilled in 1922, depth 936 feet, diameter 6 inches; flows 15 gallons a minute. (Flowed 50 gallons a minute before well 8 was drilled).

San Patricio County

Sinton -- Continued

Well 5. About 300 feet north of city park; drilled in 1939 by Layne-Texas Company, depth 473 feet, diameter 13-3/8 to 8-5/8 inches; deep-well turbine pump driven by 15-horsepower electric motor; static water level 18 feet below land surface on November 11, 1939; pumping level 54 feet below land surface when pumped 405 gallons a minute, November 11, 1939.

Well 6. In city park; drilled in 1937 by E. T. Ellwood, depth 906 feet, diameter 6 inches; flowed 100 gallons a minute in 1937 and 60 gallons a minute in 1945.

Well 8. In city park; drilled in 1941 by Layne-Texas Company, depth 940 feet, diameter 8 inches; flowed 110 gallons a minute when drilled and 100 gallons a minute in 1945.

Pumpage: 250,000 gallons a day in summer, 200,000 gallons a day in winter.

Storage: Elevated tank, 75,000 gallons; ground reservoir, 116,000 gallons; ground reservoir, 56,000 gallons.

Number of customers: 675.

Treatment: None.

Analyses of water:

Date of collection: July 1945 Analyzed by J. H. Rowley

| | Well 1 | | Well 2 | |
|---|---|---|---|---|
| | Parts per million | Equivalents per million | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 15 | | 10 | |
| Iron (Fe) | 0.07 | | 0.11 | |
| Calcium (Ca) | 8.6 | 0.43 | 13 | 0.65 |
| Magnesium (Mg) | 2.0 | 0.16 | 2.5 | 0.21 |
| Sodium (Na) | 663 | 28.82 | 804 | 34.94 |
| Potassium (K) | 16 | 0.41 | 14 | 0.36 |
| Bicarbonate ($HCO_3$) | 350 | 5.74 | 374 | 6.14 |
| Sulfate ($SO_4$) | 0.4 | 0.01 | 0.4 | 0.01 |
| Chloride (Cl) | 850 | 23.97 | 1,060 | 29.90 |
| Fluoride (F) | 1.0 | 0.05 | 1.2 | 0.06 |
| Nitrate ($NO_3$) | 2.8 | 0.05 | 3.2 | 0.05 |
| Dissolved solids | 1,730 | | 2,090 | |
| Total hardness as $CaCO_3$ | 50 | | 61 | |
| pH | 7.7 | | 7.9 | |

San Patricio County

Sinton -- Continued

Date of collection: July 1945 Analyzed by J. H. Rowley

| | Well 5 | | Well 8 | |
|---|---|---|---|---|
| | Parts per million | Equivalents per million | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 10 | | 8.0 | |
| Iron (Fe) | 0.02 | | 0.08 | |
| Calcium (Ca) | 5.5 | 0.27 | 18 | 0.90 |
| Magnesium (Mg) | 1.7 | 0.14 | 3.9 | 0.32 |
| Sodium (Na) | 356 | 15.47 | 992 | 43.12 |
| Potassium (K) | 5.4 | 0.14 | 16 | 0.41 |
| Bicarbonate ($HCO_3$) | 374 | 6.13 | 420 | 6.89 |
| Sulfate ($SO_4$) | 48 | 1.00 | 0.2 | 0.00 |
| Chloride (Cl) | 312 | 8.80 | 1,340 | 37.79 |
| Fluoride (F) | 1.0 | 0.05 | 1.4 | 0.07 |
| Nitrate ($NO_3$) | 2.2 | 0.04 | 0.0 | 0.00 |
| Dissolved solids | 943 | | 2,590 | |
| Total hardness as $CaCO_3$ | 28 | | 82 | |
| pH | 7.5 | | 8.0 | |

Drillers' logs:

Well 5

| | Thickness (feet) | Depth (feet) | | Thickness (feet) | Depth (feet) |
|---|---|---|---|---|---|
| Sandy clay | 9 | 9 | Sandy shale | 13 | 200 |
| Muddy sand | 13 | 22 | Sand | 6 | 206 |
| Caliche | 9 | 31 | Shale | 27 | 233 |
| Sand | 5 | 36 | Sand | 8 | 241 |
| Caliche | 3 | 39 | Tough shale | 46 | 287 |
| Rock | 3 | 42 | Sandy shale | 53 | 340 |
| Shale | 9 | 51 | Shale break | 2 | 342 |
| Rock | 2 | 53 | Sand | 3 | 345 |
| Caliche | 5 | 58 | Shale | 7 | 352 |
| Sand | 9 | 67 | Shale and sand breaks | 5 | 357 |
| Shale break | 2 | 69 | Sticky shale | 12 | 369 |
| Sand and shale breaks | 11 | 80 | Shale, sand breaks | 6 | 375 |
| Hard layer | 2 | 82 | Shale | 14 | 389 |
| Shale and sand layers | 13 | 95 | Sandy shale | 8 | 397 |
| Caliche | 28 | 123 | Sandy shale | 8 | 405 |
| Blue shale | 11 | 134 | Sand | 8 | 413 |
| Sand | 8 | 142 | Shale | 24 | 437 |
| Shale | 3 | 145 | Sand | 10 | 447 |
| Sand | 16 | 161 | Shale break | 2 | 449 |
| Shale | 9 | 170 | Sand | 7 | 456 |
| Sand | 17 | 187 | Hard shale | 10 | 466 |

San Patricio County

Sinton -- Continued

Well 8

| | Thickness (feet) | Depth (feet) | | Thickness (feet) | Depth (feet) |
|---|---|---|---|---|---|
| Clay | 8 | 8 | Hard sand | 18 | 433 |
| Sand | 10 | 18 | Rock | 1 | 434 |
| Clay and caliche | 30 | 48 | Hard shale | 7 | 441 |
| Sandy shale | 90 | 138 | Sand | 42 | 483 |
| Caliche | 8 | 146 | Shale | 32 | 515 |
| Shale | 95 | 241 | Sand | 21 | 536 |
| Fine sand | 15 | 256 | Shale | 29 | 565 |
| Tough shale | 38 | 294 | Sand | 22 | 587 |
| Rock | 1 | 295 | Hard shale | 125 | 712 |
| Hard shale | 80 | 375 | Sand | 14 | 726 |
| Sand | 15 | 390 | Tough shale | 181 | 907 |
| Shale | 15 | 405 | Sand | 33 | 940 |
| Sand | 10 | 415 | Shale | 12 | 952 |

Taft

Population in 1940: 2,686.

Owner: Central Power & Light Co.

Source of information: C. R. Brock, Operator July 1945

Source of supply: 4 wells at company plant.

