Quality of Water of the Gila River Basin Above Coolidge Dam Arizona

By JOHN D. HEM

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By John D. Hem

ABSTRACT

Gila River and its tributaries above Coolidge Dam drain an area of 12,890 square miles in southwestern New Mexico and southeastern Arizona. The basin is a part of the Basin and Range physiographic province and contains two important irrigated valleys, the Duncan-Virden Valley in Arizona and New Mexico and the Safford Valley in Arizona. Between 1940 and 1944 many samples of surface and ground waters in the basin were collected and analyzed, and nearly 4,000 of these analyses are tabulated in this report.

These analyses show that the chemical character and concentration of the water in Gila River change greatly from the headwaters of the river in New Mexico to Calva, Ariz., at the head of the San Carlos Reservoir behind Coolidge Dam. Above the mouth of Blue Creek near Virden, N. Mex., the river water is of low mineral content and contains mostly calcium and bicarbonate. Irrigation return flow and other ground-water inflows in the Duncan-Virden Valley cause significant changes in the chemical character of the river water at low flow, and at the gaging station at the bridge on United States Highway 666 south of Clifton, Ariz., the mineral content is appreciably higher than that of the river water at the mouth of Blue Creek.

Ground water in most of the Duncan-Virden Valley is low in dissolved matter, but in the central part of the valley near Duncan there are ground waters with concentrations of as much as 5,000 parts per million of dissolved solids. The dilute waters contain mostly calcium and bicarbonate, and the waters of higher concentration contain increased amounts of sodium, sulfate, and chloride.

In the canyon section between the bridge on United States Highway 666 and the mouth of Bonita Creek the river is joined by three important tributaries. Of these, the first and largest is San Francisco River, which contributes water containing considerable amounts of sodium and chloride. As a result of the inflow from San Francisco River the water of Gila River at the mouth of Bonita Creek contains much more sodium and chloride than it does at the bridge on United States Highway 666. There are some inflows to the river in the canyon section from ground water, but they are small and influence only slightly the chemical character of the river water. The water contributed to the river by Eagle Creek and Bonita Creek is low in mineral content and contains mostly calcium and bicarbonate.

Shallow ground waters along San Francisco River at Clifton are highly mineralized, and the Clifton Hot Springs contribute a large amount of sodium and chloride to the water of San Francisco River in Clifton. Water from the springs contains about 9,000 parts per million of dissolved matter, consisting chiefly of sodium and chloride with considerable amounts of calcium. Their flow has been

estimated at a maximum of 2.9 second-feet in August 1941 and June 1943 and a minimum of 0.9 second-foot in August 1944. Ground waters sampled eleswhere in the basins of San Francisco River, Eagle Creek, and Bonita Creek were low in concentration and contained chiefly calcium, magnesium, and bicarbonate.

San Simon Creek flood waters are likely to contain 500 to 900 parts per million of dissolved matter, consisting chiefly of sodium, bicarbonate, chloride, and sulfate. Water obtained from deep artesian wells near the town of San Simon is low in mineral content, with dissolved solids in most instances between 200 and 300 parts per million. In the western part of the artesian area near San Simon the waters contain mainly sodium and bicarbonate. East and southeast of San Simon the waters contain more calcium. Near the lower end of the San Simon Basin ground waters from deep wells contain about 1,000 parts per million of dissolved solids, mainly sodium and chloride. In most of the San Simon Creek Basin the ground waters contain more than 1.0 part per million of fluoride, and near the town of San Simon some of the ground waters contain more than 20 parts per million of fluoride.

Below the mouth of Bonita Creek Gila River enters the Safford Valley, in which large amounts of water are diverted for irrigation, and much water enters the river in this reach as ground-water and surface-water return flow. Weighted average analyses for the year ended September 30, 1944, show that the river water at the gaging station near Solomonsville at the head of the valley contained an average of 454 parts per million of dissolved matter, consisting mostly of sodium, calcium, bicarbonate, and chloride, and at Bylas, near the lower end of the valley, the river water contained an average of 957 parts per million of dissolved matter, consisting mainly of sodium and chloride. The total loads of salts carried by the river at these two stations during the year were 84,100 tons near Solomonsville and 105,000 tons at Bylas. The increases in the concentration and total load of dissolved solids of the river in the valley are caused by inflows of highly mineralized ground water, some of which represent return flow from irrigated lands and some of which represent ground-water inflows that have no connection with irrigation in the valley. The main zones of ground-water inflow to the river are in the vicinity of Pima and near Fort Thomas.

Wells in the Safford Valley at depths of less than about 100 feet draw water from the Recent alluvium in the valley, and the deeper wells obtain water, usually under artesian pressure, in the underlying older valley fill.* Most of the samples obtained in the area were from shallow wells, and analyses of these samples indicate that the concentrations of water in the alluvium in the valley range from less than 200 parts per million along Black Rock Wash to more than 10,000 parts per million along the river southeast of Fort Thomas. In most places the concentration of the ground water is more than 1,000 parts per million of dissolved solids, consisting mostly of sodium and chloride. The more dilute waters contain chiefly calcium and bicarbonate. Waters from the older fill generally are more highly mineralized than those from the alluvium and contain a higher proportion of sodium and chloride.

Many of the surface and ground waters of the basin are too highly mineralized to be satisfactory supplies for industrial uses. In parts of the basin, particularly in the lower Safford Valley, the ground waters are too highly mineralized to be used for domestic supplies, and in many places in the basin the ground waters contain too much fluoride to be good drinking waters. The surface waters of the basin are rather highly mineralized at times but are generally satisfactory for irrigation, and only in a few areas, mostly in the lower part of the basin, have

*Older valley fill is of Tertiary and Pleistocene age.

the surface waters caused any accumulation of soluble salts in the soils on which they have been used. In recent years, however, there has been a large and increasing amount of pumping from shallow ground water to supplement the supplies of surface water available for irrigation in the Duncan-Virden and Safford Valleys. Much of the ground water pumped in the Safford Valley is so highly mineralized that it would ordinarily be considered unfit for irrigation, and the continued use of large amounts of highly mineralized ground water in the valley may result in damage to crop land.

INTRODUCTION

HISTORY, SCOPE, AND PURPOSE OF THE INVESTIGATION

The investigations of quality of water upon which this report is based were begun in the summer of 1940. They were made in connection with studies of water resources of the area conducted by the United States Geological Survey, under the direction of S. F. Turner. Cooperative funds were furnished by the Arizona State Land Commission, the Corps of Engineers, and the Office of Indian Affairs. A branch laboratory was established in Safford, Ariz., in July 1940, and samples of water collected during the work in the area were analyzed there until the investigation was curtailed in June 1942. A few samples collected in 1942 and 1943 were analyzed in the Geological Survey laboratory in Roswell, N. Mex.

Work was resumed in the basin by the Geological Survey in April 1943 with funds supplied by the Defense Plant Corporation to study the effects on water supply of bottom-land vegetation in the lower Safford Valley and the practicability of providing an additional supply of water for the basin by removal of at least a part of the dense bottom-land growth. This investigation was of a highly specialized nature, and only a part of the Gila River Basin above Coolidge Dam was studied. The Safford laboratory was reestablished in June 1943 and operated until the end of 1944, when the investigation was discontinued.

The analyses of samples collected between January 1, 1940, and December 31, 1944, are tabulated in this report, and brief discussions are given of the analyses and of some of the more important quality-of-water problems in the basin. These analyses may be helpful in the consideration of present or proposed future uses of water in the basin. More comprehensive discussions of special phases of quality of water in lower Safford Valley, relating particularly to effects of plant growth, are included in a report [1] covering work done in the area in 1943 and 1944 by the Geological Survey.

[1] Gatewood, J. S., Robinson, T. W., Colby, B. R., Hem, J. D., and Halpenny, L. C., Use of water by bottom-land vegetation in lower Safford Valley, Ariz.: U. S. Geol. Survey Water-Supply Paper 1103, 1950.

ACKNOWLEDGMENTS

The investigations in the upper Gila River Basin were made in cooperation with the ground water branch and the surface water branch of the Geological Survey. The writer is particularly indebted to S. F. Turner for his assistance in furnishing information regarding the ground water resources of the area and to C. S. Howard for reviewing the manuscript. A. T. Barr and other Phelps Dodge Corp. employees, Thomas Maddock, Sr., of Safford, and other residents of the basin gave assistance in various ways.

Most of the analyses in this report were made by J. D. Hem and R. T. Kiser, but some were made by D. C. Lillywhite and R. L. White.

LOCATION AND DESCRIPTION OF THE AREA

PHYSIOGRAPHY

The area considered in this report is sometimes referred to as the upper Gila River Basin. It includes an area of 12,890 square miles in southwestern New Mexico and southeastern Arizona drained by Gila River and its tributaries above Coolidge Dam. This area represents about one-fifth of the entire Gila River Basin.

The northeastern half of the area covered in this report is mostly rugged and mountainous, with occasional peaks having altitudes of nearly 11,000 feet. At the New Mexico-Arizona State line the river bed is at an altitude of about 3,800 feet. The remainder of the basin has topography typical of the Basin and Range physiographic province, of which it is a part. It has wide and comparatively flat valleys between narrow but rugged mountain ranges trending generally in a northwest-southeast direction. The river has cut narrow canyons through these mountain ranges in passing from one valley to another, and it is in such a canyon, in the Mescal Range, that Coolidge Dam has been built to store water for irrigation of land along the river below. The lowest point in the area covered by this report is at Coolidge Dam, where the altitude of the river bed is 2,310 feet.

After flowing through an extensive series of canyons and small valleys in the mountains of southwestern New Mexico, Gila River enters the first of the major valleys near the mouth of Blue Creek, in the southwestern corner of Grant County, N. Mex. The irrigated portion of this valley is known locally as the Duncan-Virden Valley, from its two principal settlements, and is a part of the structural trough that extends from the vicinity of Clifton, Ariz., southeastward to the vicinity of Lordsburg, N. Mex. The valley is bounded on the south by a few small hills and an indefinite alluvial divide. On the north and east is Steeple Rock Mountain and on the west the Peloncillo Mountains. The river flows through this valley for about 40 miles and enters a series of canyons cut in the northern end of the Peloncillo Mountains about 6 miles above the gaging station at the bridge on United States Highway 666 south of Clifton, Ariz. In the canyon section below the bridge the river is joined by three major tributaries, San Francisco River, Eagle Creek, and Bonita Creek, which drain mountain areas to the north. About 2 miles below the mouth of Bonita Creek, Gila River emerges into another large valley through which it flows for more than 80 miles to Coolidge Dam. In this valley Gila River is joined by two major tributaries, San Simon Creek and San Carlos River, and for convenience of discussion in this report this valley has been considered in three parts. The first part, the area drained by San Simon Creek, is bounded on the east by the Peloncillo Mountains and on the west by the Chiricahua, Dos Cabezas, and Pinaleno Mountains and is referred to as the San Simon Valley. The second part is the area drained by Gila River between the mouth of Bonita Creek and the Southern Pacific Railroad bridge at Calva and is bounded on the northeast by the Gila Range and on the southwest by the Pinaleno, Santa Teresa, and Turnbull Mountains. The irrigated portion of the area is locally referred to as the Safford Valley. The third area is drained by San Carlos and Gila Rivers and is bounded on the northeast by the Gila Range and by the Mescal, Hayes, and other ranges on the southwest, west, and north. This area is occupied in part by the San Carlos Reservoir.

The general geographic features of the area covered by this report are shown on plate 1, a map of the entire Gila River Basin above Coolidge Dam. For the Safford Valley, where the most intensive studies were made, a large map (pl. 2) was prepared on a scale of 2 miles to the inch.

POPULATION

The population of the basin in 1944 was estimated to be about 40,000. This indicates a population density of about three persons to the square mile, but there are large areas in the basin that are entirely without permanent human habitation. The population is largely concentrated in areas where land can be irrigated or where there are large mines and processing plants to extract metals from the ores. The largest incorporated town in the basin in 1944 was Safford, with a population of about 3,500. The mining town of Morenci, with a population of 5,000 or more, was not incorporated. The adjoining town of Clifton had a population of about 2,500, and Duncan, principal settlement in the valley bearing its name, had about 1,000 inhabitants in 1944. Other important but smaller settlements included Bowie, San Simon, and Rodeo in the San Simon Valley, and Solomonsville, Thatcher, Pima, and Fort Thomas in the

Safford Valley. Except for widely scattered ranches and small mining operations and the Indian settlements on the San Carlos Reservation, the remaining population of the basin is located mainly on farms in districts where water is available for irrigation.

TRANSPORTATION

The north or old main line of the Southern Pacific Railroad from El Paso to Tucson passes across the upper end of the San Simon Valley through the towns of San Simon and Bowie, and the south line, formerly the El Paso Southwestern, now a part of the Southern Pacific system, crosses the basin at Rodeo, N. Mex. From Lordsburg, N. Mex., a branch railroad extends northwestward into the basin to Duncan from where it extends down the lower part of the Duncan-Virden Valley and up the foothills to Clifton. Another branch line leaves the main line at Bowie and extends northwestward to Safford, from where it goes down the Safford Valley into the San Carlos Indian Reservation and crosses the San Carlos River Valley to Globe and Miami.

United States Highway 70, a heavily traveled paved route, crosses the basin from Lordsburg, passing through Duncan and Safford to Coolidge Dam. United States Highway 80 and Arizona State Highway 86, which are paved, cross the San Simon Valley. United States Highway 666, which is a graveled road for most of its length, crosses the basin from north to south, passing from Alpine, Ariz., at the northern edge of the basin, through Clifton and Safford and reaching Arizona State Highway 86 near Bowie, which it follows out of the basin. United States Highway 260, a graveled and paved route, connects Alpine, Ariz., with Silver City, N. Mex., passing through the mountainous part of the drainage basin in New Mexico. Arizona State Highway 75, which is paved, connects Clifton and Morenci with United States Highway 70 at Duncan. Other improved roads, some of which are designated as State highways, provide communication in other parts of the basin. However, in many of the mountainous or thinly settled regions the few existing roads are poor and at times almost impassable for automobiles.

HISTORY AND DEVELOPMENT

Probably the first white man to visit the basin was Fray Marcos de Niza, Spanish explorer and missionary, who is reported to have come to this part of Arizona in 1539. Coronado's expedition of 1540 entered the basin from the San Simon Valley, passing down it to Gila River, up Gila and San Francisco Rivers past the present site of Clifton, and into New Mexico. The area was visited by many traders, explorers, and missionaries in subsequent years. Part of it was ceded to the United States in 1848 after the Mexican War, and the southwest portion, south of Gila River, was included in the Gadsden Purchase of 1853. Shortly after the Civil War valuable mineral deposits were found near Silver City, N. Mex., and in 1870 prospectors found rich copper and placer gold deposits in the area farther to the west near where Clifton now stands. This region near Clifton has been the scene of extensive mining activity since that time, and the Clifton-Morenci district is now one of the most important copper-producing areas in the United States.

The first irrigation of land in the basin was begun about 1872 by Mexican immigrants and Mormon pioneers in the Safford Valley, and later irrigation was begun in the Duncan-Virden Valley. The acreage irrigated with river water increased until 1920 and since then has remained about constant. In 1944 about 32,500 acres in the Safford Valley and about 8,000 acres in the Duncan-Virden Valley were irrigated with water from Gila River. In addition, small scattered areas in other parts of the basin were irrigated by surface waters or by water obtained from deep flowing wells or pumped from nonflowing wells.

Cotton and alfalfa are the principal crops. Vegetables of various kinds are also grown, especially in the Duncan-Virden Valley, and corn and small grains and fruits are raised to some extent.

CLIMATE AND VEGETATION

The climate of the basin ranges from cool and subhumid in the higher mountain ranges to warm and arid in the valleys. In the mountains above an altitude of approximately 7,000 feet snow is common from November to April, and the total annual precipitation may exceed 20 inches. There pine and other commercially valuable timber grow thickly. In the valleys climate and vegetation are very different from those of the mountains. At Thatcher, which is at an altitude of 2,800 feet, the mean annual temperature is 62.5°, snowfall is rare, and the annual precipitation averages 9.5 inches. The frost-free period averages 203 days a year. At the lower altitudes the native vegetation is typical of southern Arizona desert regions; creosotebush, yucca, mesquite, pricklypear, cholla, barrel cactus, and ocotillo are prevalent. The sahuaro or giant cacus is common in the lower part of the basin and reaches its northeastern limit in a grove on a group of basalt hills about 5 miles north of Fort Thomas. Juniper and live oak and some grasses occur at altitudes of 5,000 to 7,000 feet, and after rainy periods annual grasses spring up in the valleys. Along Gila River and its tributaries where water is plentiful, cottonwood, willow, and sycamore trees are found. Some bottom-land areas are covered by growths of batamote. Saltcedar (*Tamarix* *gallica*) has been introduced into the basin within the past 40 years, and large areas in the bottom land that once were barren or covered by native growth are now occupied by saltcedar. This plant thrives in the area and has grown up in dense junglelike thickets.

RAINFALL AND RUNOFF

The precipitation in the basin falls during two rather poorly defined seasons. Generally most of the rain is received in the form of violent local thunderstorms from July to September, and slower rains which may last several days occur at times during the winter months from December to March. These slower rains generally bring increased amounts of moisture to higher altitudes, often in the form of snow. Little rain falls from April to June.

Because of high evaporation rates and use of water by vegetation, only a very small percentage of the precipitation in the drainage basin reaches Gila River as runoff. The summer storms, however, are often violent and cause sudden flash floods in dry washes in local areas and at times cause sudden and large changes in discharge of the river. It is only during unusually wet winter seasons that large amounts of runoff originate in the high mountains, but it is generally in such seasons that the largest flood flows in Gila River and the largest inflow into the San Carlos Reservoir occur. The volume of the summer floods is generally not large, because the high flows are of short duration. Total runoff from the basin varies widely from year to year. Maximum annual discharge of Gila River recorded at or near the present site of Coolidge Dam from 1901 to 1944 was 1,760,000 acre-feet in 1915. Minimum annual discharge up to 1929, the year when storage in San Carlos Reservoir began, was 65,900 acre-feet; this occurred in 1922. A peak flow of about 130,000 second-feet was recorded near the dam site on January 20, 1916.

LAND USE

Attempts to dry-farm parts of the basin and adjoining areas have been made but have been unsuccessful because of the low rainfall in most of the basin. Where sufficient water is available and the soil fertile, most crops grow very well. In areas where water is not available for irrigation the land is used for grazing, but as a result of recurring drought and over grazing there is not sufficient forage on most of the land to support large numbers of animals. In some parts of the basin the scarcity of water for livestock curtails use of range land.

GEOLOGIC STRUCTURE

The geology of the northern and eastern parts of the Gila River Basin above Coolidge Dam has been studied in detail only in the rather small areas comprising the important mining districts. The geologic maps of the States of Arizona and New Mexico which have been published by the Geological Survey indicate that the rocks exposed in most of the upper part of the basin are of volcanic origin. The rocks include lavas of various types and pyroclastic deposits, such as breccias, tuff, and volcanic ash.

The geology of the Safford and Duncan-Virden Valleys and of the San Simon Valley is discussed in previous reports.[2] The following brief summary of the geologic conditions in these parts of the basin is based on these more detailed reports.

The Safford, San Simon, and Duncan-Virden Valleys are of structural origin and came into existence in the Tertiary period as a result of extensive faulting. The large undrained depressions that resulted from these disturbances were filled, in some places to a depth of more than 1,000 feet, with sediments derived from the surrounding highlands. The coarser materials were dropped near the outer edges of the basins, and the finely divided materials were carried to the central lower portions. Lakes or playas existed in the lowest parts of these depressions during a part of this period of development of the present topography. The central lake-bed deposits thus were built up, containing clay and silt and smaller amounts of gypsum, diatomite, bentonite, and in some places limestone, salt, and volcanic ash.

Outlets for the basins were formed later, and Gila River established itself in the area, eroding and removing the Tertiary and Pleistocene valley-fill sediments that had been deposited. Graded slopes toward the interior of the basins were cut in pediment fashion upon the valley fill. Two main terraces generally separated by scarps were formed in the Safford Valley. A trough varying in width from a quarter of a mile to nearly 3 miles was excavated by the river below the lower terrace in the major river valleys and was later filled to a depth of 100 feet or less with alluvium deposited by the river and its tributaries. The cultivated portions of the Safford and Duncan-Virden Valleys are underlain by this Recent alluvium. The present river flood channel has been cut in the Recent alluvium and is a quarter of a mile to half a mile wide in most of the Safford Valley but is narrower in the Duncan-Virden Valley. Gila River itself is not eroding the older fill in most parts of the basin at present, but San

[2] Turner, S. F., and others, Water resources of Safford and Duncan-Virden Valleys, Ariz. and N. Mex., 50 pp., U. S. Geol. Survey, 1941. [Mimeographed in small quantities, now exhausted. Copies on file in offices of Geological Survey at Phoenix, Safford, and Tucson, Ariz., and at Washington, D. C.] Knechtel, M. M., Geology and ground-water resources of the valley of Gila River and San Simon Creek, Graham County, Ariz.: U. S. Geol. Survey Water-Supply Paper 796-F, pp. 188-205, 1938. Schwennessen, A. T., Ground water in San Simon Valley, Ariz. and N. Mex.: U. S. Geol. Survey Water-Supply Paper 425-A, pp. 6-9, 1919.