Well 2. Depth about 220 feet; deep-well turbine pump and electric motor; yield 285 gallons a minute on February 16, 1942.

Well 6. Depth about 200 feet; deep-well turbine pump and electric motor; yield reported 300 gallons a minute.

Well 7. Depth about 200 feet; deep-well turbine pump and electric motor; yield reported 300 gallons a minute.

Well 9. Drilled in 1944 by Layne-Texas Company, depth 216 feet, diameter 24 to 16 inches, screens from 158 to 188 feet and 206 to 216 feet; deep-well turbine pump and 30-horsepower electric motor; static water level 70 feet below land surface on November 7, 1944; pumping level 156 feet when pumping 260 gallons a minute.

Pumpage: Average 601,000 gallons a day in January 1945, 763,000 gallons a day in June 1945.

Storage: Elevated tank, 100,000 gallons; ground reservoir, 140,000 gallons.

Number of customers: 776.

Treatment: Aeration and chlorination.

San Patricio County

Taft -- Continued

Analyses of water:

Date of collection: July 1945 Analyzed by J. H. Rowley

| | Well 7 | | Well 9 | |
|---|---|---|---|---|
| | Parts per million | Equivalents per million | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 16 | | 16 | |
| Iron (Fe) | 0.05 | | 0.02 | |
| Calcium (Ca) | 21 | 1.05 | 17 | 0.85 |
| Magnesium (Mg) | 8.4 | 0.69 | 7.6 | 0.62 |
| Sodium (Na) | 531 | 23.10 | 490 | 21.30 |
| Potassium (K) | 7.7 | 0.20 | 8.8 | 0.23 |
| Bicarbonate ($HCO_3$) | 394 | 6.47 | 437 | 7.17 |
| Sulfate ($SO_4$) | 113 | 2.35 | 66 | 1.37 |
| Chloride (Cl) | 570 | 16.08 | 508 | 14.33 |
| Fluoride (F) | 1.8 | 0.09 | 1.8 | 0.09 |
| Nitrate ($NO_3$) | 2.8 | 0.05 | 2.2 | 0.04 |
| Dissolved solids | 1,470 | | 1,330 | |
| Total hardness as $CaCO_3$ | 97 | | 85 | |
| pH | 7.7 | | 7.8 | |

Drillers' log:

Well 9

| | Thickness (feet) | Depth (feet) | | Thickness (feet) | Depth (feet) |
|---|---|---|---|---|---|
| Soil | 5 | 5 | Sand | 7 | 116 |
| Clay | 10 | 15 | Clay | 5 | 121 |
| Sand | 10 | 25 | Sand (broken) | 66 | 187 |
| Sandy clay | 7 | 32 | Sand and lime | 6 | 193 |
| Sandy clay and clay | 47 | 79 | Shale | 7 | 200 |
| Sand | 14 | 93 | Sand (broken) | 16 | 216 |
| Clay | 16 | 109 | Shale | 5 | 221 |

Starr County

## Rio Grande City

Population in 1940: 2,500.

Owner: Central Power & Light Co.

Source of information: Superintendent, Central Power and Light Company August 9, 1945

Source of supply: Rio Grande, pumping plant located 5 blocks east and one block south of post office.

Pumpage:

(Average in gallons a day)

| | 1940 | 1941 | 1942 | 1943 | 1944 | 1945 |
|---|---|---|---|---|---|---|
| January | 174,000 | 222,000 | 253,000 | 386,000 | 155,000 | 173,000 |
| February | 233,000 | 198,000 | 251,000 | 343,000 | 207,000 | 207,000 |
| March | 290,000 | 201,000 | 364,000 | 371,000 | 220,000 | 205,000 |
| April | 344,000 | 297,000 | 389,000 | 393,000 | 231,000 | 307,000 |
| May | 385,000 | 307,000 | 415,000 | 383,000 | 217,000 | 322,000 |
| June | 343,000 | 310,000 | 342,000 | 317,000 | 208,000 | 333,000 |
| July | 333,000 | 350,000 | 350,000 | 318,000 | 179,000 | |
| August | 333,000 | 473,000 | 417,000 | 345,000 | 195,000 | |
| September | 316,000 | 360,000 | 393,000 | 287,000 | 186,000 | |
| October | 262,000 | 318,000 | 376,000 | 213,000 | 167,000 | |
| November | 224,000 | 238,000 | 365,000 | 161,000 | 151,000 | |
| December | 229,000 | 245,000 | 378,000 | 227,000 | 185,000 | |

Storage: Elevated tank, 50,000 gallons; ground storage, 500,000 gallons.

Number of customers: 617.

Treatment: Aeration, coagulation, sedimentation, rapid sand filtration, and chlorination.

Analyses of water:

Date of collection: August 9, 1945 Analyzed by C. B. Cibulka

| | Raw water | | Finished water | |
|---|---|---|---|---|
| | Parts per million | Equivalents per million | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | | | 17 | |
| Iron (Fe) | | | 0.21 | |
| Calcium (Ca) | 82 | 4.09 | 86 | 4.29 |
| Magnesium (Mg) | 19 | 1.56 | 18 | 1.48 |
| Sodium (Na) | | | 90 | 3.92 |
| Potassium (K) | 91 | 3.94 | 12 | 0.31 |
| Bicarbonate ($HCO_3$) | 144 | 2.36 | 128 | 2.10 |
| Sulfate ($SO_4$) | 191 | 3.98 | 217 | 4.52 |
| Chloride (Cl) | 114 | 3.22 | 118 | 3.33 |
| Fluoride (F) | | | 0.6 | 0.03 |
| Nitrate ($NO_3$) | 2.0 | 0.03 | 1.2 | 0.02 |
| Dissolved solids | 654 | | 648 | |
| Total hardness as $CaCO_3$ | 282 | | 288 | |
| pH | | | 7.7 | |

Starr County

Roma

Population in 1940: 1,414.

Source of information: E. Ramirez, Water Superintendent August 9, 1945

Ownership: Municipal.

Source of supply: Rio Grande, pumping plant located 1 block east and 2 blocks south of post office.

Pumpage:

(Average in gallons a day)

| | 1941 | 1942 | 1943 | 1944 | 1945 |
|---|---|---|---|---|---|
| January | | 25,580 | 25,322 | 37,400 | 46,700 |
| February | | 27,392 | 41,428 | 46,800 | 46,700 |
| March | 20,967 | 43,233 | 49,100 | 54,400 | 80,200 |
| April | 32,700 | 43,400 | 55,300 | 73,400 | 74,900 |
| May | 24,677 | 46,161 | 71,100 | 63,000 | 92,300 |
| June | 26,700 | 53,633 | 61,300 | 67,700 | 1,087,000 |
| July | 29,064 | 45,700 | 61,800 | 78,000 | |
| August | 36,290 | 45,354 | 55,100 | 72,100 | |
| September | 27,566 | 34,900 | 51,400 | 59,000 | |
| October | 31,548 | 36,967 | 37,200 | 63,900 | |
| November | 28,733 | 40,800 | 34,300 | 51,300 | |
| December | 24,419 | 35,500 | 26,600 | 42,500 | |

Storage: Elevated tank, 60,000 gallons; concrete ground storage reservoir, 15,000 gallons.

Number of customers: 298 (also supplies the communities of La Saenz, Escobores, and San Pedro, Mexico).

Treatment: Coagulation, sedimentation, and chlorination.

Starr County

Roma -- Continued

Analyses of water:

Date of collection: August 9, 1945 Analyzed by J. H. Rowley

| | Raw water | | Finished water | |
|---|---|---|---|---|
| | Parts per million | Equivalents per million | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | | | 14 | |
| Iron (Fe) | | | 0.36 | |
| Calcium (Ca) | 82 | 4.09 | 83 | 4.14 |
| Magnesium (Mg) | 22 | 1.81 | 21 | 1.73 |
| Sodium (Na) | | ) | 109 | 4.74 |
| Potassium (K) | 114 | 4.96 ) | 11 | 0.28 |
| Bicarbonate ($HCO_3$) | 114 | 1.87 | 120 | 1.97 |
| Sulfate ($SO_4$) | 228 | 4.75 | 233 | 4.85 |
| Chloride (Cl) | 150 | 4.23 | 143 | 4.03 |
| Fluoride (F) | | | 0.8 | 0.04 |
| Nitrate ($NO_3$) | 0.8 | 0.01 | 0.2 | 0.00 |
| Dissolved solids | 725 | | 701 | |
| Total hardness as $CaCO_3$ | 295 | | 294 | |
| pH | | | 7.7 | |

Uvalde County

Sabinal

Population in 1940: 1,768.

Source of information: Mrs. R. B. C. Ware, City Secretary November 2, 1945

Ownership: Municipal.

Source of supply: 2 wells.

Well 1. At elevated tank; drilled in 1923 by Trim and Son, drilled to 2,800 feet and plugged back to 1,476 feet, diameter 10 to 6 inches; deep-well turbine pump and electric motor; static water level 230 feet below land surface in 1929; yield 250 gallons a minute.

Well 2. Drilled in 1923 by Trim and Son, depth 1,493 feet, diameter 10 to 8 inches, cased to 930 feet; deep-well turbine pump and 40-horsepower electric motor; static water level 214 feet below land surface; yield 335 gallons a minute.

Pumpage: No record.

Storage: Ele vated tank, 100,000 gallons.

Treatment: Chlorination.

Number of customers: 450.

Analyses of water:

Date of collection: November 2, 1945 — Analyzed by J. H. Rowley & C. B. Cibulka

| | Well 1 | | Well 2 | |
|---|---|---|---|---|
| | Parts per million | Equivalents per million | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 2.8 | | 14 | |
| Iron (Fe) | 0.16 | | 0.12 | |
| Calcium (Ca) | 58 | 2.89 | 88 | 4.39 |
| Magnesium (Mg) | 72 | 5.92 | 29 | 2.38 |
| Sodium (Na) | 148 | 6.43 | 17 | 0.75 |
| Potassium (K) | 21 | 0.54 | 9.5 | 0.24 |
| Bicarbonate ($HCO_3$) | 45 | 0.74 | 254 | 4.16 |
| Sulfate ($SO_4$) | 608 | 12.66 | 142 | 2.96 |
| Chloride (Cl) | 82 | 2.31 | 20 | 0.56 |
| Fluoride (F) | 1.4 | 0.07 | 0.6 | 0.03 |
| Nitrate ($NO_3$) | 0.0 | 0.00 | 3.0 | 0.05 |
| Dissolved solids | 1,020 | | 470 | |
| Total hardness as $CaCO_3$ | 440 | | 338 | |
| pH | 7.6 | | 7.1 | |

Drillers' log: No log available; top of Edwards limestone reported by Trim and Son to be 930 feet below the land surface.

Uvalde County

## Uvalde

Population in 1940: 6,679.

Source of information: R. W. Evans, City Secretary November 1, 1945

Ownership: Municipal.

Source of supply: 3 wells.

Well 1. Dug and drilled about 1910, well consists of a large pit dug to about 50 feet in depth and cemented on four sides then drilled to 375 feet, diameter of drilled well 10 inches; two horizontal centrifugal pumps mounted in the pit and driven by electric motors; yield 750 gallons a minute each; static water level 36 feet below land surface.

Well 2. Drilled in 1938 by H. Crawford and John Roberts; depth 478 feet, diameter 12-1/2 inches; deep-well turbine pump and 60-horsepower electric motor; static water level 36 feet below land surface; yield, 1,100 gallons a minute with a drawdown of about 15 feet.

Well 3. Drilled in 1942 by Henry Rosenow, depth 400 feet, diameter 12-1/2 inches; deep-well turbine pump and 60-horsepower electric motor; yield 1,100 gallons a minute.

Pumpage:

(Average in gallons a day)

| | 1942 | 1943 | 1944 | 1945 |
|---|---|---|---|---|
| January | 392,000 | 498,000 | (Average in gallons a day for the year) 910,000 | (Average in gallons a day for the year) 926,000 |
| February | 478,000 | 722,000 | | |
| March | 465,000 | 875,000 | | |
| April | 872,000 | 942,000 | | |
| May | 552,000 | 1,070,000 | | |
| June | 1,135,000 | 913,000 | | |
| July | 810,000 | 1,430,000 | | |
| August | 1,300,000 | 1,890,000 | | |
| September | 738,000 | 1,430,000 | | |
| October | 650,000 | 458,000 | | |
| November | 667,000 | 656,000 | | |
| December | 516,000 | 522,000 | | |

Storage: Elevated tank, 150,000 gallons; stand pipe in North Uvalde, 100,000 gallons.

Number of customers: 1,688.

Treatment: None.