Simon Creek and some of the other tributaries are actively attacking them.

Water-bearing beds of major importance in the valleys include tongues of sand and gravel in the Tertiary and Pleistocene valley-fill deposits and lenses of sand and gravel in the Recent alluvial fill along the river and its tributaries.

PREVIOUS INVESTIGATIONS

A number of published reports contain data on the chemical character of surface and ground waters of the basin. Schwennessen [3] investigated the San Simon Valley and the San Carlos Indian Reservation within the basin, and his reports contain analyses of ground waters and of a few surface waters in these areas. Knechtel [4] studied the Gila and San Simon Valleys in Graham County, and his report contains a considerable number of analyses of ground waters from the Safford Valley and from the San Simon Valley. A few other analyses of water samples from the area are contained in earlier Geological Survey publications. Moderately detailed analyses of samples collected in 1905–6 from San Francisco River at Alma, N. Mex., and from Gila River a short distance above the present site of Coolidge Dam have been published.[5] It is likely that development of the basin and increases in the amount of water used for irrigation have changed conditions in the area so much that the analyses for Gila River near San Carlos for 1905 and 1906 do not represent present conditions.

Analyses for most of the surface-water samples collected in the area since 1940 have been published.[6] They have been briefly summarized in the present report, and many additional surface-water analyses have been included which have not been published before. Some of the analyses of ground waters have been released in mimeographed form,[7] and are repeated in this report.

Results of studies made by the Geological Survey in the Safford and Duncan-Virden Valleys between 1939 and 1942 are outlined in

[3] Schwennessen, A. T., op. cit.; Geology and water resources of the Gila and San Carlos Valleys in the San Carlos Indian Reservation, Ariz.: U. S. Geol. Survey Water-Supply Paper 450-A, 1921.

[4] Knechtel, M. M., op. cit.

[5] Stabler, Herman, Some stream waters of the western United States: U. S. Geol. Survey Water-Supply Paper 274, pp. 40–42, 118–120, 1911.

[6] Quality of surface waters of the United States: U. S. Geol. Survey water-supply papers beginning with 1941. (Nos. 942, pp. 62–64; 950, pp. 46–47; 970, pp. 148–167; 1022, pp. 227–241, 249–275, 278–305; 1030, pp. 320–322, 325–326, 329.)

[7] Morrison, R. B., McDonald, H. R., and Stuart, W. T., Safford Valley, Graham County, Ariz., Records of wells and springs, well logs, water analyses, and maps showing locations of wells and springs, 102 pp., U. S. Geol. Survey and Arizona State Water Comm., 1942. [Mimeographed.] Morrison, R. B., and Babcock, H. M., Duncan-Virden Valley, Greenlee County, Ariz., and Hidalgo County, N. Mex., Records of wells and springs, well logs, water analyses and map showing locations of wells and springs, 29 pp., U. S. Geol. Survey and Arizona State Water Comm., 1942. [Mimeographed.]

a mimeographed report,[8] which contains some analyses of surface-water and ground-water samples and a brief discussion of the quality of water of the area.

The more detailed investigations in lower Safford Valley that were conducted in 1943 and 1944 are described in another report,[9] which contains discussions of the relation of bottom-land growth to quality of water in the area and has only the few analyses that were particularly useful in the problems considered in that investigation.

During 1946 further investigations were made by the Geological Survey in four parts of the Gila River Basin above Coolidge Dam in Arizona in connection with a State-wide investigation of ground-water basins. The results of these studies are summarized in mimeographed reports,[10] each of which contains a few analyses of typical ground waters and a brief discussion of the quality of water in the area covered.

The present report contains more than 3,000 analyses made from 1940 to 1944 which have never been published. No results of the 1946 studies are included, but only a comparatively small number of samples were collected that year in the Gila River Basin above Coolidge Dam.

METHODS OF QUALITY-OF-WATER INVESTIGATION

NUMBER AND FREQUENCY OF SAMPLES

SURFACE WATER

For a detailed study of the quality of the water resources of a large area such as the upper Gila Basin it is necessary that a large number of samples from many sources be collected and analyzed. This is especially true when reliable information concerning the quality of surface waters is desired, because the amounts and kinds of mineral matter carried in solution by a stream at any point may vary from time to time. The magnitude of the variations depends upon the magnitude and rate of changes in stream flow, nature of the rocks exposed in the drainage basin, and, to some extent, upon the ground water inflow and waste disposal into the stream. A single sample from a stream is not likely to show accurately the chemical character of water that might pass the sampling point over a long period of time. The variation in quality of water carried by Gila River is

[8] Turner, S. F., and others, op. cit.

[9] Gatewood, J. S., Robinson, T. W., Colby, B. R., Hem, J. D., and Halpenny, L. C., op. cit.

[10] Halpenny, L. C., Babcock, H. M., Morrison, R. B., and Hem, J. D., Ground-water resources of the Duncan Basin, Ariz., U. S. Geol. Survey, 1946. [Mimeographed.] Turner, S. F., and others, Ground-water resources and problems of the Safford Basin, Ariz., U. S. Geol. Survey, 1946. [Mimeographed.] Cushman, R. L., and Jones, R. S., Geology and ground-water resources of the San Simon Basin, Cochise and Graham Counties, Ariz., U. S. Geol. Survey, 1947. [Mimeographed.] Halpenny, L. C., and Cushman, R. L., Ground-water resources and problems of the Cactus Flat-Artesia area, San Simon Basin, Ariz., U. S. Geol. Survey, 1947. [Mimeographed.]

particularly large, with maximum concentrations due to large amounts of inflow of rather highly mineralized ground waters and with minimum concentrations due to flood inflows of surface-water runoff

The extent of the variations in concentration of Gila River waters at Safford is shown in figure 1. In this illustration the chloride concentrations of daily samples collected during September 1944 are plotted with daily mean discharges of the river at Safford. The wide range in chloride content during the month shows clearly the need for frequent sampling. In general, the lowest concentrations at Safford occur at times of flood flows, and highest concentrations occur at times of low flow.

Investigations made by the Geological Survey to determine the chemical character of surface waters provide for the collection of daily samples at several points along the streams being studied. These samples are analyzed to supply a maximum amount of information with a reasonable expenditure of time and money. One constituent or characteristic generally is determined for each of the daily samples, and the remaining water is then combined into a series of composite samples for each sampling station. The usual procedure is to have a composite sample for the first 10 days of a month, a second composite for the second 10 days, and a third composite for the remaining 8 to 11 days of the month. A complete analysis is made for each composite sample. By continuing the collection of samples at a point for a period of years, it is possible to obtain a reasonably complete set of figures for the quality of water of the stream, under the conditions at that point. The analyses of river water are significant only when they can be correlated with stream flow at the sampling point. For this reason it is desirable to collect river samples at or near a gaging station where stream-flow records are collected.

A program of daily sampling of Gila River at Safford was begun in August 1940. This sampling station was maintained continuously until November 20, 1944. Discharge records for the river at Safford were obtained by the ground water branch until July 1942 and subsequently by the surface water branch. In June 1943 daily sampling of Gila River was begun at the gaging stations near Solomonsville and Bylas and on San Francisco River at Clifton. The sampling at Bylas and Solomonsville was continued to December 1944 and that at Clifton to October 1944. A summary of the records obtained as a result of these programs is included in this report and provides a basis for an evaluation of the quality of surface waters of the basin in the areas where they are most extensively utilized. Additional information was obtained for Gila River, including diversions and tributaries, in part of the basin by systematic sampling at less frequent intervals at temporary gaging stations in Safford Valley and at various

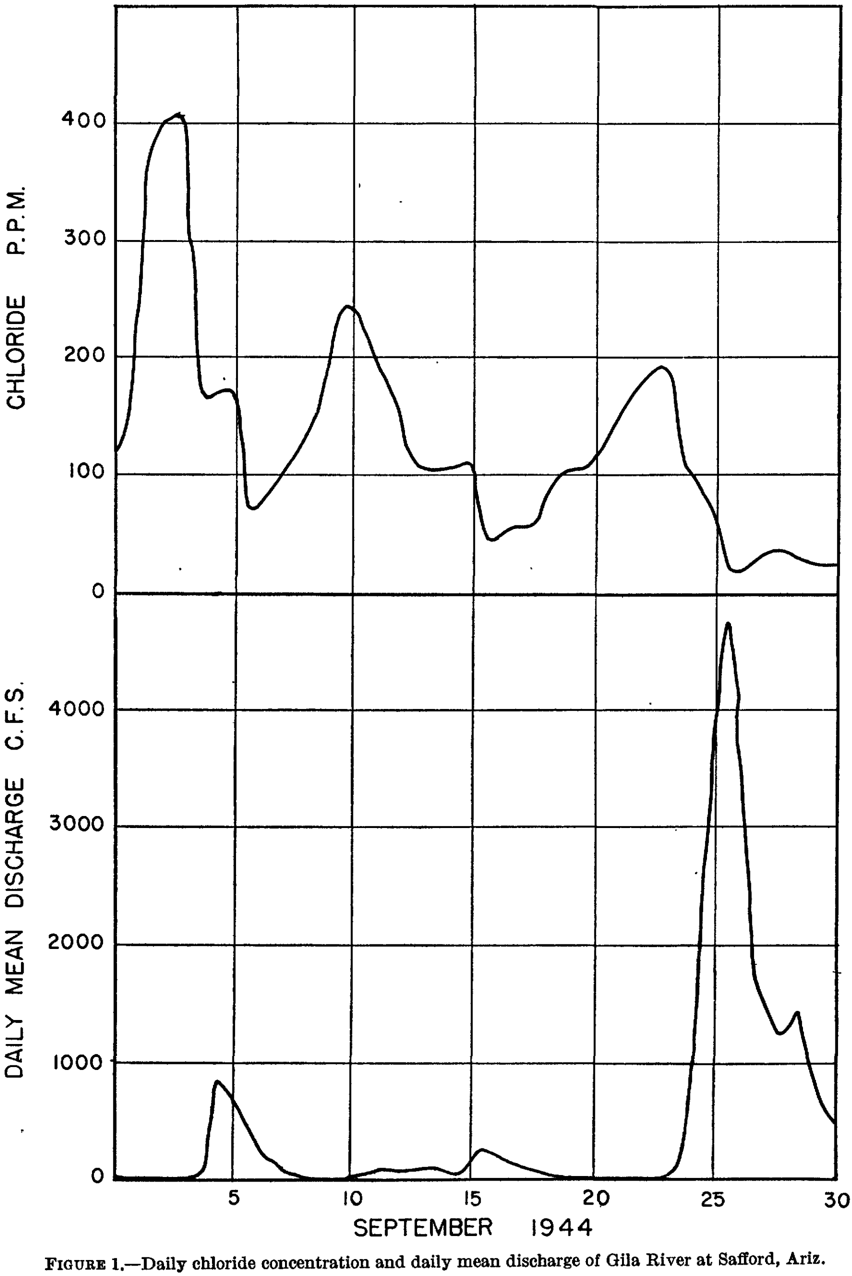

FIGURE 1.—Daily chloride concentration and daily mean discharge of Gila River at Safford, Ariz.

points in the basin where stream flow was measured in 1940, 1941, 1943, and 1944. The analyses tabulated in this report provide detailed information on the quality of most of the surface waters of the basin.

GROUND WATER

In a careful study of quality of ground waters in an area it is necessary to collect and analyze a large number of samples from many different sources. It is essential that these samples be taken so that they represent the ground water in the formation that supplies the well or spring. When a well is sampled it is desirable to obtain the sample directly from the well discharge, after sufficient water has been removed to insure that it is coming directly from the aquifers that supply the well. In numerous instances where it is necessary to sample an unused well that is not equipped with a pump and the sample is obtained by bailing, this sample may be contaminated by inflow of surface drainage or may have been altered in composition by standing for a long time in contact with the well casing.

Although a ground-water source usually yields water of practically constant composition for long periods, it is sometimes desirable to collect additional samples from some ground-water sources from time to time to detect and follow changes in concentration and chemical character. A number of ground-water sources in the basin were sampled several times between 1940 and 1944, and in 1943 and 1944 about 75 observation wells in the lower Safford Valley were sampled at bimonthly intervals. Analyses of these samples indicate the extent to which changes may occur in the chemical character and concentration of ground water from single sources. In some of the observation wells the changes were rather large. The extent of fluctuations in concentration for three observation wells in Safford Valley is shown in figure 2. The illustration also shows the changes in elevation of the water table that occurred during the period of sampling. There is little correlation between changes in concentration and changes in water level for these wells. In contrast to the analyses shown in figure 2, the changes in concentration observed in samples from deeper wells and those half a mile or more from the river were usually small.

METHODS OF ANALYSIS

After their receipt in the laboratory, surface-water samples were allowed to stand until all suspended matter had settled. The specific conductance of each daily sample was then determined. The specific conductance of a water is directly related to the total concentration of dissolved mineral matter in the water. The determination is made by drawing up a portion of the water sample into a standard cell equipped with two fixed platinum plates between which an alternating current is passed. The resistance of the water to the passage of the current is measured by means of a Wheatstone bridge and corrected for temperature. The reciprocal of this corrected resistance is the specific conductance in reciprocal ohms. The figure is multiplied by

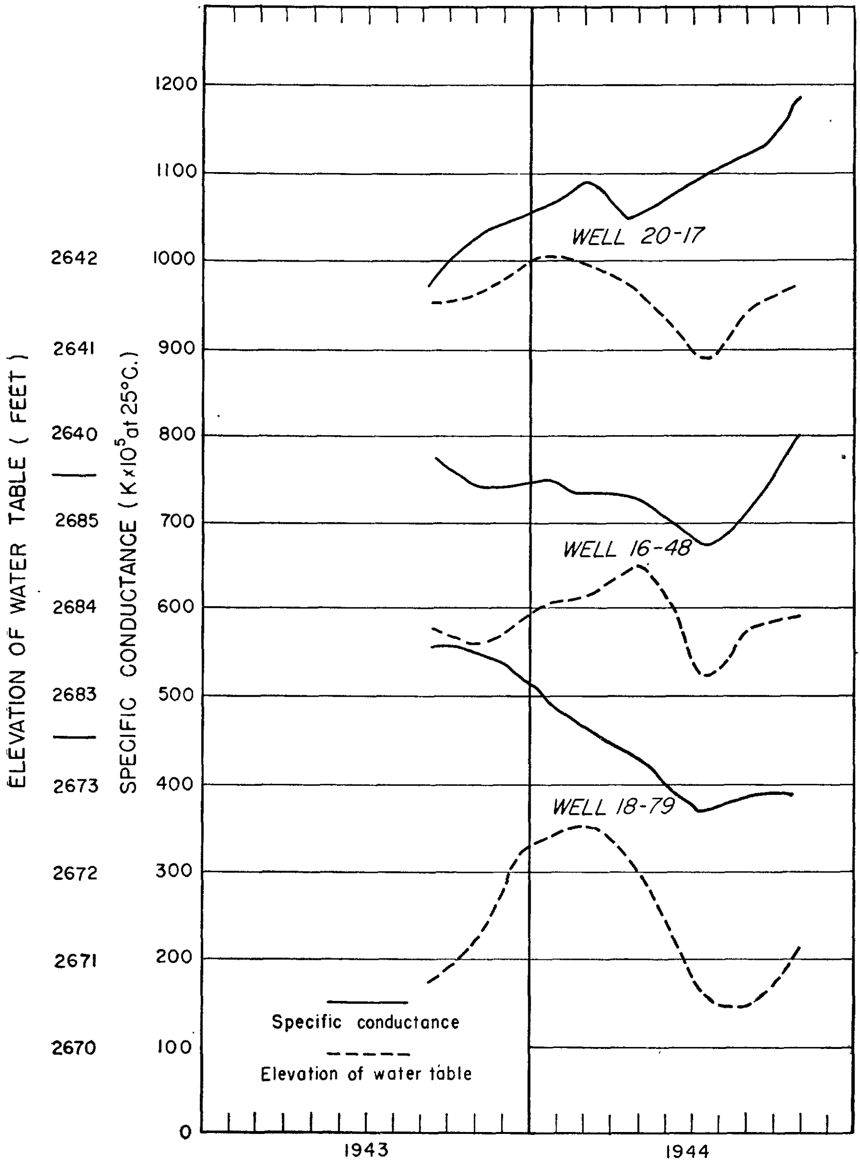

FIGURE 2.—Specific conductance and elevation of water table for three typical observation wells, Safford Valley, Ariz.

the factor 10^5 to eliminate inconvenient decimals and is reported as specific conductance ($K \cdot 10^5$ at 25° C.). Although it provides a useful indication of the total amount of dissolved matter present in a water sample, this determination gives no specific information as to exact amounts of any given constituent that is present. For this reason the results are of value chiefly in showing changes in concentration of the dissolved solids of the water from a certain source and in determining the procedure that should be followed in making up composite samples.

When changes in concentration of dissolved matter in the stream occur, it is desirable to make the composites in such a way as to show the extent and nature of the change that occurred, and a composite period is selected so as to include in the composite sample only those daily samples for which the maximum daily concentration as measured by the conductance is less than twice the minimum daily concentration. At some of the daily sampling stations in the area the variations in concentration from day to day are very large during periods of varying flow, as shown by figure 1.

For most of the composites of daily river samples complete analyses were made, including the following determinations: residue on evaporation, loss on ignition, silica, iron, calcium, magnesium sodium, potassium, alkalinity as carbonate and bicarbonate, sulfate, chloride, fluoride, nitrate, and borate. Dissolved solids was calculated from the sum of the determined constituents. Total hardness, noncarbonate hardness, and percent sodium were computed. Similar analyses were made for a few samples of ground waters that were representative of the type of water occurring in large parts of the basin. These complete analyses showed the proportions of the various constituents present in surface waters of the basin under different conditions of flow and in a general way the chemical character of much of the ground water of the basin. To supplement these data many samples of surface waters and ground waters were analyzed less completely, all significant constituents being determined except sodium and potassium, which was calculated as sodium. Many samples were collected from miscellaneous surface sources and from observation wells for the purpose of following changes in concentration, and for such samples the only determinations made were of those constituents and characteristics which showed the greatest change, such as conductivity, alkalinity, chloride, sulfate, and hardness.

Analytical procedures followed in all instances were those commonly used by the Geological Survey.[11]

EXPRESSION OF RESULTS

In general the water analyses in this report are expressed in terms of parts by weight of dissolved matter per million parts of water. Probably most users of quality-of-water data are more familiar with this form of expression than with any other. However, the expression of a chemical analysis in such a manner has a basic disadvantage for

[11] Collins, W. D., Notes on practical water analysis: U. S. Geol. Survey Water-Supply Paper 596-H, 1928.

certain uses in that equal concentrations of the various constituents are not chemically equivalent. Sometimes it may be desirable to express all constituents of a water in such a manner as to avoid this difficulty. When a water analysis is reported in terms of equivalents per million, a unit of any constituent is chemically equivalent to a unit of any other constituent. Parts per million may be converted to equivalents per million by dividing the concentration value in parts per million by the equivalent weight of the constituent. Instead of dividing by the equivalent weight it is generally more convenient to multiply by its reciprocal as given in the following list of factors for converting analyses in parts per million to equivalents per million:

Calcium	0.0499002	Sulfate	0.0208190
Magnesium	.0822368	Chloride	.0282032
Sodium	.0434839	Fluoride	.0526316
Potassium	.0255781	Nitrate	.0161270
Bicarbonate	.0163886		

Analyses shown graphically in this report are expressed in equivalents per million.

In the tables of analyses in this report specific conductance is reported in reciprocal ohms multiplied by 10^5. Percent sodium is computed by dividing 100 times the equivalents per million of sodium in the water by the sum of the equivalents per million of calcium, magnesium, sodium, and potassium present. Concentrations of dissolved solids are expressed both in parts per million and tons per acre-foot. All other constituents are reported in parts per million.

Annual weighted average analyses have been computed for river stations where samples were taken daily and for which discharge and sampling records are available for a year or more. These averages were computed by multiplying the determined quantity of each constituent of each composite sample by the discharge of the stream for the period of the composite and dividing the sum of these products by the sum of the discharge values for the year. The weighted average analysis represents approximately the composition of all the water that passed the gaging station during the year, had the water been collected in a large reservoir and thoroughly mixed. Because equal volumes of each sample were used in making up the composites, these composites do not represent exactly the average composition of the water passing the station in the period. However, most of this error is eliminated by shortening the composite period in periods of widely fluctuating discharge.

Data are included in the tables for seepage studies giving the discharge at the sampling point and the measured amount of flow in the diversions and inflow from surface-water and ground-water sources for each reach of river studied. Discharge values reported in these tables have not been adjusted for diurnal or other changes in flow.

For samples of ground water a description of the source of the sample is given, including the location to the nearest sixteenth of a section in areas which have been surveyed and, in most instances, the depth of the well, the flow or yield on pumping, and the temperature of the water. Observation wells driven in the bottom land in lower Safford Valley in 1943 are identified in the tables by numbers assigned to them according to the following system: The bottom land between Thatcher and the San Carlos Indian Reservation was divided into 22 "zones," each 1 mile wide and extending across the bottom land. The boundaries of the zones corresponded to the surveyed section lines. Within each zone wells were driven to shallow depths (generally 20 to 30 feet) spaced about 500 feet apart. The zones were numbered from 1 to 22, starting at Thatcher, and in each zone the wells were numbered starting with 1. The numbers finally assigned include the zone number followed by the number of the well within the zone. For example, observation well 19–22 is well 22 in zone 19. A metal collar bearing the number was attached to the top of the casing of each observation well for purposes of identification.

As a means of differentiating wells with similar location descriptions in the tables, those put down by the United States Geological Survey have USGS preceding the numbers. These are numbers assigned by the ground-water branch of the Geological Survey.

The yield on pumping indicated for observation wells is of significance mainly in indicating the condition of the well-point screen and to some extent in indicating the water-yielding properties of the formation supplying the well. During the investigation the well points in certain areas in the bottom land gradually became clogged with finely divided silt and with calcium carbonate deposited by the ground water.

SOURCES OF DISSOLVED MATTER IN SURFACE AND GROUND WATERS

COMMON CONSTITUENTS OF THE DISSOLVED MATTER

Water which falls as rain or snow may be considered to contain negligible quantities of dissolved mineral matter. As soon as the water reaches the ground, however, it begins to dissolve minerals from rocks and soil, so that surface runoff from storms in the basin contains appreciable, though generally small, amounts of dissolved matter. Water that percolates through the upper layers of soil or rock to reach the ground-water reservoir has a better opportunity to dissolve minerals from the rock material with which it comes in contact because its movement is slower than that of water that runs off the ground surface. For this reason ground waters of the Gila River Basin normally contain more dissolved matter than the surface waters in the same area.

Most natural waters contain calcium, magnesium, sodium, bicarbonate, sulfate, and chloride in appreciable amounts, but the amounts and kinds of dissolved salts carried by surface and ground waters are greatly influenced by the kinds of rock with which the waters have come in contact. Some of the rock constituents are readily soluble whereas others are dissolved very slowly. Interpretations of the results that have been obtained in this investigation may be aided by consideration of the types of rocks with which waters in different parts of the basin may have come in contact and the duration of the contact.

SOLUBLE MATTER IN HARD ROCKS

In the area above the Duncan-Virden Valley and in much of the mountainous northern part of the Gila River Basin the rocks are largely of volcanic origin. The surface runoff and the ground waters in these areas normally contain small amounts of dissolved mineral matter. This is illustrated by the low mineral content of streams like Eagle Creek or Gila River in New Mexico, both at high and low stages of flow. The dissolved matter in these waters consists of calcium, magnesium, and bicarbonate for the most part, with appreciable amounts of silica. In areas of this kind ground waters of high mineral content may occur under conditions such as those at the Clifton Hot Springs, which issue from a fault zone. The water from such springs probably rises from a great depth, and under the conditions of high temperature and pressure the waters dissolve mineral matter more readily.

Water found in areas of granitic rocks like those that occur in the mountains southwest of the Safford and San Simon Valleys is also likely to be of low mineral content.

Although probably most of the hard rocks exposed in the high mountainous areas of the basin are igneous, there are areas of limestone and other old sedimentary rocks that may be somewhat soluble or may contain easily soluble material included with the sediments, and both surface and ground waters from such areas may contain appreciable amounts of dissolved solids.

SOLUBLE MATTER IN VALLEY-FILL DEPOSITS

Because of their manner of deposition, the Tertiary and Pleistocene valley-fill deposits in the Gila River Basin contain in places considerable amounts of soluble matter. Common salt and gypsum occur frequently in the lake beds in the Tertiary and Pleistocene valley fill, and in certain areas where such beds are near the surface storm runoff may carry considerable quantities of dissolved matter, as in the basins of San Simon Creek and Matthews Wash. As a result of the leaching and erosion of these deposits by tributaries and side washes, appreciable quantities of soluble matter are brought into Gila River each year to form part of the load of dissolved solids carried out of the basin.

Appreciable quantities of dissolved matter also reach the river in the discharge from the artesian wells and springs in the basin. The water from these sources may be used for irrigation or may seep into the Recent alluvium in the valleys without being used. In either instance it eventually joins shallow ground water, adding to its mineral content, and finally reaches the river as inflow. Thus it is likely that a large part of the mineral content of the water in Gila River passing the Calva gaging station originated from the lake-bed deposits in the basin, particularly those below the mouth of Bonita Creek. In general, the lake-bed deposits in the Duncan-Virden area contain somewhat less soluble matter than those in the Safford area. This is indicated by the lower content of dissolved matter in the ground and surface waters sampled in the Duncan-Virden Valley. The nature of the soluble matter also seems to be different, with sulfates predominating in the Duncan-Virden area and chlorides predominating in the Safford Valley.

UNUSUAL CONSTITUENTS OF THE DISSOLVED MATTER

FLUORIDE

The waters of the Gila River Basin are unusual in several respects. One outstanding characteristic is the high fluoride content frequently found in both surface and ground waters.

GILA RIVER

It was only infrequently that any samples from Gila River contained less than 1 part per million of fluoride. Only a few determinations of fluoride were made for samples collected from Gila River above the mouth of San Francisco River, but all showed concentrations of fluoride of more than 1 part per million. Weighted average analyses for the 1944 water year show that San Francisco River had a concentration of 0.7 part per million of fluoride, and Gila River near Solomonsville had 1.3 parts per million. At Safford and Bylas the average fluoride concentration was about the same as at Solomonsville. It would appear that the main source of the fluoride in the river is above Safford Valley and is not in the San Francisco drainage area. The waters of Eagle and Bonita Creeks contain only small amounts of fluoride. Although the water from the Gillard Hot Springs is high in fluoride, the flow of the springs is small, and the total quantity contributed from this source is not very significant. Only a few determinations of fluoride have been made for samples collected from the river in the Duncan-Virden Valley or above, but it seems likely from the available information that the high concentrations of fluoride originate above the Duncan-Virden Valley. The many hot springs in that area probably contribute some fluoride, but as no analyses are available the amount cannot be estimated.

Surface runoff in the area above Duncan seems to contain appreciable amounts of fluoride. Even at the highest stage reached by the river at Safford during the period of sampling, a peak flow of 33,000 second-feet on September 30, 1941, the fluoride content of the water was 1.2 parts per million, although the total dissolved solids was only 233 parts per million. The water of this flood originated in storm runoff in the Gila drainage area above Duncan. Flood waters from other parts of the basin seldom contain as much as 1 part per million of fluoride. It seems likely therefore that dissolved fluoride minerals are carried into the river by surface runoff and add to the concentrations of the water passing Duncan at high flows, and that ground water inflows maintain the high fluoride content of the river water at times of low flow.

GROUND WATERS

Analyses in this report show very high concentrations of fluoride in ground water in certain sections of the Gila River Basin and rather high concentrations in most of the ground waters of the basin. Highest concentrations of fluoride seem to occur in areas where water-bearing valley fill was derived from rocks of a granitic type, such as those in the Pinaleno and Dos Cabezas Mountains. These granitic rocks may contain fluoride-bearing minerals that give up soluble fluorides on decomposition. Because precipitation on these high mountains contributes much of the recharge for the artesian reservoir of the Safford and San Simon Valleys, the deeper ground waters in these areas and other waters that have received some leakage from artesian aquifers may contain rather large amounts of fluoride.

Generally, the volcanic rocks in the lower part of the basin yield waters low in fluoride, but in the Duncan-Virden Valley, where volcanic rocks are prevalent, waters high in fluoride are common, especially the deeper ground waters. The mineral fluorite, crystalline calcium fluoride, is mined within the basin above Duncan. Lake beds in the Duncan-Virden Valley may have received some material eroded from these deposits.

BORATE

During 1943 and 1944 determinations of borate were made for many surface and ground water samples collected in the basin. In general, the results of these determinations indicate that surface waters in the basin are free from excessive concentrations of borate but that large amounts are found in ground waters of some areas, particularly in the lower Safford Valley. The higher concentrations of borate were found generally in water from the lake-bed formations in the older valley fill or in the shallow ground waters that had been contaminated with water from the underlying lake-bed formations. In most instances the extremely high concentrations of borate were found in waters of high mineralization.

Concentrations as high as 30 parts per million, of borate, expressed as BO_3, were found in ground waters in the area near the mouth of Markham Wash in the Safford Valley in waters containing more than 6,000 parts per million of dissolved solids. However, 10 to 20 parts per million of borate were found in some of the ground waters with concentrations of 2,000 to 5,000 parts per million of dissolved solids occurring near the north edge of the valley from Thatcher downstream to the mouth of Markham Wash. Some of the higher concentrations of both borate and fluoride were found in the part of the Safford Valley north of Pima, and it is possible that this may indicate some artesian leakage in the area, since artesian waters found near Pima have rather large amounts of fluoride and borate in solution.

CHEMICAL CHARACTER OF SURFACE AND GROUND WATERS OF THE BASIN, DISCUSSED BY AREAS

GRANT COUNTY, N. MEX.

SURFACE WATER

The only samples of surface water taken in this area were those from Gila River below Blue Creek, near Virden, N. Mex. Analyses of these samples are tabulated with analyses for lower stations on the river. They indicate that the Gila River water at the mouth of Blue Creek is of low mineral content and contains mostly calcium and bicarbonate.

GROUND WATER

Analyses 82 to 86 are the only ones available for ground waters in the part of the Gila River Basin in Grant County. The area is for the most part rugged and mountainous and is thinly populated. Few wells exist. All the analyses given are for springs. The ground waters analyzed contained small to moderate amounts of dissolved matter, consisting mainly of calcium and bicarbonate.

A considerable number of hot springs occur along the upper reaches of Gila River in New Mexico, some of which are rather large. One, Gila Hot Springs, has a reported discharge of 900 gallons a minute.[12] None of these springs are accessible by road, and as none were visited

[12] Stearns, N. D., Stearns, H. T., and Waring, G. A., Thermal springs in the United States: U. S. Geol. Survey Water-Supply Paper 679-B, p. 169, 1937.

by the writer during the investigation no analyses are available. With the possible exception of these hot springs, it is likely that ground waters in the Gila Basin in Grant County are no more concentrated than those for which analyses are given.

GILA RIVER BASIN FROM THE MOUTH OF BLUE CREEK TO THE BRIDGE ON UNITED STATES HIGHWAY 666

SURFACE WATER

SEEPAGE STUDIES

No river-sampling stations were operated regularly above the bridge on United States Highway 666 during the investigation, and the only existing data on the chemical character of water of Gila River in this section were obtained on samples collected at times when measurements of seepage losses and gains of the river were being made. At the times when such measurements were made the river was sampled at each measuring point and a partial analysis made of each sample. These are analyses 1 to 81.

The seepage studies were made to determine the quantities of water contributed to the river by ground-water inflow, the amounts lost to ground water from the river, and the portions of the river that were gaining or losing from such seepage. In order to determine these losses and gains the stream-flow measurements were so timed that the same water was measured repeatedly as it passed the measurement stations on its way downstream. Samples taken at the times of these measurements gave indications of inflow of water different in chemical character from that already in the river. Besides giving some indication as to the chemical character of the inflowing water, the analyses of these samples showed appreciable changes in the chemical character of the river water for some sections of river in which no gain or even a loss in flow was shown by the discharge measurements, indicating inflow in a part of the section compensated for by outflow in another part of the section.

The tabulated results of the seepage studies in the area show analyses of water samples and the corresponding discharges of the river for several sampling points. Seepage measurements were made at periods of comparatively low flow, and the samples collected at low flow do not represent the concentration of the river at times of high discharge. During periods when the discharge is high, discharge measurements are of little value for determining seepage gains and losses. It is likely that concentrations of dissolved matter in the river at high flow are much lower than at low flow. It seems likely also that the analyses for Gila River between Blue Creek and the bridge on United States Highway 666 given in this report represent fairly well the maximum concentrations that are likely to occur in an average year, but that minimum and average concentrations for any year cannot be predicted from them.

Figure 3 shows analyses of some samples collected during seepage studies in the area in July 1940 and May 1941. The results are expressed graphically,[13] with the total dissolved solids represented by

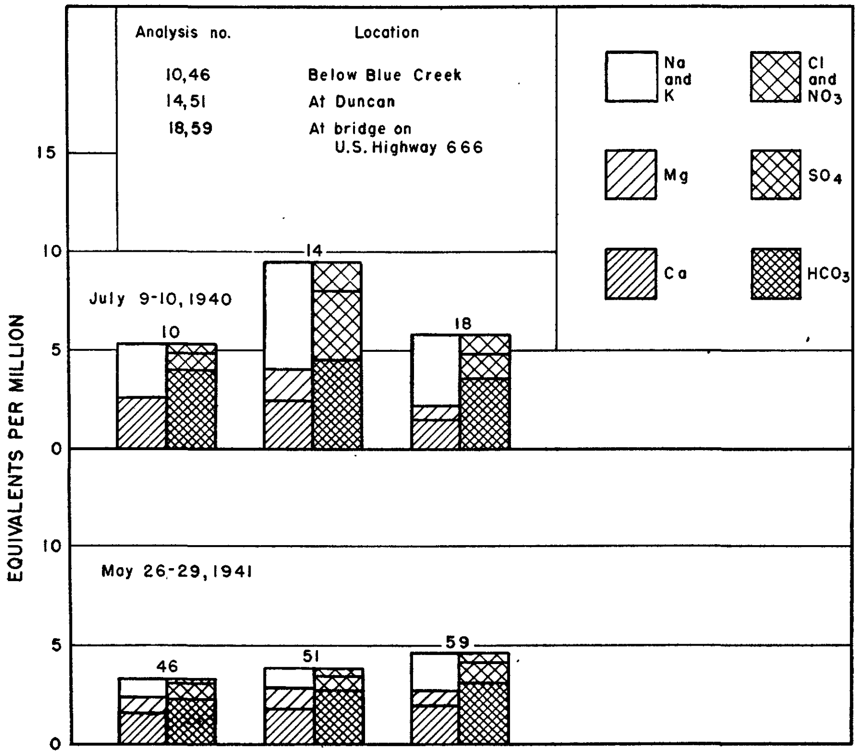

FIGURE 3.—Analyses of water from Gila River between the mouth of Blue Creek near Virden, N. Mex. and the highway bridge south of Clifton, Ariz.

the total height of the block. The segments of the block represent the proportionate concentrations of the various components of the dissolved matter, expressed in equivalents per million. These two sets of analyses show changes that occurred as the water of the river passed through the Duncan-Virden Valley at a time of low flow in the summer of 1940 and a time of somewhat higher than normal flow in the spring of 1941. The first samples of each set were taken at the gaging station on the river below the mouth of Blue Creek, which is about 5 miles above the head of the valley; the next samples were taken from the river at the Duncan highway bridge; and the last samples were taken at the gaging station at the bridge on United

[13] Collins, W. D., Graphic representation of analyses: Ind. and Eng. Chemistry, vol. 15, p. 394, 1923.

States Highway 666 south of Clifton, about 6 miles below the lower end of the valley.

The graphs in figure 3 and the tabulated analyses show that the water that passes the gaging station below Blue Creek at low flow is of low mineral content, containing chiefly bicarbonate, calcium, and magnesium. As the water passes through the Duncan-Virden Valley it changes in composition. Some of the water is diverted into irrigation canals and applied to the land. Part of the irrigation water generally passes downward to the water table, leaching salts from the soil, and as the water table slopes toward the river in most parts of the valley this water eventually returns to the river as ground-water inflow. Ground water from other sources reaches the river in some parts of the valley, but in other parts the river consistently loses water by seepage through the river-bottom materials.

During periods of low flow most or all of the water entering the valley may be diverted above Duncan, and river flow at Duncan at stages such as prevailed in July 1940 is mainly composed of ground-water inflows. The water at low flow is not highly mineralized but contains considerably higher concentrations of dissolved matter than water entering the valley at its head, most of the increase consisting of sodium and sulfate. Below Duncan there are some additional diversions for irrigation, and most of the time there is little ground-water inflow for a distance of 15 miles. Beginning about 10 miles below Duncan, at very low stages there may be no surface flow at all in the river for a distance of 5 miles. About 15 miles below Duncan the river enters a narrow rocky canyon, and near this point there is always some flow. The short canyon section ends at York, about 17 miles below Duncan, and the river continues to gain from ground-water inflow through the 13 miles from York to the gaging station at the bridge on United States Highway 666.

VARIATIONS IN FLOW BELOW DUNCAN

The variations in flow of Gila River below Duncan present an interesting phenomenon. The formations that underlie the river bed in this area probably are not extremely permeable, and it is doubtful if large flows of water could be transmitted through them as underground flow and returned to surface flow with the same chemical character as before going underground. The analyses show that the water that appeared in the river at York at times when the river above York was dry contained less dissolved matter than and was different in chemical character from water that passed Duncan. Although the water at York was less concentrated than the water that passed Duncan, it contained a larger proportion of sodium and bicarbonate. It was also somewhat more concentrated than the water entering the valley at its head above Duncan. It seems probable that at low stages the water in the river at York represents the ground-water underflow of the entire Duncan-Virden Valley, probably augmented by some underflow from Apache Creek. This water is forced to the surface by the constriction in the width of the valley and a probable decrease of the depth of valley fill at the canyon mouth. The water is similar in chemical character to that found in wells near the head of the canyon.

The water entering the river above York contains somewhat more sodium, chloride, and sulfate than river water entering the valley. The decreased calcium and magnesium content of the water at York may be due to a natural softening or base-exchange process that is going on in the saturated valley fill. A more detailed study in the vicinity of York should yield valuable information regarding the sources of the inflow received by the river.

When the river above York was dry the analyses for the river at York and at the gaging station on the bridge on United States Highway 666 south of Clifton showed no significant difference in chemical character or concentration of the water. This indicates that in the 13-mile stretch below the point where the river again began to flow all of the inflow had about the same chemical character.

In May 1941, when the river was at a high stage, slight increases in concentration occurred between the head of the valley and Duncan and between Duncan and the gaging station near Clifton. Insufficient data are available to determine whether increases occurred at other times.

The tributaries of Gila River in the Duncan-Virden Valley all are ephemeral streams. Some have small perennial flows in their upper reaches, but they contribute water and dissolved matter to the river through surface flow only during storm periods. The length of some of the tributaries and their large mountainous drainage areas suggest the possibility that there may be important quantities of underflow in the alluvium underlying the stream channels, but not enough data have been obtained to make reliable estimates of the quantity of underflow in any one of them. In the 1940–41 investigations in this area it was estimated that the total underflow of the tributaries of the river between Blue Creek and the bridge on United States Highway 666 was 12 second-feet.[14]

GROUND WATER

Analyses 87 to 158 are of samples of ground water collected in the Gila Basin from the mouth of Blue Creek to the bridge on United States Highway 666. These analyses indicate that ground waters of

[14] Turner, S. F. and others, op. cit., p. 137.

the area differ considerably in chemical character and concentration. Water of low mineral content from wells near and above Virden, N. Mex., contained less than 500 parts per million of dissolved matter, which consisted mostly of calcium and bicarbonate. Waters from wells in the lower part of the area, from Sheldon, Ariz., downstream, are similar in concentration to those found near Virden but are generally softer than are waters near Virden. Some of the waters near York contain mostly sodium and bicarbonate. The river water at low flow in this lower part of the valley is similar in chemical character to ground waters in the same area.

In the central part of the valley ground waters of high mineral content occur, and one sample collected from a well southeast of Duncan along the north side of the river and near the Arizona-New Mexico State line contained nearly 5,000 parts per million of dissolved solids (analysis 99). This was the highest concentration observed in any water sample from the area, but concentrations of more than 1,000 parts per million of dissolved solids are common in ground waters in an area of 7 or 8 square miles near the river east and southeast of Duncan. It is not possible to determine from the limited number of analyses available the exact boundaries of the areas where the more highly mineralized waters are found. However, such areas exist on both sides of the river, particularly on the south near the mouths of Rainville and Railroad Washes where lake-bed deposits are exposed. The waters from these areas contain considerable quantities of sodium, sulfate, and chloride. A spring issuing from a fault zone in lake-bed deposits flows into Rainville Wash and causes a small perennial flow at the bridge across the wash on United States Highway 70 about 1 mile east of Duncan. This water, which is probably typical of the more highly mineralized ground waters in the area, contained 1,790 parts per million of dissolved solids, which consisted largely of sodium and sulfate. The spring water seldom reaches Gila River as surface flow. The concentration of sodium, sulfate, and chloride in the spring water is believed to be typical of the more highly mineralized ground waters in the Duncan-Virden Valley.

For comparison there are shown graphically in figure 4 analyses of water from the spring in Rainville Wash and of water from an irrigation well about 2½ miles northeast of Duncan. The sample from the well may be considered representative of ground waters near Sheldon, and it is similar in concentration to those found in the valley above Virden.