Uvalde County

Uvalde -- Continued

Analysis of water:

Date of collection: November 2, 1945 — Analyzed by J. H. Rowley and C. B. Cibulka

| | Well 3 | |
|---|---|---|
| | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 11 | |
| Iron (Fe) | 0.08 | |
| Calcium (Ca) | 74 | 3.69 |
| Magnesium (Mg) | 9.5 | 0.78 |
| Sodium (Na) | 24 | 1.06 |
| Potassium (K) | 7.0 | 0.18 |
| Bicarbonate ($HCO_3$) | 277 | 4.54 |
| Sulfate ($SO_4$) | 19 | 0.40 |
| Chloride (Cl) | 24 | 0.69 |
| Fluoride (F) | 0.4 | 0.02 |
| Nitrate ($NO_3$) | 4.1 | 0.07 |
| Dissolved solids | 319 | |
| Total hardness as $CaCO_3$ | 224 | |
| pH | 7.0 | |

Drillers' log:

Well 2

| | Thickness (feet) | Depth (feet) |
|---|---|---|
| Clay and soil | 30 | 30 |
| Gravel | 28 | 58 |
| Clay | 18 | 76 |
| Limestone | 89 | 165 |
| Clay | 95 | 260 |
| Limestone | 218 | 478 |

Victoria County

## Victoria

Population in 1940: 11,566.

Ownership: Municipal.

Source of information: F. B. Lowry, City Engineer April 20, 1945

Source of supply: 6 wells.

Well 5. About 400 feet northeast of pump station; drilled in 1934 by Southern Engine and Pump Company, depth 612 feet, diameter 12-1/2 to 10 inches, screen from 562 to 606 feet and gun-perforated from 509 to 538 feet; deep-well turbine pump and 10-horsepower electric motor; flows; pump yield reported 402 gallons a minute after 24 hours pumping in October 1942; temperature 77° F.

Well 6. About 300 feet northeast of pump station, drilled in 1938, depth 365 feet, diameter 16 to 8-5/8 inches, screens at 158 to 180 feet, 204 to 222 feet, 258 to 314 feet, and 326 to 346 feet, under-reamed and gravel-walled; deep-well turbine pump and electric motor; static water level 1.0 foot below land surface; yield 500 gallons a minute with drawdown at 78 feet after 5 hours pumping; temperature 74° F; water turbid and well unused.

Well 7. About 300 feet northwest of pump station, drilled in 1940 by A. E. Fawcett, Jr., depth 412 feet, diameter 16 to 10 inches, screen from 364 to 410 feet; deep-well turbine pump and 40-horsepower electric motor, pump set at 100 feet; flows 50 gallons a minute at ground level; pump yield 1,000 gallons a minute with drawdown of 90 feet in 1940; yield 731 gallons a minute after 24 hours pumping in October 1942; temperature 73° F.

Well 8. About 200 feet east of pump station, drilled in 1941 by A. H. Masiran, depth 414 feet, diameter 16-3/4 to 8 inches, screen from 374 to 413 feet; deep-well turbine pump and electric motor; flows; pump yield 525 gallons a minute with drawdown of 62 feet when drilled; yield 430 gallons a minute after 24 hours pumping in October 1942; temperature 75° F.

Well 9. About 200 feet northwest of pump station, drilled in 1941 by Layne-Texas Company, depth 604 feet, diameter 13 to 10-3/4 inches, screens at 475 to 527 feet and 554 to 600 feet; deep-well turbine pump and 20-horsepower electric motor, pump set at 100 feet; flows; pump yield 525 gallons a minute with drawdown of 100 feet when drilled; yield 603 gallons a minute after 24 hours pumping in October 1942; temperature 75° F.

Well 10. One block west of city limits on east Pine Street, drilled in 1942 by Layne-Texas Company, depth 1,504 feet, plugged back to 1,012 feet, diameter 16 to 8-5/8 inches, screen from 804 to 991 feet, under-reamed and gravel-walled; deep-well turbine pump and 125-horsepower electric motor; static water level 21 feet below land surface on September 2, 1942; yield 1,000 gallons a minute with drawdown of 201 feet after 39 hours pumping; pumps directly into water mains; temperature 82-1/2° F.

Victoria County

Victoria -- Continued

Pumpage: No record.

Storage: 2 elevated tanks, 500,000 and 300,000 gallons each; concrete ground reservoir, 1,000,000 gallons.

Number of customers: 3,305.

Treatment: Aeration.

Analyses of water:

Date of collection: April 20, 1945 Analyzed by J. H. Rowley

| | Well 5 | | Well 6 | |
|---|---|---|---|---|
| | Parts per million | Equivalents per million | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 21 | | 26 | |
| Iron (Fe) | 4.7 | | 3.9 | |
| Calcium (Ca) | 34 | 1.70 | 36 | 1.80 |
| Magnesium (Mg) | 11 | 0.90 | 11 | 0.90 |
| Sodium (Na) | 146 | 6.36 | 152 | 6.59 |
| Potassium (K) | 7.9 | 0.20 | 6.4 | 0.16 |
| Bicarbonate ($HCO_3$) | 402 | 6.59 | 386 | 6.33 |
| Sulfate ($SO_4$) | 14 | 0.29 | 10 | 0.21 |
| Chloride (Cl) | 80 | 2.26 | 102 | 2.88 |
| Fluoride (F) | 0.4 | 0.02 | 0.6 | 0.03 |
| Nitrate ($NO_3$) | 0.0 | 0.00 | 0.0 | 0.00 |
| Dissolved solids | 517 | | 537 | |
| Total hardness as $CaCO_3$ | 130 | | 135 | |
| pH | 7.0 | | 7.2 | |

| | Well 7 | | Well 8 | |
|---|---|---|---|---|
| | Parts per million | Equivalents per million | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 28 | | 26 | |
| Iron (Fe) | 1.2 | | 7.9 | |
| Calcium (Ca) | 37 | 1.85 | 36 | 1.80 |
| Magnesium (Mg) | 12 | 0.99 | 12 | 0.99 |
| Sodium (Na) | 128 | 5.57 | 134 | 5.82 |
| Potassium (K) | 5.8 | 0.15 | 3.9 | 0.10 |
| Bicarbonate ($HCO_3$) | 360 | 5.90 | 366 | 6.00 |
| Sulfate ($SO_4$) | 3 | 0.06 | 3 | 0.06 |
| Chloride (Cl) | 91 | 2.57 | 93 | 2.62 |
| Fluoride (F) | 0.6 | 0.03 | 0.6 | 0.03 |
| Nitrate ($NO_3$) | 0.0 | 0.00 | 0.0 | 0.00 |
| Dissolved solids | 484 | | 497 | |
| Total hardness as $CaCO_3$ | 142 | | 140 | |
| pH | 7.4 | | 7.4 | |