The more highly mineralized waters in the area probably represent drainage from irrigated lands near the river and inflow from water-bearing strata in the lake-bed formations that underlie parts of the

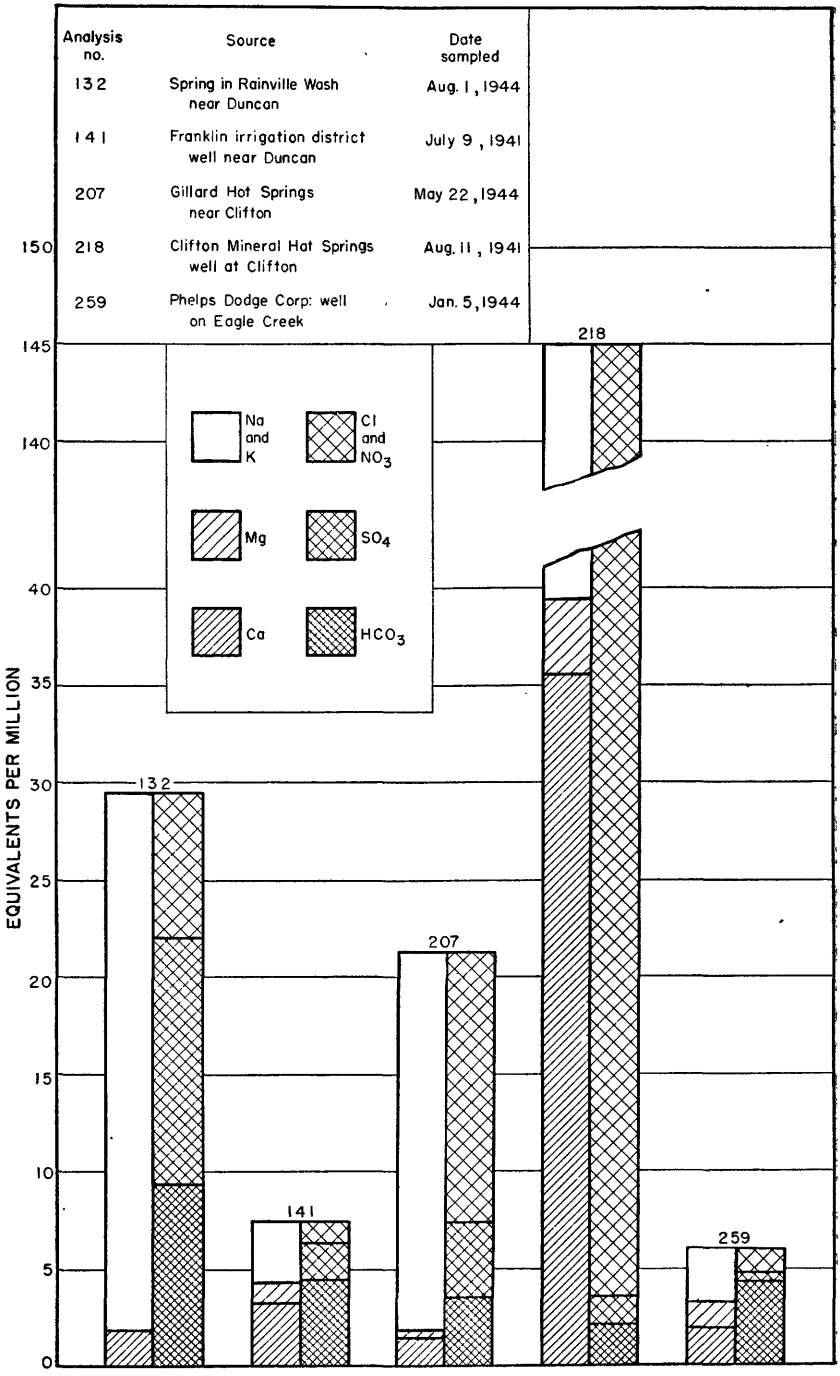

FIGURE 4.—Analyses of ground waters from the Gila River Basin above the mouth of Bonita Creek.

valley. These lake beds contain considerable amounts of soluble matter, and water obtained from them should be rather highly mineralized.

Another characteristic of ground waters as well as surface waters in the area is their relatively high fluoride content. Fluoride seems to be more abundant in water from the deeper wells that are drilled into lake-bed deposits, but it is present in significant amounts in shallower ground waters throughout the valley. It is only in the more dilute ground waters in the area that fluoride content is generally below 1 part per million.

Several of the ground-water sources sampled contained unusually large amounts of nitrate. A maximum concentration of 199 parts per million was found in a sample of highly mineralized water from a shallow well near Duncan. The source of such a high concentration of nitrate is not known, but rather high concentrations are common in the shallow ground waters of the entire basin and have been found in other parts of Arizona as well.

GILA RIVER BASIN FROM THE BRIDGE ON UNITED STATES HIGHWAY 666 TO MOUTH OF BONITA CREEK

SURFACE WATER

At the bridge on United States Highway 666 south of Clifton, Gila River is entrenched in a deep rock-walled canyon. The canyon is continuous for 16 miles downstream to the mouth of Bonita Creek near the head of Safford Valley. In this canyon section the river receives inflow from comparatively minor ground-water sources and from three major tributaries—San Francisco River, Eagle Creek, and Bonita Creek. A field investigation of part of this section of the Gila River Canyon was made during November 1940 for the purpose of sampling the river, its tributaries, and some of the spring inflows. Analyses 159 to 164 are for samples from Gila River in this area. The waters of Gila River change noticeably in chemical character between the bridge on United States Highway 666 and the mouth of Bonita Creek. This change takes the form of a large increase in the concentration of sodium and chloride, most of which is brought in by San Francisco River.

GROUND WATER

There are few wells in this area, but a number of springs occur along Gila River. The largest of these are the Gillard Hot Springs, located about 4 miles below the highway bridge and about 2 miles above the mouth of San Francisco River. They consist of a series of small seeps extending for about 150 feet along the north bank of the river. At high stages of the stream all the seeps are under water, and even at low stages much of the seepage zone is flooded so that it is difficult to estimate the volume of spring flow. From the analyses of water of the springs and of the river above and below them and the river discharge measured at the gaging station at the highway bridge about 4 miles upstream on the day the samples were taken, it is estimated that the flow from the seepage zone was about 400 gallons a minute. The dissolved solids in the spring water, amounting to 1,260 parts per million, consisted mainly of sodium and chloride but contained 10 parts per million of fluoride. (See analyses 204 to 207.) An analysis of water from the Gillard Hot Springs, No. 207, is shown graphically in figure 4. The water issues from a fault zone, and its high temperature indicates that it probably rises from a considerable depth. In April 1942 the temperature of the water discharged was measured, and several seeps were found to have temperatures of 181° F. This temperature, so far as is known, is considerably higher than that of any other hot spring in the basin. On cool days a cloud of vapor, which is visible for some distance up and down the canyon, hangs over the seepage zone. The springs may be reached by a primitive road about 5 miles long branching off from United States Highway 666 south of Clifton, but it is not always passable for automobiles. Limited facilities for hot baths have been constructed at the springs but have deteriorated from long disuse because of the inaccessible location of the springs. A well has been dug to a depth of 26 feet in the alluvium of the canyon bottom and yields hot water similar to the spring water, but no pump has been installed on the well.

In November 1940 several other springs were observed in the canyon of Gila River, and a few of them had temperatures somewhat above the normal ground-water temperatures for the area. Most of the springs in the Gila River Canyon were less concentrated than the Gillard Hot Springs and contained less than 1,000 parts per million of dissolved matter, which consisted mainly of sodium and chloride. Two small thermal springs were found in the bottoms of minor canyons draining into Gila River between the mouths of Eagle and Bonita Creeks. The waters were similar in concentration and character, containing less than 300 parts per million of dissolved matter, with bicarbonate as the principal anion, a somewhat larger amount of magnesium than calcium, and a very small amount of sodium. Analyses for some of the springs are given. (See Nos. 203 and 209–212.)

SAN FRANCISCO RIVER BASIN

SURFACE WATER

MAIN STREAM

San Francisco River enters Gila River from the north about 6 miles below the gaging station on Gila River near Clifton. The San

Francisco is the largest tributary of the Gila in the part of the basin covered by this report. At Clifton, 8½ miles above the mouth of the San Francisco, the drainage area is 2,790 square miles. This area is similar in topography to that drained by Gila River in New Mexico, which is characterized by rugged mountains and plateaus, and much of which is at an altitude high enough to support a growth of pine timber. Annual discharges of San Francisco River for the periods 1914–15, 1917, 1928–33, and 1936–45 measured at Clifton have ranged from a maximum of 678,700 acre-feet in 1915 to a minimum of 50,860 acre-feet in 1944.

Analyses 165–172 show the quality of water in San Francisco River above Clifton at low stages of the river and probably represent the maximum concentrations of dissolved matter that are likely to occur in the stream above Clifton. The water contains rather small amounts of dissolved matter, made up mostly of calcium and magnesium bicarbonate.

For a period of 17 months in 1943 and 1944 samples were collected daily from San Francisco River at the site of the old Phelps Dodge Corp. smelter, 1½ miles below the gaging station on the river in Clifton. There is little inflow between the gaging station and the sampling point, so that discharges measured at the gaging station should represent the discharges at the sampling point. Samples were not collected at the gage because inflow of highly mineralized waters occurs just above it, and often the water in the river at the gaging station is not of uniform concentration all the way across the stream. Analyses 173–191 show some of the results of the daily sampling of the river below Clifton. The weighted average analysis for the year ended September 30, 1944, is shown graphically in figure 5. The water usually contained a moderate amount of dissolved mineral matter, consisting mainly of sodium and chloride. The river water may be rather highly mineralized at times of low flow. The dissolved matter carried past the sampling station during the year ended September 30, 1944, amounted to 37,500 tons.

BLUE RIVER

Blue River, the largest tributary of San Francisco River, was sampled once at low flow, at which time the water contained 344 parts per million of dissolved matter, mainly calcium and magnesium bicarbonates. (See analysis 193.)

CHASE CREEK

Chase Creek, which joins San Francisco River at Clifton, is an intermittent stream. It discharges no water to the San Francisco as surface flow except during wet weather, but a perennial flow is maintained in parts of its course just above Clifton by springs in its bed,

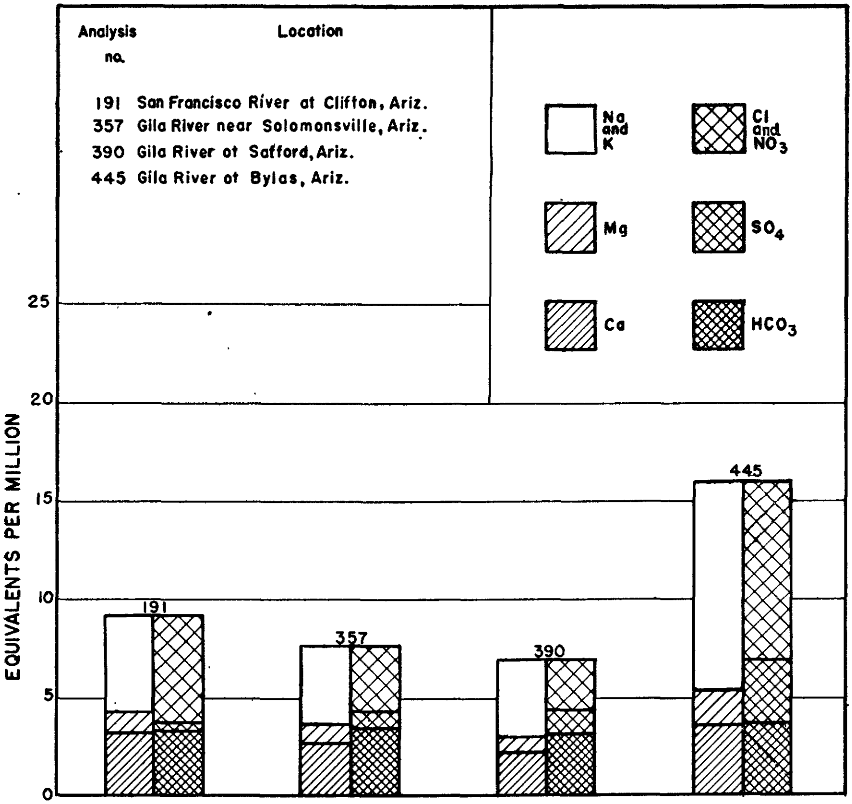

FIGURE 5.—Weighted average analyses of water at four gaging stations in the Gila River Basin for the year ended September 30, 1944.

drainage from abandoned mines, and waste from leaching pits operated in Chase Creek Canyon by the Phelps Dodge Corp. to remove copper from the mine drainage waters. Analyses 194 and 195 are of samples of water from Chase Creek. In the upper reaches of the stream springs occur where the underflow of the creek is forced to the surface by rock ledges in the canyon bottom. The water from these springs is moderately low in mineral content. A sample collected from one contained 596 parts per million of dissolved solids, which consisted chiefly of calcium and sulfate. Analyses of the mine drainage waters entering the creek indicate that these waters frequently contain appreciable quantities of copper salts, both in solution and in suspension, but that the concentrations of dissolved solids usually amount to less than 1,000 parts per million. By treatment in the leaching pits the copper is precipitated, and the waste water issuing from the pits contains iron salts and generally some free sulfuric acid. In flowing over the rocky stream bed some of the acid is neutralized and the iron oxidized and precipitated. Water flowing in the creek about 2½ miles upstream from Clifton was sampled in 1944. The water was brown in color, owing to its iron content, and contained the equivalent of 256 parts per million of free sulfuric acid, with a total of 1,730 parts per million of sulfate. (See analysis 194.) The flow was small, and it disappeared into the alluvium of the creek bed about a mile above Clifton.

The other streams in the San Francisco River Basin were not sampled during the investigation.

GROUND WATER

Analyses of 33 ground water samples collected in the San Francisco Basin are tabulated in this report. About the only important developments of ground water in the basin are those at Clifton.

PHELPS DODGE CORPORATION WELL

The Phelps Dodge Corp. has drilled a well on the right bank of the river just above the mouth of Chase Creek to obtain water for use in the Morenci ore-treatment plant. The well was sampled at weekly intervals for a period of about 7 months, beginning in July 1943. Water from this well varied widely in concentration, as shown by analyses 222–240. Its conductance ranged from 309 to 1,100 during the period, but it was always high in sodium and chloride and generally very high in hardness. Water of this type would not be considered satisfactory for many industrial uses, but large quantities were pumped and used in the Morenci plant in 1943 and 1944 in processes where water of good quality was not required.

The lower concentrations of the well water occurred at times when flow in San Francisco River was normal or above normal, and the higher concentrations were observed after the river had been at a rather low stage for several months. Sampling of the well water was not continued long enough to indicate how closely the quality of water obtained from the well was related to the volume of flow in San Francisco River.

CLIFTON HOT SPRINGS

The well of the Clifton Mineral Hot Springs Co. is located about a quarter of a mile below the mouth of Chase Creek, on the left bank of San Francisco River. This well furnishes highly mineralized water at a temperature of about 130° F. for mineral baths and the municipal swimming pool. The water is obtained from the river alluvium at a shallow depth. It was sampled several times from 1941 to 1944, and the analyses are tabulated on pages 82–83. The water was variable in concentration but always was highly mineralized. It contained large amounts of sodium, calcium, and chloride but only small quantities of other ions. An analysis of water from the well is shown graphically in figure 4.

Some seepage springs along the river, which were sampled several times, discharge water of the same chemical character as the well water. An analysis of water from the Clifton Hot Springs was published in 1905.[15] Analyses for samples collected from the springs and the well from 1940 to 1944 are numbered 213–221 in the tables of analyses. The high temperature and high mineralization of the water from the Clifton Hot Springs indicate that the water comes from a deep-seated source. It probably rises along a fault zone and enters the alluvium in the bottom of the San Francisco Canyon, from whence it seeps into the river or is removed by pumping.

RELATIONSHIP OF CLIFTON HOT SPRINGS TO QUALITY OF WATER IN SAN FRANCISCO RIVER

The change in the chemical character of the water of San Francisco River as it passes through Clifton has been noted by early investigators.[16] The change is believed to be caused by inflow from the Clifton Hot Springs. Between 1940 and 1944 a series of observations was made to determine the amount of the change in concentration of the river water. The visible inflow from the Clifton Hot Springs is usually small. When first visited in 1940 a number of small seeps were visible in the river bottom near the Southern Pacific depot in Clifton, but on two visits to the springs in 1944 there was no visible inflow in the section. A rather large volume of water is probably discharged into the river from spring openings under the water surface, however, but the only evidence of this inflow is the increase in concentration of the river waters in the area. The gaging station on the river just below the seepage zone provides a measure of the combined river and spring flow, and from gaging station records and analyses of samples taken at about the same time from the river above Clifton and below the spring zone and from the springs it is possible to compute the flow of the springs and the load of dissolved solids they contribute to the river. The results of the computations are tabulated below.

	Computed spring discharge (second-feet)	*Computed salt load of springs (tons per day)*
Oct. 30, 1940	2.7	65
Aug. 11, 1941	2.9	70
June 15, 1943	2.9	69
Jan. 10, 1944	2.1	65
Aug. 1, 1944	.9	24
Nov. 1, 1944	1.2	32

[15] Lindgren, Waldemar, U. S. Geol. Survey Geol. Atlas, Clifton folio (no. 129), p. 13, 1905.

[16] Lindgren, Waldemar, the copper deposits of the Clifton Morenci district, Ariz.: U. S. Geol. Survey Prof. Paper 43, p. 51, 1905.

On August 11, 1941, the river flow was measured twice with a current meter at both the upper and lower sampling points. The averages of these two measurements at each sampling point indicated an increase of river flow in the spring zone amounting to 2.5 second-feet, which checks closely with the computed spring flow of 2.9 second-feet.

The tonnage of dissolved matter contributed by the springs was an appreciable part of the daily mean load of 103 tons carried by the river past the sampling station below Clifton during the year ended September 30, 1944. The sodium chloride in the spring water had a significant effect on the chemical character of the waters of both San Francisco River and Gila River below the San Francisco.

APPARENT DECREASE IN SPRING FLOW IN 1944

From data collected in the Clifton area in 1944 it appears that the discharge of the Clifton Hot Springs into the river was less in that year than at previous times for which data were obtained. The discharge of highly mineralized water from the fault zone into the river alluvium probably is fairly constant, but some of the water may have been removed from the alluvium before it could seep out into the river. The analyses of samples from the Phelps Dodge well at Clifton indicate that it yields highly mineralized water similar in chemical character to water obtained from the spring zone a short distance down the river. It seems probable that at least some of the water obtained from this well comes from the same source as that supplying the springs. The continuous heavy pumping of the well in 1944 may have lowered the hydrostatic head of highly mineralized water in the spring zone enough to reduce the outflow into the river. With lower rates of pumping at the well it is likely that the spring flow would again reach the amounts computed in 1940, 1941, and 1943.

The apparent decrease in spring flow caused by pumping suggests the possibility of preventing at least a part of the water of the Clifton Hot Springs from entering the river. A much more detailed investigation of the Clifton vicinity would be needed to determine whether a program of disposing of the highly mineralized water by pumping or other means would be feasible or economically justifiable. If the water of the Clifton Hot Springs could be completely prevented from reaching the river, Gila River water available to the Safford Valley water users would be considerably improved in quality and only slightly reduced in quantity.

OTHER SPRINGS

Other hot springs are reported to exist above Clifton in the San Francisco River Basin,[17] but they were not visited by the writer.

[17] Stearns, N. D., Stearns, H. T., and Waring, G. A., op. cit., pp. 168-169.

Because of the low mineral content of Blue River and of San Francisco River above Clifton, even at low flow, it seems unlikely that any springs along the upper reaches of these streams contribute appreciable quantities of dissolved matter to the river.

EAGLE CREEK BASIN

SURFACE WATER

EAGLE CREEK

Eagle Creek, a perennial stream, joins Gila River about 2 miles below the mouth of San Francisco River. It drains a mountainous area west of and similar in topography to the San Francisco drainage basin.

Samples were collected from the creek daily for about 9 months beginning in July 1943. They were taken about 10 miles west of Morenci at the Phelps Dodge Corp. pumping plant, which furnishes water for the operations at Morenci. The water of Eagle Creek at low stages seldom contains much more than 300 parts per million of dissolved mineral matter, and during flood stages it is even less concentrated. Most of the dissolved matter consists of calcium, magnesium, and bicarbonate. No gaging station was maintained on Eagle Creek by the Geological Survey during the investigation; hence no weighted average analyses or loads of dissolved solids could be computed for the stream. A sample taken at the mouth of Eagle Creek at low flow indicates that there is no appreciable change in chemical character or concentration of its water between the Phelps Dodge pumping station and the mouth of the creek. Eagle Creek, therefore, contributes water of low mineral content to Gila River. No analyses are available for other streams in the basin of Eagle Creek.

GROUND WATER

A series of small hot springs is reported to exist in the canyon of Eagle Creek near the Phelps Dodge Corp. pumping plant,[18] but no analyses for them are available. Near the site of the diversion from Eagle Creek a well has been drilled in the alluvium of the canyon of Eagle Creek to obtain water for the public supply of Morenci. The well was sampled at weekly intervals for 7 months, beginning in July 1943 (analyses 246–263). Water from this well was fairly constant in composition and similar in chemical character to the surface flow in the creek, except that the well water contained slightly more sodium and fluoride. The well water contained about 350 parts per million of dissolved solids, consisting chiefly of sodium, calcium, and bicarbonate. A typical analysis of the water from the well, together with analyses of other ground waters of the Gila River Basin, is shown graphically in figure 4. Since the well water is reported to have a

[18] Stearns, N. D., Stearns, H. T., and Waring, G. A., op. cit., p. 116.

temperature as high as 90° F. at times, some of the water may come from the source that supplies the hot springs reported in the area.

No other samples of ground waters were obtained in the basin of Eagle Creek.

BONITA CREEK BASIN

SURFACE WATER

BONITA CREEK

Bonita Creek enters Gila River about 5 miles below the mouth of Eagle Creek and about 2 miles above the head of the Safford Valley. It is a perennial stream in its lower reaches and drains an area southeast of the Eagle Creek Basin, which has a similar topography. No gaging station existed on Bonita Creek during the investigation, and, because of the inaccessibility of the creek, only one sample was obtained directly from it. However, about 5 miles above the mouth there is an infiltration gallery, which collects water for a pipe line extending down the creek and the Gila River Valley to Safford, where the water is used as the public supply. A number of samples collected from the tap and analyzed in the Geological Survey Laboratory in Safford give an indication of the quality of the combined surface flow and underflow of the creek. These analyses show that the water in Bonita Creek is similar in character to that of Eagle Creek and that it generally contains about 300 parts per million of dissolved matter consisting chiefly of calcium and magnesium bicarbonates. A sample taken at flood stage contained 139 parts per million of dissolved solids.

GROUND WATER

No analyses are available for ground waters in the Bonita Creek Basin except those for the combined ground and surface water represented by the Safford public supply. Various springs are reported to exist in the area, but none were visited.

SAN SIMON BASIN

SURFACE WATER

SAN SIMON CREEK

The drainage area of San Simon Creek above the gaging station on the creek near Solomonsville, 2½ miles above its mouth, is 2,280 square miles. In area this valley comprises a major part of the basin of Gila River above Coolidge Dam. However, in most of the San Simon Basin there is little rainfall, and for this reason the annual runoff of San Simon Creek is normally very much smaller than that of San Francisco River, which drains an area only slightly larger but with heavier precipitation. There is usually flow in San Simon Creek only during storm periods. Annual discharges at the gage near Solomonsville from 1935 to 1943 ranged from 2,600 to 16,000 acre-feet. Irrigation waste water often enters the creek in small quantities below the gaging station.

No samples of flood flows were taken directly from San Simon Creek, but a few analyses for Gila River at Safford are available for times when the flow in the river at Safford was practically all coming from floods in San Simon Creek. (See analyses 264–269.) These analyses indicate that flood waters from San Simon Creek contain 500 to 900 parts per million of dissolved matter, which is a fairly high concentration for flood water compared with flood runoff in other areas of the Gila River Basin. The dissolved matter consists mainly of sodium, chloride, bicarbonate, and sulfate, but the chemical character of water from flood flows originating in different parts of the San Simon Basin may vary considerably. The high percentage of sodium in the water from San Simon Creek makes it less desirable for irrigation than flood waters from most other tributaries that have been sampled.

Another characteristic of surface flow from San Simon Creek is its high sediment content; at times when flood flows originated in San Simon Creek the water in Gila River at Safford often contained more than 10 percent of sediment by weight. The sediment is very finely divided, yellowish brown in color, and settles very slowly. It is generally believed by farmers in the Safford Valley that the water from San Simon Creek is inferior in quality for irrigation purposes and that the suspended matter it contains is damaging to their land and crops.

GROUND WATER

Ground water has been developed for irrigation in several parts of the San Simon Basin. These areas are near Rodeo, N. Mex., at the head of the creek; near San Simon, Ariz., in the upper part of the basin; and locally along the eastern and western sides of the lower end of the basin where it merges with the Safford Valley. The lowermost developments and those near the town of San Simon use water from flowing wells, which have been successfully drilled in these areas.

RODEO AREA

A few analyses of ground water in the area near Rodeo were published in 1919.[19] These analyses indicate that the ground water is low in dissolved mineral matter, which consists largely of sodium and bicarbonate.

SAN SIMON ARTESIAN BASIN

In the artesian area near the town of San Simon 55 samples were obtained in 1940 and 1941 from flowing wells and 3 samples from shallow nonartesian wells. Analyses of these samples, Nos. 270–333, show that none of the artesian waters sampled in the vicinity of the

[19] Schwennessen, A. T., Ground water in San Simon Valley, Ariz. and N. Mex.: U. S. Geol. Survey Water-Supply Paper 425-A, p. 21. 1919.

town of San Simon had high concentrations of dissolved matter. Two distinct types of water were obtained from the artesian wells in this area. East of San Simon Creek and in the southeastern part of the artesian basin the water obtained from the deep wells contained mostly calcium and bicarbonate. In the western part of the area of flowing wells the waters contained more sodium than calcium and magnesium. Bicarbonate was the usual predominating anion, but some waters contained moderate amounts of sulfate. An analysis of a water of each type is shown graphically in figure 6.

The two types of water obtained from artesian wells near San Simon may have resulted from different origins of the valley-fill deposits in the area. Most of the fill east of San Simon Creek presumably was derived from the Peloncillo Mountains east of the basin. These mountains have large areas of volcanic rocks containing calcium and magnesium. The fill in the western part of the area probably originated in the granitic rocks of the Dos Cabezas range to the west.

Almost all the ground water in the San Simon artesian area contains relatively large amounts of fluoride. Some of the sodium-bicarbonate type of artesian waters in the western part of the area were found to be exceptionally high in fluoride, one sample having a concentration of 38 parts per million. This sample was obtained from an abandoned artesian well that yielded a small flow of warm water containing less than 500 parts per million of total dissolved matter. This is an unusual water, as its fluoride concentration is higher than has been found in any other part of the Gila River Basin.

The shallow ground waters in the vicinity of the town of San Simon were not intensively studied, but it appears from the three available analyses that the shallow waters may contain considerably more dissolved matter than the artesian waters. The sodium, sulfate, and chloride concentrations of these waters are rather high, and the fluoride content is high enough to make the water objectionable for domestic use. It is likely that there is considerable variation in the composition of shallow waters in the vicinity of San Simon.

LOWER SAN SIMON AREA

In the lower part of the San Simon drainage basin there are areas where it is reported difficult to find ground water of satisfactory quality for livestock, but during this investigation no waters of excessive concentrations were found. Samples from some nonflowing artesian wells in the lower part of the valley contained about 1,000 parts per million of dissolved matter. These waters were soft, containing little calcium or magnesium but considerable amounts of sodium, chloride, and sulfate and, in some instances, considerable amounts of bicarbonate. At the extreme lower end of the drainage area of San Simon Creek some of the shallow ground waters sampled were rather con-

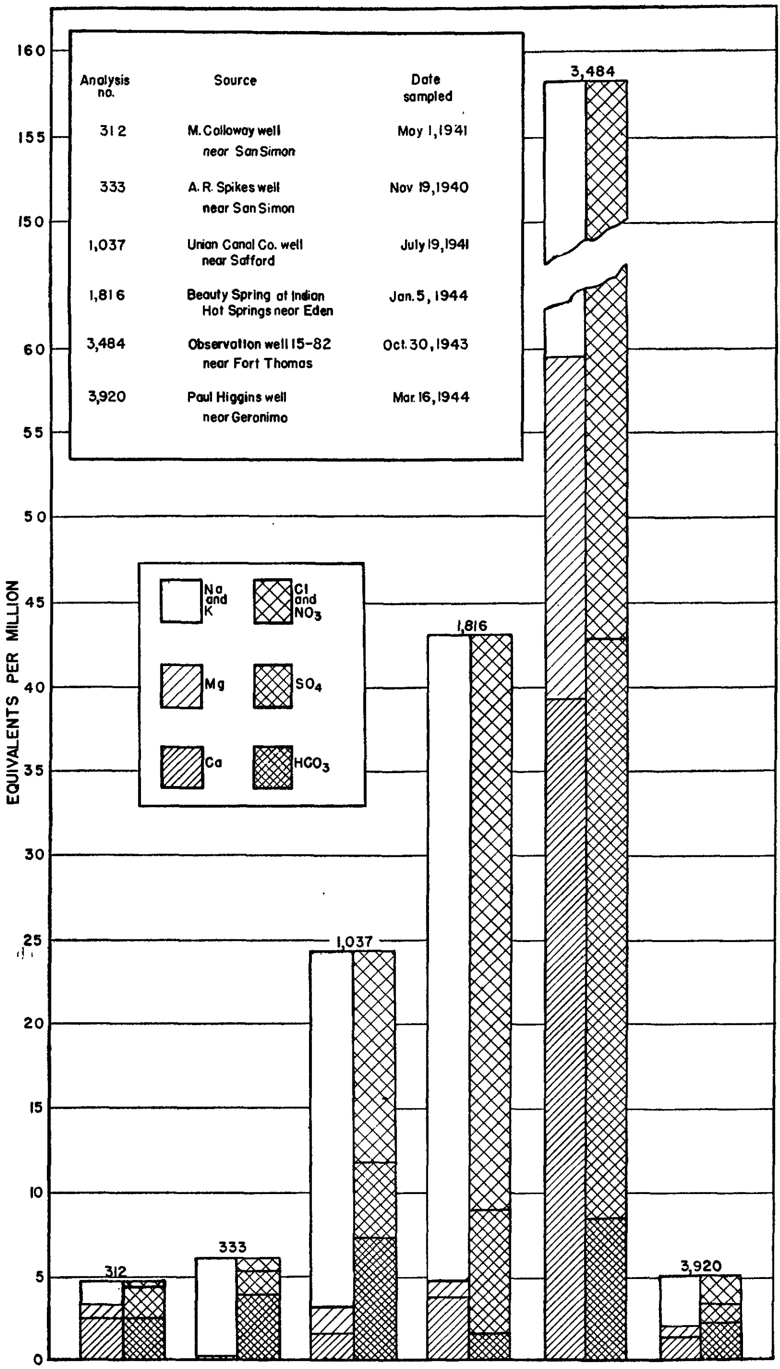

FIGURE 6.—Analyses of ground waters from the Gila River Basin below the mouth of Bonita Creek.

centrated, one sample containing more than 6,000 parts per million of dissolved matter. In the southeastern part of the lower San Simon drainage basin several nonflowing artesian wells have been drilled. One well has a large flow of warm water, which has been used in recent years for small-scale irrigation. The water contains more than 90 percent of sodium with a total solids content of about 1,000 parts per million.

GILA RIVER BASIN FROM MOUTH OF BONITA CREEK TO CALVA

SURFACE WATER

Analyses 344 to 450 provide a summary of the chemical character of Gila River waters between the mouth of Bonita Creek and the Southern Pacific Railroad bridge at Calva, as shown by analyses of samples collected during the period from 1940 to 1944. Additional analyses for some of the sampling points in the area for the period have been published in the annual reports on quality of surface waters of the United States—Water-Supply Papers 942, 950, 970, 1022, and 1030.

GILA RIVER FROM SOLOMONSVILLE GAGING STATION TO CALVA

Samples taken at the gaging station just below the mouth of Bonita Creek and at the gaging station near Solomonsville, 3 miles downstream, indicate the chemical character of Gila River water at the upper end of the area. Below the gaging station near Solomonsville large amounts of water are diverted from the river for irrigation, and the river receives considerable inflow from ground water and from irrigation return flow, so that a large increase occurs in the concentration of dissolved matter in the river water. Samples taken at or near the gage at Calva indicate the chemical character of water leaving the area. The samples taken at Bylas resemble closely in chemical character the water passing Calva, 10 miles downstream, and the discharges measured at Calva were used with the Bylas analyses to compute a weighted average. There is rarely any increase in flow of the river between Bylas and Calva. Samples taken from the river at points between Bonita Creek and Calva indicate the extent of and the locations where the changes in chemical character occur.

The best over-all indication of the changes that occur in the chemical character of river waters in this part of the basin is found in the weighted average analyses for the samples collected daily at the gaging stations near Solomonsville, at Safford, and at Bylas for the year ended September 30, 1944. These analyses are shown graphically in figure 5 and are Nos. 357, 390, and 445 in the tables. An indication of the chemical character of the water leaving the Duncan-Virden Valley can be obtained from figure 3, although no weighted average analyses are available. The chloride concentration of this water, which is comparatively low, is greatly increased by the inflow of water from San Francisco River. The resultant Gila River water that enters the Safford Valley at the gaging station near Solomonsville contains a rather large percentage of chloride, although it is somewhat lower than the percentage of chloride in San Francisco River water.

In general the mineral matter contributed to Gila River in its passage through Safford Valley consists largely of sodium, chloride, and sulfate. This is well illustrated by the gain in sodium and chloride between Solomonsville and Bylas. During the year ended September 30, 1944, the river water passing the gaging station near Solomonsville contained, on the average, 454 parts per million of dissolved solids, consisting mainly of sodium, calcium, chloride, and bicarbonate. The water passing Solomonsville was diverted to a large extent for irrigation in the upper part of the Safford Valley, so that only about half as much water passed Safford in the river as entered the valley at Solomonsville. Three irrigation canals bypass the Safford gaging station and carry a large volume of water. Part of the water passing Safford in the river was contributed by inflow of dilute flood waters below the Solomonsville gage. There are several tributaries in this section, of which San Simon Creek is the largest, but none of them have perennial flows. The river water passing Safford during the 1944 water year was about 10 percent less concentrated than the water passing the Solomonsville gaging station during that period, but the water at Safford was slightly different in character, containing a larger proportion of sodium, somewhat more bicarbonate and sulfate, and less chloride.

Most of the observed change in chemical character of the river water takes place between Safford and Calva. Below Safford, although additional diversions are made for irrigation, the river receives more inflow from ground-water and surface-water sources than is diverted. As a result, the total flow of the river leaving the valley at Calva during the year ended September 30, 1944, was about 9 percent more than the flow that passed Safford during the year. However, because of the large diversions above Safford, the flow at Calva was 40 percent less than the flow that entered the valley at the gaging station near Solomonsville. The concentration of dissolved solids in the water leaving the valley was more than double that of the water entering the valley in Gila River. Computed from the analyses and the discharge records, the total load of dissolved solids passing the Solomonsville station during the year was 84,100 tons, the amount passing Safford in the river was 42,200 tons, and the amount leaving the valley at Calva was 105,000 tons, a net increase in load through the valley of 20,900 tons. The significance of the increase cannot be definitely stated on the basis of the records for this one year.

The runoff for the 1944 water year for Gila River was lower than normal, and it is likely that the increase in load of dissolved matter might be different in other years. Weighted average analyses for Safford are available for the water years 1941 to 1944. (See analyses 381, 384, 387, and 390.) It should be noted that the concentration of the water passing the Safford station is lower for years of high discharge. No data are available for the other two stations, except for 1944.

The changes in chemical character of the river water as it passes through Safford Valley are shown by the analyses of samples collected at several additional sampling points. Maximum and minimum concentrations observed during 12 months or shorter periods are shown for stations at which samples were collected at irregular intervals. Most of these stations were located in the lower part of the valley between Thatcher and Calva and were operated during part of 1943 and 1944, but one station above and two below Safford were operated intermittently for a time during 1940 and 1941. It was not possible to make weighted average analyses for these stations because of incomplete discharge data and infrequent sampling. However, the highest concentrations of dissolved matter were found in the river water passing the gaging station at Fort Thomas at times of low flow. There was an increase in concentration as the water passed from Safford to Fort Thomas, and a maximum concentration of more than 6,000 parts per million was observed at Fort Thomas in the summer of 1944. Below Fort Thomas the maximums observed were lower because the ground water inflows occurring below Fort Thomas were of less concentrated water than those farther upstream.

SEEPAGE STUDIES

At times when studies were being made of seepage gains and losses of Gila River between Bonita Creek and Calva, water samples were collected at each river measuring point. Analyses of these samples indicate the changes in the chemical character of the waters of the Gila River that occur at low flow in this part of the basin. Two typical sets of analyses, those for the October 1940 and June 1944 observations, have been reproduced in graphic form in figure 7. Tabulated analyses 451 to 812 include results for all samples collected in the seepage studies.

When the first seepage measurements were made in 1940 the uppermost gaging station on the river in Safford Valley was that below Bonita Creek. This gage was abandoned in 1941 and replaced by a station 3.8 miles downstream, referred to as "Gila River near Solomonsville, Ariz." The lower gaging station was used as the initial point for reporting mileage between stations in the seepage measure-

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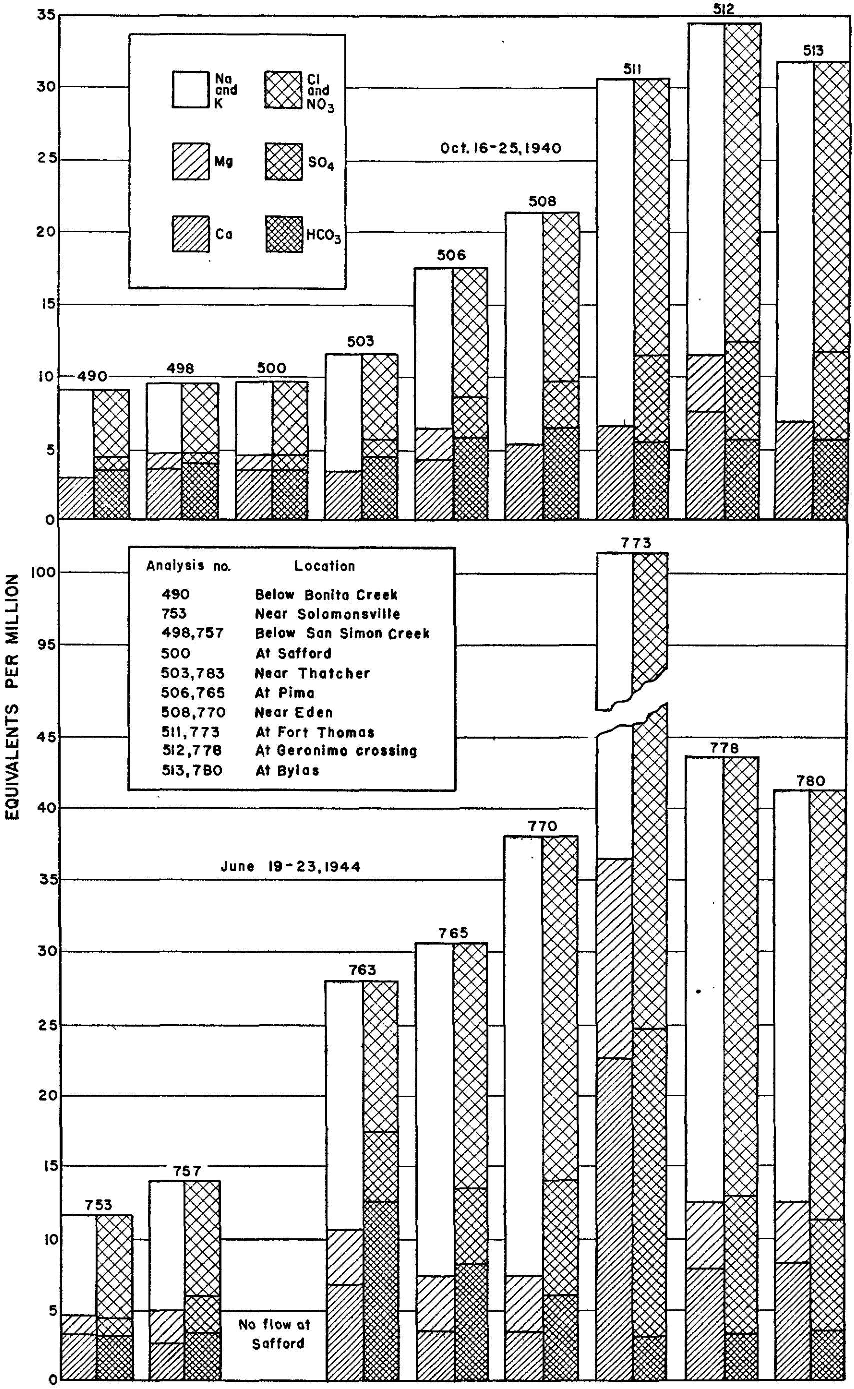

FIGURE 7.—Analyses of water from Gila River between the mouth of Bonita Creek near Solomonsville, Ariz., and Bylas, Ariz.

ments made after 1941. The meandering of the river channel caused changes in the river distances between some of the stations between 1941 and 1943; consequently, different mileage figures are shown for certain reaches after 1941.