Victoria County

Victoria -- Continued

Date of collection: April 20, 1945 Analyzed by J. H. Rowley

| | Well 9 | | Well 10 | |
|---|---|---|---|---|
| | Parts per million | Equivalents per million | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 18 | | 23 | |
| Iron (Fe) | 2.3 | | 0.97 | |
| Calcium (Ca) | 29 | 1.45 | 18 | 0.90 |
| Magnesium (Mg) | 10 | 0.82 | 6.9 | 0.57 |
| Sodium (Na) | 150 | 6.51 | 221 | 9.60 |
| Potassium (K) | 5.9 | 0.15 | 6.6 | 0.17 |
| Bicarbonate ($HCO_3$) | 359 | 5.88 | 348 | 5.70 |
| Sulfate ($SO_4$) | 15 | 0.31 | 37 | 0.77 |
| Chloride (Cl) | 96 | 2.71 | 168 | 4.74 |
| Fluoride (F) | 0.6 | 0.03 | 0.6 | 0.03 |
| Nitrate ($NO_3$) | 0.0 | 0.00 | 0.0 | 0.00 |
| Dissolved solids | 504 | | 656 | |
| Total hardness as $CaCO_3$ | 114 | | 74 | |
| pH | 7.5 | | 7.5 | |

Drillers' logs:

Well 7

| | Thickness (feet) | Depth (feet) | | Thickness (feet) | Depth (feet) |
|---|---|---|---|---|---|
| Surface soil | 17 | 17 | Hard lime | 37 | 229 |
| Sand - lime streaks | 31 | 48 | Sand and boulders | 3 | 231 |
| Coarse sand | 12 | 60 | Hard lime | 51 | 282 |
| Gravel | 42 | 102 | Sand, loose | 13 | 295 |
| Shale and sand | 13 | 115 | Shale and lime | 7 | 302 |
| Hard sand rock | 10 | 125 | Hard sand | 15 | 317 |
| Shale - lime streaks | 16 | 141 | Sand | 7 | 324 |
| Shale and boulders | 7 | 148 | Shale, sticky | 17 | 341 |
| Gumbo | 39 | 187 | Hard sand rock | 21 | 362 |
| Shale and boulders | 5 | 192 | Pink gumbo | 14 | 376 |
| Rock, hard | 2 | 194 | Sand | 36 | 412 |

Victoria -- Continued

Well 8

| | Thickness (feet) | Depth (feet) | | Thickness (feet) | Depth (feet) |
|---|---|---|---|---|---|
| Surface soil | 6 | 6 | Shale | 5 | 236 |
| Clay | 18 | 24 | Sand | 3 | 239 |
| Sand and gravel | 70 | 94 | Shale, sticky | 29 | 268 |
| Clay and gravel | 5 | 99 | Sand | 4 | 272 |
| Sand rock | 2 | 101 | Shale | 8 | 280 |
| Sand and boulders | 25 | 126 | Sand | 12 | 292 |
| Sand and shale streaks | 18 | 144 | Shale | 4 | 296 |
| Sand and boulders | 24 | 168 | Sand and shale streaks | 30 | 326 |
| Shale | 3 | 171 | Shale | 10 | 336 |
| Sand | 5 | 176 | Hard sand and boulders | 24 | 360 |
| Shale | 11 | 187 | Shale, pink sticky | 14 | 374 |
| Sand | 6 | 193 | Sand and boulders | 37 | 411 |
| Shale, sticky | 23 | 216 | Shale | 3 | 414 |
| Sand | 15 | 231 | | | |

Webb County

Laredo

Population in 1940: 39,274.

Source of information:
H. T. Ellsworth, Dist. Mgr.
E. J. Hood, Water Plant Supt.
July 29, 1944

Owner: Central Power & Light Co.

Source of supply: Rio Grande.

Pumpage:

(Average in thousands of gallons a day)

| 1940 | 1941 | 1942 | 1943 | 1944 (6 mo.) |
|---|---|---|---|---|
| 2,600 | 2,650 | 3,279 | 4,208 | 4,410 |

(Maximum in thousands of gallons a day)

| 1940 | 1941 | 1942 | 1943 | 1944 (6 mo.) |
|---|---|---|---|---|
| | | 5,407 | 6,901 | 6,756 |

Storage: 2 concrete reservoirs 2,000,000 and 2,200,000 gallons each.

Number of customers: 5,700.

Treatment: Aeration, coagulation, sedimentation, rapid sand filtration, pre and post chlorination.

Analysis of water:

Date of collection: July 29, 1944 — Analyzed by J. H. Rowley

| | Finished water | |
|---|---|---|
| | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 16 | |
| Iron (Fe) | 0.10 | |
| Calcium (Ca) | 102 | 5.09 |
| Magnesium (Mg) | 36 | 2.96 |
| Sodium (Na) + Potassium (K) | 207 | 9.00 |
| Bicarbonate ($HCO_3$) | 122 | 2.00 |
| Sulfate ($SO_4$) | 322 | 6.70 |
| Chloride (Cl) | 293 | 8.26 |
| Fluoride (F) | 0.8 | 0.04 |
| Nitrate ($NO_3$) | 2.8 | 0.05 |
| Dissolved solids | 1,040 | |
| Total hardness as $CaCO_3$ | 402 | |
| pH | 7.7 | |

Monthly averages of finished water at Laredo (in parts per million except pH)
Analyses by Central Power and Light Company

| | Magnesium (Mg) | | | Sulfate ($SO_4$) | | | Chloride (Cl) | | | Hardness as $CaCo_3$ | | | pH | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1941 | 1942 | 1943 | 1941 | 1942 | 1943 | 1941 | 1942 | 1943 | 1941 | 1942 | 1943 | 1941 | 1942 | 1943 |
| Jan. | -- | 46 | 39 | -- | 575 | 420 | 280 | 525 | 290 | -- | 675 | 560 | 8.2 | 8.1 | 7.8 |
| Feb. | -- | 53 | 42 | -- | 600 | 430 | 245 | 550 | 320 | -- | 650 | 600 | 8.3 | 8.0 | 7.8 |
| Mar. | -- | 50 | 32 | -- | 500 | 330 | 280 | 500 | 280 | -- | 600 | 470 | 8.3 | 8.0 | 7.8 |
| Apr. | -- | 45 | 28 | -- | 400 | 260 | 245 | 430 | 225 | -- | 470 | 390 | 8.2 | 7.9 | 7.8 |
| May | -- | 30 | 30 | -- | 340 | 280 | 115 | 330 | 280 | -- | 390 | 450 | 8.1 | 7.8 | 7.8 |
| June | -- | 26 | 18 | -- | 350 | 240 | 235 | 240 | 160 | -- | 360 | 350 | 8.2 | 7.7 | 7.8 |
| July | -- | 22 | 7 | 380 | 270 | 220 | 330 | 205 | 130 | 460 | 310 | 270 | 8.2 | 7.7 | 7.7 |
| Aug. | 17 | 20 | 16 | 310 | 270 | 230 | 220 | 190 | 154 | 340 | 350 | 340 | 8.3 | 7.7 | 7.7 |
| Sept. | 12 | 8 | 20 | 240 | 140 | 215 | 190 | 64 | 205 | 155 | 185 | 410 | 8.3 | 7.8 | 7.7 |
| Oct. | 19 | 16 | 18 | 360 | 190 | 205 | 165 | 115 | 200 | 440 | 220 | 330 | 8.3 | 7.7 | 7.7 |
| Nov. | 40 | 31 | 25 | 620 | 330 | 215 | 380 | 220 | 300 | 700 | 350 | 450 | 8.3 | 7.8 | 8.0 |
| Dec. | 55 | 32 | 33 | 640 | 380 | 280 | 600 | 240 | 290 | 720 | 525 | 590 | 8.3 | 8.3 | 7.9 |
| Avg. | -- | 31.6 | 25.7 | -- | 362 | 277 | 274 | 301 | 236 | -- | 424 | 430 | 8.2 | 7.9 | 7.8 |

Willacy County

Lyford

Population in 1940: 891.

Ownership: Municipal.

Source of information: W. A. Comp, Water Superintendent August 8, 1945

Source of supply: Well 0.4 mile north of railroad depot and east of highway, drilled in 1908 by Layne-Texas Company for irrigation purpose, depth 1,935 feet, diameter 10 to 8 inches, screens reported at 1,200 feet and near bottom; rotary pump and 15-horsepower electric motor; small flow one foot above land surface after pump has been shut down 10 to 12 hours; temperature 92° F.

Pumpage (estimated): Maximum 75,000 gallons, average 50,000 gallons a day.

Storage: Elevated tank, 60,000 gallons.

Number of customers: 130.

Treatment: None.

Analysis of water:

Date of collection: August 8, 1945 Analyzed by C. B. Cibulka

| | Parts per million | Equivalents per million |
|---|---|---|
| Calcium (Ca) | 106 | 5.29 |
| Magnesium (Mg) | 28 | 2.30 |
| Sodium and Potassium (Na + K) | 1,070 | 46.52 |
| Bicarbonate ($HCO_3$) | 115 | 1.89 |
| Sulfate ($SO_4$) | 1,580 | 32.89 |
| Chloride (Cl) | 685 | 19.32 |
| Nitrate ($NO_3$) | 0.4 | 0.01 |
| Dissolved solids | 3,530 | |
| Total hardness as $CaCO_3$ | 380 | |

Raymondville

Population in 1940: 4,050.

Ownership: Municipal.

Source of information: Bill Schupp, City Manager August 10, 1945

Source of supply: Canal from Rio Grande. (Formerly supplied from well drilled in 1928 by Layne-Texas Company, depth 1,416 feet, cased to 1,360 feet, diameter 12 to 8-1/4 inches; static water level reported 10 feet below land surface on June 25, 1928; yield 325 gallons a minute with drawdown of 31 feet).

Pumpage: Maximum 900,000 gallons a day.

Willacy County

Raymondville -- Continued

Storage: Elevated tank, 75,000 gallons; ground reservoir, 250,000 gallons.

Number of customers: 1,260.

Treatment: Coagulation, sedimentation, rapid sand filtration, pre and post chlorination.

Analyses of water:

Date of collection: Well, March 23, 1937; Canal, August 8, 1945. State Health Dep't. Analyzed by C. B. Cibulka

| | Well | Canal - Finished water | |
|---|---|---|---|
| | Parts per million | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | | 17 | |
| Iron (Fe) | 0.14 | 0.11 | |
| Calcium (Ca) | 43 | 78 | 3.89 |
| Magnesium (Mg) | 22 | 19 | 1.56 |
| Sodium (Na) | | 103 | 4.47 |
| Potassium (K) | | 9.9 | 0.25 |
| Bicarbonate ($HCO_3$) | | 99 | 1.62 |
| Sulfate ($SO_4$) | 1,167 | 226 | 4.71 |
| Chloride (Cl) | 56 | 135 | 3.81 |
| Fluoride (F) | 2.25 | 0.6 | 0.03 |
| Nitrate ($NO_3$) | | 0.0 | 0.00 |
| Dissolved solids | 2,781 | 659 | |
| Total hardness as $CaCO_3$ | 284 | 272 | |
| pH | 8.2 | 7.8 | |

Willacy County

Raymondville -- Continued

Drillers' log:

Well

| | Thickness (feet) | Depth (feet) | | Thickness (feet) | Depth (feet) |
|---|---|---|---|---|---|
| Sand | 84 | 84 | Sand | 8 | 686 |
| Clay | 59 | 143 | Gumbo | 144 | 830 |
| Sand | 78 | 221 | Clay and sand | 21 | 851 |
| Clay | 51 | 272 | Sand rock | 1 | 852 |
| Sand | 39 | 311 | Clay and gravel | 20 | 872 |
| Clay | 25 | 336 | Sand rock | 2 | 874 |
| Sand | 26 | 362 | Clay | 42 | 916 |
| Clay | 24 | 386 | Clay and gravel | 23 | 939 |
| Sandy clay | 35 | 421 | Packsand | 4 | 943 |
| Sand | 15 | 436 | Clay | 35 | 978 |
| Clay | 16 | 452 | Packsand | 7 | 985 |
| Sand and clay layers | 24 | 476 | Clay | 41 | 1026 |
| Gumbo | 30 | 506 | Gumbo | 15 | 1041 |
| Sand | 16 | 522 | Sand | 14 | 1055 |
| Clay | 8 | 530 | Clay | 26 | 1081 |
| Sand | 16 | 546 | Sand | 15 | 1096 |
| Sand rock | 1 | 547 | Sand rock | 1 | 1097 |
| Clay | 36 | 583 | Clay | 16 | 1113 |
| Sand | 18 | 601 | Sandy clay | 87 | 1200 |
| Clay | 15 | 616 | Packsand | 10 | 1210 |
| Sand | 40 | 656 | Clay | 94 | 1304 |
| Clay | 22 | 678 | Sandy clay | 12 | 1416 |

Wilson County

Floresville

Population in 1940: 1,708.

Ownership: Municipal.

Source of information: Tom Johnson, Water Superintendent July 29, 1944

Source of supply: Well 2 blocks west and 2 blocks south of court house, drilled in 1925 by San Antonio Public Service Co., depth 1,523 feet (reported no water below 850 feet), diameter 8 inches; flows 375 gallons a minute; temperature 91° F.

Pumpage (flow): Average 300,000 gallons a day.

Storage: 4 concrete basins, 160,000 gallons; elevated tank, 75,000 gallons.

Number of customers: 525.

Treatment: Aeration, coagulation, hypo-chlorination and sedimentation.