Discharge values reported in the tables are those actually measured. Discharge values for seepage measurements made in 1943 and 1944 were adjusted for use in certain computations discussed in another report,[20] and the adjusted values are given in that report.

One of the first sets of seepage measurements was made during the period October 16–25, 1940. On October 16 the river just below the mouth of Bonita Creek had a discharge of 154 second-feet and a concentration of 498 parts per million of dissolved solids, about half of which was sodium and chloride. The river gained somewhat in flow in the 9 miles from this point to the San Jose Canal wasteway, but the water showed no significant changes in chemical character or concentration. Any inflow in this reach must have been of about the same character as the water already in the river. From the San Jose Canal wasteway to the mouth of San Simon Creek there was an increase of 20 parts per million in dissolved solids, which was probably caused by ground-water inflow in this reach of the river. Little change in the concentration was noted from San Simon Creek to Safford. From Safford to the Smithville Canal heading a 12-percent increase in dissolved matter was observed, which was composed largely of sodium and chloride. Below Safford, inflows due to return drainage from irrigated lands began to appear, most of which contained considerable amounts of sodium and chloride. At Pima, 28 miles below the gaging station at the head of the valley, the chemical character of the water in the river was strongly affected by ground-water inflows. The concentration of dissolved solids increased 50 percent over the concentration observed below the mouth of Bonita Creek. However, most of the water originally in the river at the head of the valley had been diverted, so that the flow at Pima was only about a third that at the head of the valley. Most of the inflow of ground water reaching the river above Pima represented irrigation return flow.

Between Pima and Fort Thomas, a distance of about 16 miles, a further increase of about 90 percent in the concentration of dissolved solids occurred. Most of the increase was in sodium, chloride, and sulfate, although increases in concentrations of all ions except bicarbonate were observed. The maximum concentration for this series of samples, 2,000 parts per million, was found in a sample collected at the Geronimo crossing 6 miles below Fort Thomas. The concentration of inflowing water in this area was lower than that of the river

[20] Gatewood, J. S., Robinson, T. W., Colby, B. R., Hem, J. D., and Halpenny, L. C., Use of water by bottom-land vegetation in lower Safford Valley, Ariz.: U. S. Geol. Survey Water-Supply Paper 1103, pp. 96–101, 1950.

water at the Geronimo crossing, so that by the time the river water reached Bylas, 6½ miles farther downstream, it had a lower concentration than at Geronimo. In the lower 4 or 5 miles of this reach the river flow decreased and was less at Bylas than at the Geronimo crossing. However, as there is a definite decrease in the concentration of the water in the reach, there must have been some inflow, probably in the upper part of the reach, which was smaller in amount than the outflow farther downstream. No further changes in the chemical character of the water occurred from Bylas to Calva. For the entire distance of 67 miles of river, from Bonita Creek to Calva, there was a net gain during this series of measurements of 51.6 second-feet and an increase of more than 350 percent in concentration of dissolved solids.

The measurements begun on February 14, 1944, represent a different condition, one in which the ground-water levels in the valley were high and inflow was at a maximum. The measurements, however, covered only the lower part of the valley, from Thatcher to Calva. The river above Thatcher had received some ground water inflow, but the amount was small compared with quantities reaching it farther downstream. Between Thatcher and Pima the water increased in concentration of dissolved solids from 717 to 863 parts per million. The increase was mainly in sodium, chloride, and bicarbonate and occurred even though a considerable quantity of dilute surface water entered the river in the reach. The net gain from ground-water inflow for the reach was computed to be 22.8 second-feet.

From Pima to the Eden crossing, a distance of about 7 miles, there was a further gain in flow of 18.7 second-feet, owing to ground water inflow, and an increase of about 85 percent in the concentration of dissolved solids. The increases were in sodium, sulfate, and chloride.

Between the Eden crossing and the gaging station at Fort Thomas there was a ground water inflow of 11.8 second-feet, and the concentration of dissolved matter increased to 2,200 parts per million at Fort Thomas, which was nearly 40 percent more than that at Eden crossing. The increase was chiefly in sodium and chloride. At that point the study was stopped and was resumed on February 18. During the intervening 2 days the river at Fort Thomas had decreased in flow by about half, and the concentration of dissolved solids in the water on February 18 was 3,370 parts per million. The maximum concentration of dissolved solids for the February 1944 measurements, 3,500 parts per million, was found in a sample collected at the gaging station near Geronimo, 3.9 miles below Fort Thomas. The river continued to gain in flow from Fort Thomas to the Calva gaging station, but the concentration of total dissolved solids decreased progressively, reaching 2,580 parts per million at Calva, which indicated that the inflow was less concentrated than the river water.

In the February 1944 set of measurements the discharge of the river increased by 84.5 second-feet, owing to ground-water inflows between Thatcher and Calva. The dissolved solids concentration increased by more than 300 percent in the reach.

During the period June 19–23, 1944, the river was at a very low stage, and as a result of dry weather and heavy pumping ground-water levels were low, so that inflow to the river was small. The seepage measurements were begun at the gaging station near Solomonsville on June 19. The river at that point had a flow of 49.2 second-feet, and the water contained 660 parts per million of dissolved solids. No change in concentration occurred as the water moved downstream to the San Jose Canal heading, where the entire flow of the river was diverted into the canal. Below the diversion the river was dry for 2.5 miles. Seepage of ground water into the river above the mouth of San Simon Creek caused a small flow, which contained 806 parts per million of dissolved solids, a 25 percent increase in concentration over water in the river at the head of the valley. The seepage contained more sodium, magnesium, and sulfate than the original water. This surface flow ceased before it reached Safford, where the river was dry.

At Thatcher a flow amounting to 0.9 second-foot, which contained 1,490 parts per million of dissolved solids, mostly sodium and chloride, resulted from ground water inflows. This surface flow ceased below Thatcher. Between Thatcher and Pima, however, ground-water inflows entered the river, causing a flow of 3 second-feet in the river channel at Pima. This water had a concentration of 1,760 parts per million of dissolved matter. Most of this water was diverted between Pima and the Eden crossing, so that at the crossing the river had a flow of only 0.1 second-foot. The river water at the Eden crossing contained 2,240 parts per million of dissolved matter, most of which was sodium and chloride. Between the Eden crossing and Fort Thomas some highly mineralized ground water entered the river, and at Fort Thomas the river flow was 1.1 second-feet and the water contained 6,020 parts per million of dissolved solids, or more than twice as much as at Eden crossing.

Below Fort Thomas there was inflow of ground water with a lower mineral content, and at the Geronimo crossing, 6.4 miles below Fort Thomas, the river had a flow of 7.2 second-feet and a concentration of 2,580 parts per million. Below the Geronimo crossing there was no further inflow large enough to affect the concentration of the water appreciably, and the river water at Bylas was of about the same concentration as that at the Geronimo crossing. Flow decreased below Bylas, and at the Calva gaging station there was no flow at all in the river.

The low-flow measurements and analyses indicate that there is always ground-water inflow to Gila River in parts of the Safford Valley. The inflow generally consists of water containing relatively large amounts of dissolved mineral matter, and as a result the river gains considerable amounts of sodium and chloride in its passage through the valley. The principal zones of inflow to the river are in the vicinity of Pima in a reach of about 7 miles and between Fort Thomas and the Geronimo crossing in a reach of about 6½ miles. Significant gains of water and changes in dissolved mineral matter occurred in both these areas even at lowest river discharge.

TRIBUTARY WASHES

No perennial streams enter Gila River in the Safford Valley. However, there are a number of tributaries in the valley that carry water during storm periods, and some of these are perennial streams in their upper reaches at high altitudes. This report contains some analyses of the samples that have been collected from these washes, some from their upper reaches when the streams were carrying water from melting snow and others from flood waters originating from heavy local rains.

The samples of water from the upper reaches of the streams during the spring runoff period give an indication of the quality of the water that recharges the aquifers in the older fill cropping out near the mountains. No appreciable amount of this water reached the river as surface flow even in 1941, a year of unusually large runoff, because of the large losses from the streams in the recharge areas. The content of dissolved matter was very low for all samples from the upper reaches of these tributaries.

The samples taken during flood flows in the lower reaches of the washes indicate that at times some of the washes in the area may discharge water to the river containing appreciable amounts of dissolved salts and suspended sediment. This is particularly true of San Simon Creek and Matthews Wash. The latter drains an extensive area of badlands in the Tertiary and Pleistocene valley-fill deposits where soluble matter probably is relatively abundant.

Considerable amounts of irrigation waste water and surface drainage from irrigated land at times enter the river from both natural and artificial channels. The quality of the river water at low stages may for short periods be considerably influenced by these inflows, but the inflows are extremely variable, and individual ones often last only a few hours.

GROUND WATER

The study of the quality of ground water in the Safford Valley was more detailed than in the rest of the Gila River Basin, and a large proportion of the analyses in this report therefore is of samples collected in this area. A large number of wells and springs in the Safford Valley are owned by residents and used for various purposes. In addition, more than 1,300 shallow observation wells were driven during the investigation for observation of water-table fluctuations and for the collection of water samples. Between 1940 and 1944 most of the wells and springs in the valley were sampled at least once, and many were sampled two or more times.

There are two water-bearing formations of major importance in the valley. Most of the wells obtain water from the widespread sand and gravel layers in the Recent alluvial fill of the inner cultivated valley. This material has been deposited by the river and its tributaries to a maximum depth in most places of less than 100 feet in a trough a quarter of a mile to nearly 3 miles wide carved in the underlying Tertiary and Pleistocene valley fill. Practically all the wells in the Safford Valley have depths of 100 feet or less and obtain water from this Recent alluvium. Wells with depths much over 100 feet and all flowing wells obtain water from the aquifers in the underlying Tertiary and Pleistocene valley fill.

WATER FROM RECENT ALLUVIUM

In most places water from the Recent alluvium differs in chemical character from water from the lake-bed or other Tertiary and Pleistocene fill deposits. The shallow ground waters from various parts of the valley, however, differ greatly in chemical character and concentration, and in a few instances water from a single well has been known to change 50 percent or more in concentration over a period of a few months.

A map showing dissolved mineral content of ground water in Recent alluvium from Thatcher to the east line of the San Carlos Indian Reservation is included in another report.[21] This map shows conditions existing in 1944.

Bonita Creek to San Jose Dam.—In the upper part of the valley above the San Jose diversion dam, northeast of Solomonsville, the waters of the Recent alluvium contain 500 to 1,000 parts per million of dissolved solids. The water is similar in composition to the water of the river at low flow in this part of the valley. Generally the main constituents are sodium, calcium, chloride, and bicarbonate, but the more highly mineralized waters contain relatively larger amounts of sodium and chloride. Large quantities of sodium and chloride are

[21] Gatewood, J. S., Robinson, T. W., Colby, B. R., Hem, J. D., and Halpenny, L. C., op. cit., pl. 5.

found in most of the more concentrated ground waters of Safford Valley.

San Jose Dam to Safford.—Between the San Jose diversion dam and Safford the ground waters are somewhat more highly mineralized than those near the head of the valley, containing increased amounts of sodium and chloride, but in most places in this part of the valley total mineral content of ground water seldom exceeds 1,500 parts per million. However, there is a zone of highly mineralized water about a mile wide and 4 miles long extending northwestward along the Southern Pacific right-of-way from a point about 2½ miles above the mouth of San Simon Creek nearly to Safford. Near San Simon Creek the mineral content of ground waters in this zone is more than 5,000 parts per million, but it decreases to the northwest where, near Safford, dissolved solids are only about 2,000 parts per million.

Safford to Pima.—From Safford to Pima, along the south side of the river, concentrations of dissolved mineral matter in the ground water generally range from 1,000 to 2,000 parts per million. On the north side of the river in this part of the valley concentrations are somewhat higher than on the south, particularly near the mesa, and in places reach 3,000 parts per million. Water in this part of the valley contains increased amounts of sodium, chloride, and sulfate. The bicarbonate content of many of the ground waters is unusually high; several samples were found that contained more than 800 parts per million. Some of the waters contained unusually large amounts of nitrate.

Pima to Markham Wash.—Near the mouth of Cottonwood Wash, which enters the river from the south at Pima, and along the south side of the river there is an area extending downstream for almost 2 miles from Pima where the ground water contains 500 to 1,000 parts per million of dissolved matter. The water is of lower mineral content near the river and of higher mineral content along the extreme southern edge of the irrigated land in the valley. The rather low mineral content of the water near the river probably is caused by the underflow of Cottonwood Wash. Along the north side of the river below Pima the ground water is more highly mineralized than on the south side, with the concentration increasing downstream to the mouth of Markham Wash, about 5 miles below Pima. In places the ground water near the mouth of Markham Wash may contain as much as 9,000 parts per million of dissolved solids, and it sometimes contains nearly as much sulfate as chloride, which is somewhat unusual for the Safford Valley. Sodium is the predominant cation. On the south side of the river from about 2 miles below Pima downstream to Markham Wash increases in concentration occur, and in places near the mesa there are small areas where ground waters have concentrations as high as 4,000 parts per million of dissolved solids, mainly sodium and chloride.

Markham Wash to Fort Thomas.—Below the mouth of Markham Wash the ground water on the north side of the valley is of somewhat better quality than that just above the wash. For about 2 miles down the valley the concentration of dissolved solids in the ground water ranges from 1,500 to 2,000 parts per million. Below this area the ground water increases in mineralization downstream until opposite the gaging station near Ashurst, about 7 miles below Markham Wash, it has a concentration of nearly 8,000 parts per million of dissolved matter, consisting mainly of sodium and chloride. Along the south side of the river for about 3 miles below Markham Wash the ground water contains 1,500 to 3,000 parts per million of dissolved matter, the higher concentrations occurring in localized small areas and near the mesa, and here also the more concentrated waters contain large amounts of sodium and chloride. Farther downstream concentrated ground waters are found over a large area, and the concentrations are higher than those found in ground waters near Markham Wash. From a point about 3 miles below the wash to Fort Thomas nearly all the ground water on the south side of the valley has a high mineral content, concentrations of more than 10,000 parts per million occurring in places. These waters are of the sodium chloride type and because of their high mineral content are totally unusable.

At Fort Thomas near Black Rock Wash there is a small area with ground water of low mineral content. Wells in the wash flood plain south of Fort Thomas yield some of the best water in the basin. It has a dissolved mineral content of less than 200 parts per million, most of which is calcium and bicarbonate. Where this ground water leaves the wash flood plain and enters the alluvium of the Gila River Valley there is a small area of ground water similar in character to that found in the ground water of the wash flood plain, but the effect of dilution decreases with distance from the wash. The size of the area of ground water of low mineral content at the mouth of this wash is variable and seems to be dependent on precipitation and runoff in the wash drainage area. As much as a year may be required before effects of heavy rains are noticeable in the enlargement of the area of dilute ground water at the edge of the river valley near the wash. The quality of water from individual wells in this area has changed rather rapidly at times when the amount of underflow of the wash changes.

Along the north side of the river, from the gaging station near Ashurst to Fort Thomas, the ground water generally is highly mineralized and similar in composition to that on the south side of the valley, containing large amounts of sodium and chloride. However, near the north edge of the irrigated land, ground waters with concentrations of 3,500 parts per million of dissolved matter are found in places. In most of this part of the valley concentrations are considerably higher than 3,500 parts per million.

Fort Thomas to Indian reservation line.—Below Fort Thomas, on the south side of the river near the mesa, water having less than 500 parts per million of dissolved matter occurs. This belt of water of low mineral content widens downstream, until near the mouth of Goodwin Wash, 5 miles below Forth Thomas, it occupies practically the entire width of the valley. Below this point to near the San Carlos Indian Reservation line the belt of this type of water narrows but is continuous along the south edge of the valley. The water contains mainly calcium and bicarbonate and is probably derived from underflow in Black Rock, Goodwin, and other washes entering the valley in this area. On the south side of the river below Fort Thomas the concentration of dissolved solids in the ground water apparently tends to increase from south to north across the valley.

On the north side of the river, between Fort Thomas and the mouth of Goodwin Wash, the ground water has a concentration of 3,000 to 4,000 parts per million of dissolved solids, consisting chiefly of sodium and chloride. The temperature of water from some shallow wells in the area was found to be as high as 97° F., or about 30° above the normal for shallow ground waters in the valley. Many other wells in this part of the valley also yielded warm water. This fact, together with the chemical character of the water, suggests that there is extensive leakage from deep-seated artesian aquifers in the vicinity. The artesian water probably rises along openings caused by faulting. Faults in the Tertiary and Pleistocene valley fill are well exposed in the vicinity. On the north side of the river, from the mouth of Goodwin Wash to the Indian reservation line, a distance of about 3 miles, the concentration of dissolved matter in the ground water ranges from about 1,500 to 3,000 parts per million, sodium and chloride being the principal constituents.

Indian reservation line to Calva.—Quality of ground water between the Indian reservation line and the Calva gaging station was not studied intensively. The area is largely uncultivated, and not many wells exist besides the few that were driven for use during the investigation. In general the water sampled in the Indian reservation contains 1,500 to 5,000 parts per million of dissolved matter, mainly sodium and chloride. Near Bylas the concentration of ground waters ranges from about 2,000 parts per million on the south side of the valley to 3,000 near the river and 4,000 near the mesa on the north side of the valley. In the vicinity of Calva the concentration on both sides of the valley is about 3,000 parts per million, but in the bottom-land area the ground water is somewhat less highly mineralized.

Goodwin Spring, which is just inside the Indian reservation near Goodwin Wash, about 3 miles above its mouth, yields water containing less than 300 parts per million of dissolved matter, mainly calcium and bicarbonate.

Concentrations of more than 10,000 parts per million of dissolved matter are reported by Schwennessen[22] for ground water on the San Carlos Indian Reservation.

Graphical analyses.—Three analyses typical of waters from the Recent alluvium of Safford Valley are shown graphically in figure 6. No. 3920 represents the more dilute waters of the Recent alluvium and is typical of the underflow from side washes, which recharge the alluvial fill in the lower part of the valley. No. 1037 may be considered typical of the waters found near the center of the valley at Safford and Thatcher and of much of the ground water pumped and used for irrigation in the Safford Valley in 1944. It has a sodium percentage somewhat higher than the average but otherwise is representative. No. 3484 represents some of the more highly concentrated water found in the lower part of Safford Valley southeast of Fort Thomas.

WATER FROM TERTIARY AND PLEISTOCENE VALLEY-FILL DEPOSITS

Artesian wells.—The Recent alluvium of Safford Valley is underlain by Tertiary and Pleistocene valley fill, which was deposited when the Safford Valley was a closed basin. Near the center of the valley these Tertiary and Pleistocene fill deposits were laid down in a closed lake or playa, which was more or less saline. These lake beds were made up, for the most part, of very finely divided and almost impermeable material. However, tongues of sand and gravel occur in them that contain water under artesian head sufficient to cause the water to flow from wells drilled in the lake beds. The conditions causing artesian pressure in this area are described by Knechtel.[23] The area of recharge for the formations is mainly along the base of the Pinaleno Mountains. Water occurring in the coarse materials near the mountains is of good quality, and if it is intercepted by a well before the water has passed through the lake beds in the Tertiary and Pleistocene fill it may contain as little as 500 parts per million of dissolved matter. Near Gila River, at the maximum distance from the recharge area, the waters from artesian wells are likely to be

[22] Schwennessen, A. T., Geology and water resources of the Gila and San Carlos Valleys in the San Carlos Indian Reservation, Ariz.: U. S. Geol. Survey Water-Supply Paper 450-A, p. 22, 1921.

[23] Knechtel, M. M., Geology and ground-water resources of the valley of Gila River and San Simon Creek, Graham County, Ariz.: U. S. Geol. Survey Water-Supply Paper 796-F, pp. 209-212, 1938.

highly mineralized. In all instances sodium and chloride are predominant in the highly mineralized artesian waters of the area.

The largest flowing well in the valley is near Pima. It is known as the Mack well, and was drilled originally for an oil test. It reached a depth of 3,767 feet. The flow measured in April 1942 was 1,350 gallons per minute.[24] and the water had a temperature of 138° F. The dissolved solids content was about 3,400 parts per million. A flowing well with a much smaller yield and lower temperature, located at Geronimo, is 600 feet deep and yields water containing 14,400 parts per million of dissolved solids. In both wells the dissolved matter consists largely of sodium and chloride. Only a few more artesian wells exist near Gila River in the Safford Valley, but a number have been drilled south of Safford in the Cactus Flat-Artesia district on the flood plains of Marijilda and Stockton Washes. In this area about 1,000 acres are irrigated, chiefly from flowing wells, which generally yield warm water containing 1,000 or more parts per million of dissolved matter consisting almost entirely of sodium salts, with chloride and sulfate predominating. The waters also are generally very high in fluoride.

Analyses for a number of the flowing wells in the Cactus Flat-Artesia area have been published.[25] A few of the wells in this district were resampled in 1942, and there had been no significant change in the chemical character of their water since the sampling by Knechtel in 1933 and 1934.

Flowing wells have also been obtained in the vicinity of upper Ash Creek, Cottonwood Wash. and adjoining areas. The yield of the wells in these areas was generally small, and the water was of lower mineral content in most instances than artesian waters found elsewhere in the vicinity of Safford Valley. The waters low in dissolved solids contain mainly sodium and bicarbonate. Those of higher mineral content generally have sodium and chloride derived from lake-bed formations with which they have come in contact.

A nonflowing artesian well furnishes the public water supply at Bylas. The water is soft and low in minerals. It contains mainly sodium and bicarbonate but is rather high in fluoride. It is likely that the water yielded by this well comes from the coarser sediments in the Tertiary and Pleistocene valley fill, which include small amounts of soluble matter.

Attempts to obtain additional water supplies from artesian wells in Safford Valley are probably not advisable because of the poor quality of the water, especially for irrigation. Although some of the artesian

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[24] Morrison, R. B., McDonald, H. R., and Stuart, W. T., Safford Valley, Graham County, Ariz., Records of wells and springs, well logs, water analyses, and map showing location of wells and springs, pp. 27–28, U. S. Geol. Survey and Arizona State Water Comm., 1942. [Mimeographed.]

[25] Knechtel, M. M., op. cit., p. 222.

waters are soft, they are rarely good for domestic use because of excessively high concentrations of sodium salts or because they contain objectionable amounts of fluoride.

Artesian springs.—In some parts of the Safford Valley the Tertiary and Pleistocene fill deposits have been disturbed by faulting, and through the openings caused by this faulting water comes to the surface, forming springs. The larger springs of this type occur north and south of Pima, at the Indian Hot Springs north of Eden, and north and west of Fort Thomas. Water from nearly all these springs contains 3,000 to 4,000 parts per million of dissolved solids and is similar in chemical character to water from the deep Mack well near Pima. The temperatures range from 119° F. at the largest of the Indian Hot Springs to about 70° F. in some of the springs near Big Spring Wash, north of Pima. The temperature of 70° is only about 5° above the average temperature of shallow ground water in the area. As a rule the springs with low rates of flow have the lower temperatures, and the concentration of dissolved matter in the water may be more than 5,000 parts per million. The proportion of the constituents are the same, however, for most of the springs. Near the San Carlos Indian Reservation line the lake beds contain some limestone strata, and north of Bylas a number of springs issue from these limestone beds. These springs are thermal, and their water is similar in quality to that from lake beds farther up the valley, containing more dissolved solids than would normally be expected in water from limestone beds.

Analysis 1816, shown graphically in figure 6, represents a sample from the Beauty Spring, largest of the hot springs at Indian Hot Springs near Eden, and may be considered typical of water from lake beds in the area.

Chemical character of artesian water.—Water from the Tertiary and Pleistocene valley-fill strata in the Safford Valley and surrounding area generally is high in sodium and low in hardness. Even though calcium sulfate, mostly in the form of gypsum, is relatively common in the lake-bed formations of the valley, there is generally only a comparatively small amount of calcium in the water from these beds. It is possible that a natural softening process is going on in the lake beds by means of a base exchange reaction as the water passes through them. This effect has been noted in ground waters of other areas,[26] and silicate minerals capable of base exchange reactions exist in the Tertiary and Pleistocene valley-fill formations. Many waters from the aquifers in these formations in Safford Valley have high fluoride and borate concentrations. These constituents are usually present in

[26] Renick, B. C., Base exchange in ground water by silicates as illustrated in Montana: U. S. Geol. Survey Water-Supply Paper 540-D, pp. 53-74, 1924.

much smaller quantities in ground waters from the Recent alluvium, and the presence of large fluoride and borate concentrations in shallow ground water indicates that such a water may be contaminated by leakage of artesian aquifers in the underlying Tertiary and Pleistocene fill. Such leakage, through fault openings or by slow seepage through confining beds, may take place in several areas in the Safford Valley.

WATER FROM MINOR WATER-BEARING FORMATIONS

Some ground waters in the basin between Bonita Creek and Calva come from rocks other than those discussed. Gravel and sand in the upper reaches of some of the washes entering the valley supply small amounts of water for wells, and in places water is forced to the surface by rock ledges in the bottoms of the washes to form small springs. A few springs and wells obtain water from the fractured volcanic rocks of the Gila Mountains. Some of the spring waters are thermal. Occasionally small springs occur in the dense granites and gneisses of the Pinaleno, Santa Teresa, and Turnbull Mountains. Waters from all these sources are low in mineral content and contain mostly calcium, magnesium, and bicarbonate.

In some places springs occur in the terrace gravels that cover the mesas bordering the valley. In a few places the water from these springs is low in mineral content, containing mainly calcium and bicarbonate, but generally water from the terrace gravels is highly mineralized because of the sodium and chloride it has leached from underlying lake beds and can only be used for watering stock.

GILA RIVER BASIN FROM CALVA TO COOLIDGE DAM

SURFACE WATER

SAN CARLOS RESERVOIR

The San Carlos Reservoir, formed back of Coolidge Dam, if filled to capacity (about 1,200,000 acre-feet) would back water up the river to a point a short distance above the Calva gaging station on the Southern Pacific Railroad bridge. The reservoir has never been more than about two-thirds full, and most of the time since the dam was completed in 1928 has been less than one-third full.

The analyses for Gila River at Calva show the quality of water entering the reservoir from the Gila. Indications of the quality of the reservoir water in 1941 may be obtained from the published analyses for Gila River at Ashurst-Hayden Dam near Florence, Ariz.[27] However, the water at this sampling point has been affected by many inflows below Coolidge Dam and may be different from the water

[27] Collins, W. D., Howard, C. S., and Love, S. K., Quality of surface waters of the United States, 1941: U. S. Geol. Survey Water-Supply Paper 942, p. 65, 1943.

in the reservoir. Water in the reservoir in 1941 was of much better quality than normal.

SAN CARLOS RIVER

San Carlos River empties into San Carlos Reservoir about 10 miles below Calva. The San Carlos is a perennial stream for most of its length, but during dry seasons there may be no flow at its mouth. It is the last major tributary of the Gila above Coolidge Dam and has a drainage area of 1,040 square miles above the reservoir high-water line. Most of the drainage area is mountainous and within the Indian Reservation.

Analyses 3975 to 3980 are the only ones available for San Carlos River. They represent the results of daily sampling during August and September 1937 at the gaging station near Peridot. This period of sampling probably represents a typical period of rapidly varying summer flow. No extremely high discharges occurred during the period, but the conductance of daily samples ranged from a minimum of 46.4 on August 7 to a maximum of 109 on September 6. The principal components of the dissolved matter in the samples were sodium, bircarbonate, and chloride.

These analyses do not provide a sufficient basis for estimating average dissolved solids concentrations of San Carlos River for a year. However, the period of record includes days of very low flow, and it appears probable that dissolved solids concentrations at low flow in San Carlos River are much lower than concentrations at low stages in Gila River at Calva.

GROUND WATER

During 1940 when the reservoir was at a very low stage several observation wells were driven near the confluence of Gila and San Carlos Rivers in an area generally covered by water of the reservoir but dry during the summer of 1940. The analyses of water from these wells (3981–3986) do not differ greatly from analyses for samples collected from shallow wells in the area of the Indian reservation near Calva. These wells were flooded by the reservoir in 1941, and no further observations could be made. No other wells in the area were sampled.

PUBLIC WATER SUPPLIES

Available analyses of public water supplies in the Gila River Basin and descriptions of the sources of these supplies are tabulated. (See analyses 3987–3999.) Practically all of these public supplies are obtained from ground water sources.

The Clifton supply is obtained from San Francisco River and the Safford supply from an infiltration gallery on Bonita Creek. The Safford supply was formerly obtained from reservoirs on Frye Creek in the Pinaleno Mountains, but it was not always adequate, and ground waters in the vicinity of the town are too highly mineralized to be satisfactory. When a replacement was necessary in 1936 the infiltration gallery was installed on Bonita Creek about 5 miles above its mouth. A pipe line about 24 miles in length carries this water by gravity to Safford and also provides water for Solomonsville and Thatcher. The system can normally furnish about 900,000 gallons of water daily. When required, supplementary supplies are obtained from the Frye Creek system and from wells in Safford.

The quality of most of the public supplies in the basin is good, except that some of the ground waters used contain rather large amounts of fluoride. Hardness of the raw water at Duncan is rather high, but the water is partly softened before delivery to consumers. None of the other supplies are treated, except for chlorination.

RELATIONSHIP OF CHEMICAL CHARACTER TO USE OF WATER

INDUSTRIAL USE

The chemical character of a water has great significance in determining the uses to which the water may be put. This is especially true of water to be used by industry. Certain industries require water of particularly good quality, but the requirements for different industrial processes vary greatly.

Hardness is the most objectionable characteristic in water that is to be used in most industrial processes. It is due chiefly to the dissolved salts of calcium and magnesium, and when a hard water is used in a steam boiler a hard and adherent scale of calcium and magnesium salts forms inside the boiler. The silica in the water is also precipitated and forms part of the scale. This scale decreases the efficiency of the boiler and eventually has to be removed, often at considerable expense. For special industrial uses various other impurities may be objectionable.

The Gila River Basin above Coolidge Dam is not highly developed industrially. It is only at the mining settlements of Clifton and Morenci that important quantities of water are used in industry. Probably in almost any part of the basin where a new industry required a large supply of water of good quality there would be considerable difficulty in obtaining it without excessive expense for treatment. Trouble in obtaining water was experienced by the Phelps Dodge Corp. and its predecessors in the original construction and recent expansion of ore-treatment facilities at Morenci. During early stages of development a water supply of suitable quality was found in Eagle Creek, supplemented by wells put down along the creek, and the water has been used for many years at Morenci, although a 1,500-

foot pumping lift is required to raise the water to the point where it is needed. Water from the Clifton well, which also was pumped to Morenci in large quantities in 1943 and 1944, is of poor quality and generally would be considered unsatisfactory for many industrial purposes. Except for the generation of steam, however, most processes at Morenci do not require water of extremely good quality.

Expansion of the ore-treatment facilities at Morenci completed in 1944 required additional water supplies. Because of uncertainty as to water rights the original plan of diverting water from San Francisco River above Clifton was not carried out. Instead, an agreement was made with the Salt River Valley Water Users Association under which the Phelps Dodge Corp. was to be allowed to divert up to 14,000 acre-feet of water annually from Black River, a tributary of Salt River, in exchange for construction by the Phelps Dodge Corp. of a storage dam on Verde River, another tributary of Salt River.

In 1944 a system was completed for the diversion of water from Black River into the upper Gila River Basin by pumping from Black River over the divide to the Eagle Creek Basin. The water flowing by gravity down Eagle Creek to the existing point of diversion can be pumped to Morenci. This complicated and expensive system indicates the difficulty experienced by the Phelps Dodge Corp. in obtaining satisfactory quantities of water and is typical of the difficulty that might be experienced in the establishment of new industries with large water requirements, as the waters of the upper Gila River Basin are fully utili-ed by existing developments. Water supplies for small industries, however, probably could be obtained in many parts of the basin.

There are no industrial users in the basin, other than the Phelps Dodge Corp., that consume appreciable amounts of water. Small quantities are used in the cities and towns for steam generation. Municipal water supplies are usually treated before being used for these purposes to keep the calcium and magnesium salts in solution. Ground waters in parts of the basin are used for railroad locomotives. In Safford ground waters are used for air conditioning and cooling, for which purposes their quality is not very important.

DOMESTIC USE

Water for domestic purposes should be free from excessive amounts of dissolved mineral matter and unpleasant tastes and odors. It should also be free from harmful bacteria. Bacteriological examinations are not made by the Geological Survey; hence the analyses in this report do not indicate the suitability of water for human consumption from that standpoint. Excessive quantities of dissolved mineral

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matter give many of the ground waters and surface waters of the basin an unpleasant taste and make them unfit for drinking.

PUBLIC HEALTH SERVICE STANDARDS

Standards with respect to the content of dissolved matter in waters to be used for drinking and culinary purposes on common carriers have been published by the United States Public Health Service.[28] According to these standards, drinking water should contain no more than 250 parts per million of chloride, 250 parts per million of sulfate, and 125 parts per million of magnesium. For a water of "good chemical quality" the total dissolved solids should not exceed 500 parts per million, but if no such water is available a total dissolved solids content of as much as 1,000 parts per million is permissible. Some flexiblity is allowed in the other limits, depending on the quality of waters which are available that meet the standards in other respects, for it is known that many adults have used waters containing somewhat more dissolved matter than the recommended limits for many years without ill effects.

FLUORIDE IN DOMESTIC WATER SUPPLIES

Excessive quantities of fluoride in a water may make it unfit for domestic uses. It is in connection with drinking water that fluoride content has its greatest significance, and in recent years this problem has received considerable attention. It is commonly recognized that waters containing more than 1.5 parts per million of fluoride are likely to cause mottling of tooth enamel in children who drink such waters while their permanent teeth are forming. Mottled tooth enamel is common among the natives of the basin. The occurrence of fluoride-bearing waters in the basin has been discussed, and their distribution can be studied in the tables of analyses in this report.

AVAILABILITY OF SATISFACTORY DOMESTIC WATER SUPPLIES

In most of the populated areas of the basin ground waters are the most likely to be suitable for small domestic supplies, although surface waters are utilized for some public supplies after treatment to make them safe for drinking. From analyses given in this report it is apparent that waters from a large part of Safford Valley and smaller areas in other parts of the basin are too highly mineralized to be satisfactory for most domestic uses. However, in 1944 there was practically no part of the basin with a permanent population located more than a few miles from a supply of water satisfactory for domestic use. In the vicinity of San Simon only a few waters were found that contained sufficiently small amounts of fluoride for them to be satisfactory for drinking water for young children, and in this part of the

[28] Public Health Service drinking water standards and manual of recommended water sanitation practice: Reprint no. 2697, U. S. Pub. Health Serv. Repts., vol. 61, no. 11, pp. 371-384, Mar. 15, 1946.

basin, drinking water free from excessive amounts of fluoride might be difficult to obtain.

LIVESTOCK USE

Drinking water for livestock is of importance in the basin. Although large quantities of water are not required for this purpose, a large number of small scattered developments are necessary. The quality of water need not be as good as that for human consumption, for most animals can tolerate water several times as concentrated as can be used by man. Only the most highly mineralized waters of the basin are unsatisfactory for livestock.

IRRIGATION USE

In the upper Gila River Basin a very large amount of water is used for irrigating crops. Compared with the quantities used in this manner, the quantities used in other ways are insignificant.

In irrigation practice the water applied is disposed of in several different ways. Part is evaporated, and part is used by the plants in their growth or is transpired by them. If an excess of water is applied to the land, part of the excess will run off the surface of the field, and part probably will penetrate the soil below the root zone of the plants and continue down to the ground-water reservoir. The dissolved solids that were originally contained in the water cannot be evaporated or transpired. They may be used to some extent by the plants, but most of them must be removed in some other manner, or continued application of irrigation water may result in such a large accumulation of salts in the soil at the root zone of the plants as to affect plant growth. The concentration of dissolved salts in the root-zone water is usually several times that of the applied irrigation water but should be kept within certain limits. Harmful accumulations of salts in the root zone can generally be prevented by adding an excess of water during irrigation so that some of the water passes downward to the water table, carrying with it salts leached from the soil. Where the drainage of the land is as good as it is in the Safford Valley this procedure is generally effective, but the more dissolved mineral matter the irrigation water contains when it is applied the more difficult it is to hold down the concentration of the dissolved solids of the root-zone water.

This is only one phase of a problem that becomes more complex if the water used has a high percentage of sodium. The analyses in this report include a computation of the percentage of sodium where sufficient analytical data are available. A water containing a high percentage of sodium tends to cause a base exchange reaction in the soil when used for irrigation. In this reaction the calcium in the soil is replaced by the sodium in the water, and as a result the soil becomes less permeable and is more difficult to cultivate. The base exchange reaction cannot be prevented by using an excess of water, but in some areas it has been controlled by adding gypsum to the water or soil. This treatment increases the amount of calcium in the water and retards the base exchange reaction.

BORON IN IRRIGATION WATER

The element boron is essential to proper plant growth. If, however, boron is present in water or soil in excess of a few tenths of a part per million some plants are likely to be damaged. Therefore relatively small amounts of boron in irrigation water may make the water unfit for use on certain types of crops, and the concentration of boron may be sufficient to render the water entirely unfit for all but the most boron-tolerant plants.

Irrigation water containing more than 0.5 part per million of boron, 2.7 parts per million when reported as BO_3, can damage the more sensitive crops.[29] The crops most sensitive to boron are lemons and grapefruit,[30] neither of which are grown in the upper Gila River Basin. Peach, apple, and pecan trees are reported to be sensitive to boron. The first two are grown to a limited extent in Safford Valley and elsewhere in the basin, and in recent years pecans have been cultivated in considerable quantity, though largely in the upper part of the Safford Valley. Cereal grains, corn, and cotton are reported as semitolerant. It is possible that ground waters in some parts of the lower Safford Valley contain enough boron to injure cotton if the soil is not sufficiently well-drained to prevent accumulation of boron in the soil. Onions, alfalfa, and sugar beets are considered tolerant and probably would not be damaged by waters containing relatively high concentrations of boron.

Damage from excessive boron concentrations has not been reported in the Safford Valley or other parts of the upper Gila Basin, but it is possible that continued use of ground water for irrigation may cause damage from this element in time if the ground waters containing large amounts of boron are used to irrigate sensitive crops.

CLASSIFICATION OF IRRIGATION WATERS

From the aspects of the problem of quality of irrigation waters which have been mentioned, it is apparent that it would be difficult to fix definite limits for mineral content of satisfactory irrigation water. Besides the effects that may result from the way in which a water is applied to the land, the texture and drainage of the soil, and

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[29] Scofield, C. S., and Wilcox, L. V., Boron in irrigation water: U. S. Dept. Agr. Tech. Bull. 264, pp. 9–10, 1931.

[30] Eaton, F. M., Boron in soil and irrigation waters and its effect on plants: U. S. Dept. Agr. Tech. Bull. 448, p. 9, 1935.

sensitivity to salts of the crops grown, there are further influences, such as the climate and rainfall of the region, which may be of considerable importance. A flexible set of standards for classification of irrigation waters on the basis of the dissolved solids that they contain has been prepared by the Department of Agriculture.[31] Three classes of water are set up as follows:

	Class 1	Class 2	Class 3
Specific conductance ($K \times 10^5$ at 25° C.)	<100	100–300	>300
Boron (p. p. m.)	<0.5	0.5–2.0	>2.0
Borate (p. p. m.)	<2.7	2.7–10.8	>10.8
Sodium (percent)	<60	60–75	>75
Chloride (p. p. m.)	<177	177–355	>355

Waters in class 1 are considered "excellent to good, suitable for most plants under most conditions"; those in class 2 "good to injurious, probably harmful to the more sensitive crops"; and those in class 3 "injurious to unsatisfactory, probably harmful to most crops and unsatisfactory for all but the most tolerant."

The same publication lists the crops that may be grown satisfactorily on soils of weak, medium, and strong salinity. Plants most sensitive include beans, field peas, oats, and wheat. Less sensitive plants include onions and most of the other vegetables, most grains, and grain crops raised for hay. The plants most tolerant to dissolved solids include cotton, alfalfa, sugar beets, and most grasses.

SURFACE WATERS USED FOR IRRIGATION

On the basis of these standards, it is possible to evaluate roughly the water supplies in the Gila River Basin above Coolidge Dam for use in irrigation. All the surface waters and probably most of the ground waters used for irrigation in the Duncan-Virden area are of "excellent-to-good" quality. However, the ground waters in sections of the Gila Valley southeast of Duncan and between Duncan and Virden are either in the "good-to-injurious" or "injurious-to-unsatisfactory" classifications. These waters were not being used very extensively for irrigation at the time of the investigation. Little trouble has been encountered in the Duncan-Virden Valley with excessive amounts of salts in the soil in the past, and, unless larger quantities of the more highly mineralized waters are used, little trouble from this source may be expected in the future. Some of the more sensitive crops are rather widely grown in this part of the basin, and they would probably show the effects of excessive salt content of the soil rather quickly.

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[31] Wilcox, L. V., and Magistad, O. C., Interpretation of analyses of irrigation waters and the relative tolerance of crop plants, 8 pp., Riverside, Calif., U. S. Bur. Plant Industry, Soils, and Agr. Eng., May 1943. [Mimeographed.]