Analysis of water:

Date of collection: July 29, 1944 Analyzed by J. H. Rowley

| | Parts per million | Equivalents per million |
|---|---|---|
| Silica ($SiO_2$) | 15 | |
| Iron (Fe) | 0.05 | |
| Calcium (Ca) | 26 | 1.30 |
| Magnesium (Mg) | 11 | 0.90 |
| Sodium (Na) | 100 | 4.33 |
| Potassium (K) | 9.1 | 0.23 |
| Bicarbonate ($HCO_3$) | 354 | 5.80 |
| Sulfate ($SO_4$) | 16 | 0.33 |
| Chloride (Cl) | 22 | 0.62 |
| Fluoride (F) | 0.2 | 0.01 |
| Nitrate ($NO_3$) | 0.0 | 0.00 |
| Dissolved solids | 412 | |
| Total hardness as $CaCO_3$ | 110 | |
| pH | 7.6 | |

Poth

Population in 1940: 509.

Ownership: Municipal.

Source of information: E. J. Koserak, City Secretary July 29, 1944

Source of supply: Well drilled in 1936, depth 2,032 feet, diameter 7 to 4-1/2 inches, casing perforated from 1,779 to 2,032 feet; flows 390 gallons a minute, shut-in pressure 12 pounds when drilled; temperature 115° F.

Wilson County

Poth -- Continued

Pumpage:

(Average in gallons a day)

| | 1941 | 1942 | 1943 | 1944 |
|---|---|---|---|---|
| January | 18,000 | 29,000 | 37,000 | 31,000 |
| February | 15,000 | 40,000 | 60,000 | 34,000 |
| March | 28,000 | 32,000 | 53,000 | 31,000 |
| April | 15,500 | 49,000 | 46,000 | 55,000 |
| May | 18,000 | 28,000 | 84,000 | 58,000 |
| June | 21,000 | 70,000 | 38,000 | |
| July | 43,000 | 62,000 | 66,000 | |
| August | 55,000 | 72,000 | 78,000 | |
| September | 70,000 | 37,000 | 67,000 | |
| October | 33,000 | 37,000 | 39,000 | |
| November | 34,000 | 37,000 | 27,000 | |
| December | 25,000 | 40,000 | 28,000 | |

Storage: Elevated tank, 50,000 gallons.

Number of customers: 147.

Treatment: None.

Analysis of water:

Date of collection: July 29, 1944 Analyzed by J. H. Rowley

| | Parts per million | Equivalents per million |
|---|---|---|
| Silica ($SiO_2$) | 21 | |
| Iron (Fe) | 0.03 | |
| Calcium (Ca) | 6.0 | 0.30 |
| Magnesium (Mg) | 1.9 | 0.16 |
| Sodium (Na) | 215 | 9.34 |
| Potassium (K) | 4.0 | 0.10 |
| Bicarbonate ($HCO_3$) | 495 | 8.13 |
| Sulfate ($SO_4$) | 32 | 0.67 |
| Chloride (Cl) | 38 | 1.07 |
| Fluoride (F) | 0.6 | 0.03 |
| Nitrate ($NO_3$) | 0.0 | 0.00 |
| Dissolved solids | 567 | |
| Total hardness as $CaCO_3$ | 23 | |
| pH | 8.2 | |

Wilson County

Poth -- Continued

Drillers' log:

Well

| | Thickness (feet) | Depth (feet) |
|---|---|---|
| Sand, shale, gumbo, and boulders | 650 | 650 |
| Sandy shale (Neches greensand) | 192 | 842 |
| Sandy shale and boulders (Queen City sand) | 788 | 1630 |
| Fine sand and shale (Carrizo sand) | 140 | 1770 |
| Soft sand | 230 | 2000 |
| Soft sandy shale (Wilcox group) | 32 | 2032 |

Saspamco

Population in 1940: 200.

Owner: San Antonio Sewer and Pipe Company

Source of information: Wilson County report July 29, 1944

Source of supply: Well drilled in 1915, depth 600 feet, diameter 10 inches; reported water level 135 feet below land surface, drawdown 175 feet after pumping 33 gallons a minute for 24 hours.

Pumpage: No record.

Storage: Elevated tank, 10,000 gallons.

Treatment: None.

Analysis of water:

Date of collection: July 29, 1944 Analyzed by J. H. Rowley

| | Parts per million | Equivalents per million |
|---|---|---|
| Silica ($SiO_2$) | 12 | |
| Iron (Fe) | 0.10 | |
| Calcium (Ca) | 42 | 2.10 |
| Magnesium (Mg) | 21 | 1.73 |
| Sodium and Potassium (Na + K) | 265 | 11.52 |
| Bicarbonate ($HCO_3$) | 331 | 5.43 |
| Sulfate ($SO_4$) | 290 | 6.04 |
| Chloride (Cl) | 137 | 3.86 |
| Fluoride (F) | 0.2 | 0.01 |
| Nitrate ($NO_3$) | 0.8 | 0.01 |
| Dissolved solids | 940 | |
| Total hardness as $CaCO_3$ | 192 | |
| pH | 7.9 | |

Wilson County

Stockdale

Population in 1940: 926.

Ownership: Municipal.

Source of information: John E. Wheeler, Water Superintendent July 28, 1944

Source of supply: Well (city well no. 2), drilled in 1935 by Kelly Construction Company, depth 315 feet, diameter 8 to 6 inches; deep-well turbine pump and 10-horsepower electric motor; reported water level 55 feet below land surface when drilled; drawdown 50 feet after pumping 124 gallons a minute for 80 hours; yield 93 gallons a minute in 1940.

Pumpage: Maximum 100,000 gallons a day.

Storage: Elevated tank, 50,000 gallons.

Number of customers: 150.

Treatment: None.

Analysis of water:

Date of collection: July 28, 1944 Analyzed by J. H. Rowley

| | Parts per million | Equivalents per million |
|---|---|---|
| Silica ($SiO_2$) | 21 | |
| Iron (Fe) | 2.8 | |
| Calcium (Ca) | 67 | 3.34 |
| Magnesium (Mg) | 26 | 2.14 |
| Sodium (Na) | 53 | 2.30 |
| Potassium (K) | 12 | 0.31 |
| Bicarbonate ($HCO_3$) | 240 | 3.93 |
| Sulfate ($SO_4$) | 126 | 2.62 |
| Chloride (Cl) | 54 | 1.52 |
| Fluoride (F) | 0.1 | 0.01 |
| Nitrate ($NO_3$) | 0.8 | 0.01 |
| Dissolved solids | 483 | |
| Total hardness as $CaCO_3$ | 274 | |
| pH | 7.7 | |

Zapata County

## Zapata

Population in 1940: 700.

Owner: R. San Miguel, Jr.

Source of information: R. San Miguel, Jr., Owner August 9, 1945

Source of supply: Rio Grande, pumping plant located 2 blocks west and 2 blocks south of court house.

Pumpage (estimated): 40,000 to 50,000 gallons a day.

Storage: Elevated wood tank, 5,000 gallons; concrete ground reservoir, about 50,000 gallons.

Number of customers: 125.

Treatment: Coagulation, sedimentation, filtration, and chlorination.

Analyses of water:

Date of collection: August 9, 1945 Analyzed by C. B. Cibulka

| | Raw water | | Finished water | |
|---|---|---|---|---|
| | Parts per million | Equivalents per million | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | | | 15 | |
| Iron (Fe) | | | 0.63 | |
| Calcium (Ca) | 84 | 4.19 | 82 | 4.09 |
| Magnesium (Mg) | 21 | 1.73 | 19 | 1.56 |
| Sodium (Na) | | ) | 104 | 4.50 |
| Potassium (K) | 106 | 4.60 ) | 7.7 | 0.20 |
| Bicarbonate ($HCO_3$) | 132 | 2.17 | 102 | 1.67 |
| Sulfate ($SO_4$) | 208 | 4.33 | 231 | 4.81 |
| Chloride (Cl) | 142 | 4.00 | 136 | 3.84 |
| Fluoride (F) | | | 0.6 | 0.03 |
| Nitrate ($NO_3$) | 1.5 | 0.02 | 0.0 | 0.00 |
| Dissolved solids | 758 | | 675 | |
| Total hardness as $CaCO_3$ | 296 | | 282 | |
| pH | | | 7.7 | |

Zavala County

## Crystal City

Population in 1940: 6,529.

Ownership: Municipal.

Source of information: L. L. Willams, City Manager May 10, 1945

Source of supply: 2 wells.

Well 1. Plugged and abandoned.

Well 2. Drilled in 1927 by Floyd Trimm, depth 1,050 feet, diameter 12 inches; deep-well submersible pump and 50-horsepower electric motor; yield 800 gallons a minute; temperature 88° F.

Well 3. At pump station, drilled in 1941, depth 990 feet, diameter 12-1/2 to 8 inches, liner perforated between 755 and 990 feet; deep-well turbine pump and electric motor; static water level reported 80 feet below land surface when drilled; yield 800 gallons a minute with drawdown of 14 feet; temperature 88° F.

Pumpage: Maximum 1,000,000 gallons, minimum 500,000 gallons, average 750,000 gallons a day.

Storage: Elevated tank, 50,000 gallons; concrete ground reservoir, 50,000 gallons.

Number of customers: 1,208.

Treatment: Periodic chlorination.

Analyses of water:

Date of collection: January 9, 1945 Analyzed by State Health Dep't.

| | Well 2 | | Well 3 | |
|---|---|---|---|---|
| | Parts per million | Equivalents per million | Parts per million | Equivalents per million |
| Silica ($SiO_2$) | 19 | | 20 | |
| Iron (Fe) | 0.28 | | 0.45 | |
| Calcium (Ca) | 64 | 3.19 | 64 | 3.19 |
| Magnesium (Mg) | 19 | 1.56 | 19 | 1.56 |
| Sodium & Potassium (Na + K) | 61 | 2.66 | 60 | 2.61 |
| Bicarbonate ($HCO_3$) | 296 | 4.85 | 293 | 4.80 |
| Sulfate ($SO_4$) | 64 | 1.33 | 64 | 1.33 |
| Chloride (Cl) | 43 | 1.21 | 43 | 1.21 |
| Fluoride (F) | 0.2 | 0.01 | 0.2 | 0.01 |
| Nitrate ($NO_3$) | 0.4 | 0.01 | 0.4 | 0.01 |
| Dissolved solids | 420 | | 430 | |
| Total hardness as $CaCO_3$ | 238 | | 238 | |
| pH | 7.5 | | | |

Zavala County

Crystal City -- Continued

Drillers' log:

Well 3

| | Thickness (feet) | Depth (feet) | | Thickness (feet) | Depth (feet) |
|---|---|---|---|---|---|
| Surface soil | 4 | 4 | Brown shale | 50 | 500 |
| Yellow sand | 76 | 80 | Blue shale | 45 | 545 |
| Blue gumbo | 25 | 105 | Sand | 10 | 555 |
| Brown shale | 10 | 115 | Blue shale | 45 | 600 |
| Blue shale | 65 | 180 | Light shale | 20 | 620 |
| Brown shale | 65 | 245 | Brown shale | 110 | 730 |
| Sand, water | 10 | 255 | Light shale | 25 | 755 |
| Brown shale | 35 | 290 | Sand | 15 | 770 |
| Sand, water | 25 | 315 | Gumbo | 15 | 785 |
| Brown shale and coal | 15 | 330 | Sand | 110 | 895 |
| Sand | 10 | 340 | Gumbo | 10 | 905 |
| Shale | 90 | 430 | Sand | 85 | 990 |
| Sandy shale | 20 | 450 | | | |

La Pryor

Population in 1940: 500.

Owner: R. K. Miller.

Source of information: R. K. Miller, Owner May 9, 1945

Source of supply: Well, purchased from Central Power and Light Company, drilled in 1927, depth 520 feet, diameter 10 to 6-5/8 inches, perforated casing from 460 to 520 feet; deep-well turbine pump and 7-1/2-horsepower electric motor; static water level 129.3 feet below land surface on January 28, 1930 and reported 130 feet on May 9, 1945; yield 50 gallons a minute; temperature 78° F.

Pumpage (estimated): Average 30,000 gallons a day.

Storage: Elevated tank, 22,000 gallons.

Number of customers: 124.

Treatment: None.

Zavala County

La Pryor -- Continued

Analysis of water:

Date of collection: May 9, 1945 Analyzed by J. H. Rowley

| | Parts per million | Equivalents per million |
|---|---|---|
| Silica ($SiO_2$) | 18 | |
| Iron (Fe) | 0.03 | |
| Calcium (Ca) | 85 | 4.24 |
| Magnesium (Mg) | 14 | 1.15 |
| Sodium and Potassium (Na + K) | 3.0 | 0.13 |
| Bicarbonate ($HCO_3$) | 283 | 4.64 |
| Sulfate ($SO_4$) | 21 | 0.44 |
| Chloride (Cl) | 15 | 0.42 |
| Fluoride (F) | 0.4 | 0.02 |
| Nitrate ($NO_3$) | 0.2 | 0.00 |
| Dissolved solids | 303 | |
| Total hardness as $CaCO_3$ | 270 | |
| pH | 7.1 | |

PUBLIC WATER SUPPLIES IN SOUTHERN TEXAS

# I N D E X

## A



## B



## C



## D



## E



## F



## G



## H

J



K



L



M



N



O



P



R



S

T



U



V



W



Y



Z