In the lower part of the basin the surface waters are generally not as good in quality as those available for use in the Duncan-Virden Valley. An indication of the chemical character of surface waters available for irrigation along Gila River below Bonita Creek may be obtained from the analyses in this report. Because the demand for water for irrigation is highest at times of low river flow when salt concentrations in the water are near their maximum, the average concentration of water diverted from the river is likely to be higher than the annual weighted average computed for the river at the point of diversion. Even at low flow, however, the water of the river at the gage near Solomonsville is generally in the upper part of the "good-to-injurious" classification. Since the average quality of water diverted is probably better than that of the river at low flow, there is little reason to believe that surface waters would be likely to cause any difficulty from salt accumulation in the upper part of the Safford Valley. The area is well-drained, and in the past the quantities of water applied were in excess of the amounts actually required by the plants, which resulted in continuous leaching of the soil and root zone. In only a few small areas was damage from salt accumulation above Safford reported in a soil survey of the area made about 10 years ago.[32]

Below Safford the concentration of dissolved matter in the river water increases rapidly, and canals diverting water from the river in the lower part of the Safford Valley may at times receive water that is near or within the "injurious-to-unsatisfactory" classification. When the river flows are higher the water is generally much better in quality, and at least a part of the damage done by use of the more concentrated waters may be remedied by heavy applications of the flood waters. The average quality of surface water used in most of the lower part of the Safford Valley is poorer than that of water used above Safford and probably is near the "good-to-injurious" class. Some damage from accumulation of salt may be observed in parts of the lower Safford Valley, and it was reported in several areas by Poulson and Youngs.[33]

It is generally believed by residents of the Safford Valley that lands in the upper part of the valley are considerably more productive than those in the lower part. Drainage conditions are good in most of the lower part of the valley, and the crops raised are those less sensitive to salts, so that waters of rather poor quality can be used without the damaging effects that might be the result of using similar waters in less well drained localities. The weighted average analysis for Gila River water at Bylas indicates that the water reaching the San

[32] Poulson, E. N., and Youngs, F. O., Soil survey of the upper Gila Valley area, Arizona: U. S. Dept. Agr., Bur. Chem. and Soils [Soil Survey Rept.], ser. 1933, no. 15, 1938.
[33] Poulson, E. N., and Youngs, F. O., op. cit., p. 29.

Carlos Reservoir from this source during 1943 and 1944 was of the "good-to-injurious" type. In a year of higher flow the water would probably have been of somewhat better quality. From the standpoint of quality, waters of Gila River used for irrigation in the Safford Valley have apparently been satisfactory, and they have caused little damage on the whole, in spite of their occasional high concentrations of dissolved mineral matter. If conditions should continue in the future about the same as in the 60 years before 1940, there would be no reason to expect any great amount of trouble caused by salinity from continued use of Gila River water.

GROUND WATERS USED FOR IRRIGATION

Artesian water—Water from artesian wells is used to some extent for irrigation in the basin. In the Cactus Flat-Artesia area, near the town of San Simon, and in a few places along the northern edge of the Pinaleno Mountains, there are small acreages irrigated mainly with ground water from flowing wells. In most of these places the acreages under cultivation have decreased in recent years, generally because the flow from the wells has decreased. Except in the Cactus Flat-Artesia area these artesian waters are low in dissolved matter. There, however, most of the waters are rather highly mineralized, and all of them have a very high percentage of sodium. Continuous use of these waters for irrigation has noticeably impaired the productiveness of some of the land in the Cactus Flat-Artesia area.

Artesian water is available in the Safford Valley, but because of its poor quality it is used for irrigation to only a very limited extent. For several years the highly mineralized water from the Mack well has been allowed to flow into the Dodge-Nevada canal below Pima and mix with the surface water in the canal, and the resulting water has been used for irrigation. Analyses of water from the canal below the well and of water from the well show that at times the canal water practically all comes from the artesian well. Like other artesian waters in the Safford Valley, the water of the Mack well contains large amounts of sodium and chloride, the percentage of sodium being very high. The well water is classified "injurious-to-unsatisfactory," but if mixed with large enough amounts of dilute surface water the mixture probably is suitable for some crops.

Shallow ground water—The entire problem caused by the salt content of irrigation waters in the Safford Valley has probably been greatly aggravated in recent years by the increasing use of shallow ground waters for irrigation, though the seriousness of the problem is not yet fully realized in most of the area. Use of shallow ground water in the Duncan-Virden Valley and more especially in the Safford Valley to provide supplementary supplies for irrigation has increased greatly since its beginning about 1938. In 1944 one-third to one-fourth of the total amount of irrigation water used in the Safford Valley came from wells, but only a small area is entirely dependent upon shallow ground water for its water supply.

In the Duncan-Virden Valley the quality of ground waters that are being used extensively is probably satisfactory, but in the Safford Valley the conditions are very different. It is recognized that much of the recent development of ground-water irrigation in the Safford Valley was necessary to insure a sufficient quantity of water for all the land that is under cultivation when the river is at low stages. However, in many instances little attention has been paid to the quality of the ground water and its suitability for irrigation, and much water has been pumped and used that should be classified as unfit for that purpose. There are ground waters in parts of the Safford Valley that contain small amounts of dissolved matter and can be grouped in the "excellent-to-good" class. However, most of the ground water that is pumped from the irrigation wells is either near the upper limit of concentration for the "good-to-injurious" class or within the "injurious-to-unsatisfactory" group.

If the ground waters are to provide each year as large a part of the irrigation supplies as they did in 1944, precautions will be required to avoid serious damage. It is possible that the drainage of the valley is sufficiently good to allow the continuous use of waters that would elsewhere be considered unfit for irrigation, but this cannot be ascertained until the extensive use of ground waters has been continued for a longer period. In the meantime it should be more widely recognized that many of the waters being pumped and used for irrigation in the Safford Valley are more highly mineralized than would usually be considered satisfactory and that such waters should be used with care.

Irrigation practices that are followed in parts of the Safford Valley tend to counteract to some extent the effects of the highly mineralized waters. A large amount of the pumping is done by the various organized canal companies in the valley, and the water pumped by them empties directly into main irrigation canals where it is mixed with water from Gila River. This mixture applied to the land from the canals diverting water above Safford is probably of satisfactory quality for irrigation most of the time. The river water available at times of low flow for canals diverting below Safford is likely to contain considerable amounts of dissolved matter and may not be appreciably better in quality than the ground water pumped into the canals. Also ground water pumped in the lower parts of the valley is likely to be more highly mineralized than that obtained above Safford. At times of high flow the water from the river is of satisfactory quality, but generally little pumping is done at such times. Much ground water throughout the valley is pumped by individual well owners or from wells owned by two or more farmers and is applied directly without mixing. In some instances the salts that may be left in the soil by the ground water thus used may be leached out by later irrigations with water of low mineralization from surface sources.

It is, of course, inadvisable to use for irrigation ground waters containing amounts of dissolved matter greater than the lower limits of the "injurious-to-unsatisfactory" class, except in emergencies when no other water is available.

REMOVAL OF SALTS FROM THE BASIN BY DRAINAGE INTO GILA RIVER

Earlier in this report it was shown that the soluble salt load carried by Gila River past the Calva gaging station during the 1944 water year was 105,000 tons. This salt load was 20,900 tons greater than the load carried by the river past the gaging station near Solomonsville in the same period. According to the usual concept, a favorable drainage condition in an irrigated area is indicated when a greater quantity of soluble solids leave the area by drainage than enter the area in the water supply.

The simplest interpretation of the gain in salt load of Gila River as it passes through Safford Valley would be that a favorable drainage condition exists, with excess soluble salts being removed from the soil and carried off in drainage waters. However, the significance of the observed gain in load of Gila River in Safford Valley cannot be interpreted so simply. Unknown and probably large quantities of soluble matter are added to the Calva load by surface runoff entering the river below the Solomonsville gaging station. Inflows of artesian water which occur in the lower part of the valley contribute large amounts of soluble salts to the area. The amounts so added are probably sufficient to equal or exceed the observed gain in load of the river from the head of the valley to Calva. Soluble salts from these two additional sources represent for the most part leaching of Tertiary and Pleistocene fill deposits rather than irrigated land, and the gain in river load thus produced is not indicative of conditions in the irrigated lands. Although it is probable that drainage conditions are generally favorable in much of Safford Valley, the observed gain in load of soluble matter of the river should not be taken to indicate that soluble salts are not accumulating in any of the irrigated soils of the valley.

The extent to which the data for the 1944 water year may be indicative of conditions in other years is not known. The period was abnormally dry, and the results for the year probably are not the same as would be obtained in a period of normal or above normal precipitation and runoff.

In considering the "salt balance" for the valley the situation is further complicated because of the increasing use of ground water for irrigation. If the ground water pumped in 1944 had an average concentration of about 2 tons per acre-foot (based on analysis 1,037, fig. 6), the total pumpage of about 52,000 acre-feet[34] in the valley that year would have contained 104,000 tons of dissolved salts, a quantity practically equal to the 105,000 tons of dissolved matter that left the valley in the river at Bylas during the year. If the productiveness of the lands of Safford Valley is to be maintained, the salt left by evaporation and transpiration of the irrigation water must be disposed of in some way. If it all were leached from the soil and returned to the ground water and the ground water did not increase in concentration, nearly all the quantity should show up as a gain in salt load of the river in the valley. These would, of course, be impossibly ideal conditions, and some accumulation of salts in both the soil and ground water probably cannot be avoided. However, unless the future annual gain in salt load of the Gila River between the Solomonsville and Calva gaging stations averages several times as much as that for the year ended September 30, 1944, it would seem that significant quantities of soluble salts are accumulating in the soil and shallow ground waters of the Safford Valley, particularly in the lower part of the valley.

ANALYSES OF SURFACE WATERS AND GROUND WATERS

The analyses of surface-water and ground-water samples from the Gila River basin are included in the following tables. Each analysis has been assigned a number for purposes of identification.

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[34] Turner, S. F., and others, Ground-water resources and problems of the Safford Basin, Ariz., p. 8, U. S. Geol. Survey, 1946. [Mimeographed.]

Changes in the chemical character of the water of Gila River between the mouth of Blue Creek near Virden, N. Mex., and the bridge on United States Highway 666 south of Clifton, Ariz.

[Analyses in parts per million]

Analysis No.	Date sampled and sampling point	Miles below initial point	Discharge (second-feet)	Change in discharge from preceding measuring point (second-feet): Inflow (+) or diversion (−)	Change in discharge: Net gain (+) or loss (−) (unadjusted)	Specific conductance ($K \times 10^5$ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Hardness as $CaCO_3$: Total	Hardness as $CaCO_3$: Noncarbonate	Percent sodium
	1940																		
	May 16:																		
	Below Blue Creek near Virden, N. Mex.	0	95.8																
1	At Virden highway bridge	9.0	31.0	44.9−	19.8−	38	34	12	39	199	31	16			230	0.31	134	0	39
2	At Virden, N. Mex.	12.5	18.5	25.8−	13.3+	43	40	11	44	223	33	17			255	.35	145	0	40
3	At New Mexico-Arizona State line	15.5	18.5	15.3−	15.3+	53	27	12	75	244	44	25			302	.41	117	0	58
4	At Duncan highway bridge	20.2	24.7	2.3+	3.9+	69	38	15	99	264	97	38			417	.57	156	0	58
	Below Colmenero Canal head	24.5	17.4	7.9−	.6+														
	May 17:																		
5	Below Colmenero Canal head	24.5	17.7			66	22	17	101	185	125	44			400	.54	125	0	64
6	At Sandia Wash	27.7	14.7	0	3.0−	86	71	21	94	336	126	44			522	.71	264	0	44
	At Sheldon, Ariz.	31.7	0	6.8−	7.9−														
7	At York, Ariz.	37.1	15.3	0	15.3+	54	19	11	89	188	77	36			325	.44	93	0	68
8	At Rustlers Canyon	44.5	30.5	0	15.2+	58	38	10	78	223	73	33			342	.47	136	0	55
9	At gaging station near Clifton, Ariz.	50.6	28.7	0	1.8−	56	37	10	79	225	72	32			341	.46	134	0	56
	July 9:																		
10	Below Blue Creek near Virden, N. Mex.	0	31.0			47	52	13	35	242	35	18			272	.37	183	0	30
11	At Virden highway bridge	9.0	.9	30.2−	.1+	44	50	12	32	231	30	16			254	.35	174	0	28
12	At Virden, N. Mex.	12.5	4.2	3.0−	6.3+	53	58	13	42	276	35	19			303	.41	198	0	32
13	At New Mexico-Arizona State line	15.5	4.9	3.0−	3.7+	71	62	14	86	371	54	27			426	.58	212	0	47
14	At Duncan highway bridge	20.2	4.4	0	.5−	88	48	21	122	272	170	50			545	.74	206	0	56
	Below Colmenero Canal head	24.5	0	3.4−	1.0−														
15	At Sandia Wash	27.7	2.0	0	2.0+	89	54	21	115	270	165	56			544	.74	221	0	53
	At Sheldon, Ariz.	31.7	0	0	2.0−														

Changes in the chemical character of the water of Gila River between the mouth of Blue Creek near Virden, N. Mex., and the bridge on United States Highway 666 south of Clifton, Ariz.—Continued

[Analyses in parts per million]

Analysis No.	Date sampled and sampling point	Miles below initial point	Discharge (second-feet)	Change in discharge from preceding measuring point (second-feet): Inflow (+) or diversion (−)	Change in discharge from preceding measuring point (second-feet): Net gain (+) or loss (−) (unadjusted)	Specific conductance ($K \times 10^5$ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Hardness as $CaCO_3$: Total	Hardness as $CaCO_3$: Noncarbonate	Percent sodium
	1940																		
	July 10:																		
16	At York, Ariz.	37.1	12.9	0	12.9+	56	36	11	73	222	69	34	---	---	328	0.45	135	0	54
17	At Rustlers Canyon	44.5	22.5	0	9.6+	57	30	9.2	83	217	67	33	---	---	328	.45	113	0	62
18	At gaging station near Clifton, Ariz.	50.6	21.9	0	.6−	56	28	8.7	83	214	63	32	---	---	320	.44	106	0	63
	Sept. 3:																		
19	Below Blue Creek near Virden, N. Mex.	0	29.9	---	---	47	54	15	34	252	39	16	---	---	282	.38	196	0	27
20	At Virden highway bridge	9.0	4.9	33.2−	8.2+	44	54	14	29	238	38	15	---	---	267	.36	192	0	25
21	At Virden, N. Mex.	12.5	4.9	7.6−	7.6+	50	66	15	31	277	37	19	---	---	305	.41	226	0	23
	At New Mexico-Arizona State line	15.5	5.6	3.2−	3.9+	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	Sept. 4:																		
22	At New Nexico-Arizona State line	15.5	6.5	---	---	70	80	17	52	357	53	24	---	---	402	.55	270	0	29
23	At Duncan highway bridge	20.2	3.9	0	2.6−	88	64	25	96	292	160	46	---	---	535	.73	263	23	44
24	At York, Ariz.	37.1	---	---	---	54	37	11	70	198	75	34	---	---	325	.44	138	0	52
	Oct. 8:																		
	Below Blue Creek near Virden, N. Mex.	0	81.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
25	At New Mexico-Arizona State line	15.5	44.3	---	---	46.5	48	15	41	244	35	19	2.1	1.0	281	.38	181	0	33
26	At Duncan highway bridge	20.2	65.6	0	21.3+	51.0	52	18	42	258	46	20	2.1	1.2	308	.42	204	0	31
27	Above Colmenero Canal head	24.4	56.2	0	9.4−	54.6	54	17	46	265	53	23	---	1.2	325	.44	205	0	33
	Oct. 9:																		
28	Below Colmenero Canal head	24.5	40.2	---	---	59.0	58	19	49	280	61	25	---	1.0	351	.48	223	0	32
29	At Sandia Wash	27.7	37.3	0	2.9−	59.0	59	17	53	281	62	26	---	1.0	356	.48	217	0	35
30	At Sheldon, Ariz.	31.7	31.7	0	5.6−	58.9	58	17	54	280	64	24	---	1.0	356	.48	215	0	35
31	At York, Ariz.	37.1	40.1	1.7−	10.1+	57.4	50	15	58	251	61	28	---	4.7	341	.46	186	0	40
32	At Rustlers Canyon	44.5	47.6	0	7.5+	56.2	46	14	66	255	64	28	---	1.2	345	.47	172	0	46

	Oct. 10:																		
33	At gaging station near Clifton, Ariz	50.6	52.2	0	4.6+	56.7	45	13	68	252	63	29	------	1.2	343	.47	166	0	47
	Oct. 21:																		
34	Below Blue Creek near Virden, N. Mex.	0	56.0	--------	--------	43.7	46	12	37	224	32	19	------	.4	256	.35	164	0	33
	Oct. 22:																		
35	At Virden highway bridge	9.0	32.1	25.6−	1.7+	42.8	47	14	33	226	35	17	------	.2	257	.35	175	0	29
36	At Virden, N. Mex	12.5	16.5	22.2−	6.6+	44.8	49	13	36	240	31	17	------	.4	264	.36	176	0	31
37	At New Mexico-Arizona State line	15.5	24.7	2.8+	5.4+	51.8	52	14	48	271	40	19	------	.8	308	.42	187	0	36
38	At Duncan highway bridge	20.2	34.1	0	9.4+	59.4	58	14	66	294	67	24	------	.6	374	.51	202	0	41
	Oct. 23:																		
	At Duncan highway bridge	20.2	36.7	--------	--------	--------	------	------	--------	--------	------	------	------	------	------	------	------	------	------
39	Below Colmenero Canal head	24.5	32.2	0	4.5−	63.0	62	16	65	294	76	29	------	1.0	394	.54	221	0	39
40	At Sandia Wash	27.7	26.7	0	5.5−	62.8	60	17	63	289	74	30	------	.4	386	.52	220	0	38
	At Sheldon, Ariz	31.7	22.8	0	3.9−	--------	------	------	--------	--------	------	------	------	------	------	------	------	------	------
	Oct. 24:																		
41	At Sheldon, Ariz	31.7	29.3	--------	--------	67.3	62	18	74	304	89	34	------	.6	428	.58	229	0	41
42	At York, Ariz	37.1	35.0	2.6−	8.3+	63.9	50	17	77	270	86	35	------	1.0	399	.54	195	0	46
43	At Rustlers Canyon	44.5	41.9	0	6.9+	61.0	46	15	77	248	85	37	------	.4	382	.52	176	0	49
	Oct. 25:																		
44	At gaging station near Clifton, Ariz	50.6	45.0	0	3.1+	61.5	46	14	77	251	81	35	------	.4	377	.51	172	0	49
	Oct. 29:																		
45	At gaging station near Clifton, Ariz	50.6	51	--------	--------	60.6	46	19	69	259	74	38	------	------	374	.51	193	0	44
	1941																		
	May 26:																		
46	Below Blue Creek near Virden, N. Mex	0	309	--------	--------	27.8	30	10	19	133	33	10	------	------	168	.23	116	7	26
47	At Virden highway bridge	9.0	280	49.7−	20.7+	27.8	30	10	20	136	33	9.0	------	------	169	.23	116	5	27
	May 27:																		
48	At Virden highway bridge	9.0	295	--------	--------	27.6	30	8.7	22	133	30	13	------	------	170	.23	111	2	30
49	At Virden, N. Mex	12.5	254	32.4−	8.6−	27.7	30	8.7	22	135	30	11	------	------	169	.23	111	0	44
50	At New Mexico-Arizona State line	15.5	280	17.6−	43.6+	30.4	33	9.6	22	152	29	11	------	------	180	.24	122	0	28
51	At Duncan highway bridge	20.2	251	2.2−	26.8−	34.5	35	12	26	164	36	15	------	------	205	.28	137	2	29
	May 28:																		
52	At Duncan highway bridge	20.2	289	--------	--------	34.5	34	9.6	32	164	37	15	------	------	209	.28	124	0	36
53	Below Colmenero Canal head	24.5	300	0	11.0+	36.3	36	12	28	167	41	14	------	------	213	.29	139	2	30
54	At Sandia Wash	27.7	270	6.7−	23.3−	37.4	37	10	34	168	43	17	------	------	224	.30	133	0	35
55	At Sheldon, Ariz	31.7	230	9.5−	30.5−	37.4	38	10	34	173	42	17	------	------	226	.31	136	0	35
56	At York, Ariz	37.1	254	3.4−	27.4+	39.0	38	11	34	174	45	17	------	------	231	.31	140	0	34

Changes in the chemical character of the water of Gila River between the mouth of Blue Creek near Virden, N. Mex., and the bridge on United States Highway 666 south of Clifton, Ariz.—Continued

[Analyses in parts per million]

Analysis No.	Date sampled and sampling point	Miles below initial point	Discharge (second-feet)	Change in discharge from preceding measuring point (second-feet): Inflow (+) or diversion (−)	Change in discharge from preceding measuring point (second-feet): Net gain (+) or loss (−) (unadjusted)	Specific conductance ($K \times 10^5$ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Hardness as $CaCO_3$: Total	Hardness as $CaCO_3$: Noncarbonate	Percent sodium
	1941																		
	May 29:																		
57	At York, Ariz	37.1	232			40.1	38	10	37	174	46	18			235	.32	136	0	37
58	At Rustlers Canyon	44.5	259	0	27.0+	40.7	37	12	37	178	48	18			240	.33	142	0	36
59	At gaging station near Clifton, Ariz	50.6	251	0	8.0−	41.2	36	10	44	178	53	18			249	.34	131	0	42
	July 7:																		
60	Below Blue Creek near Virden, N. Mex	0	50.7			43.3	46	13	35	223	36	15	1.1	0.8	257	.35	168	0	31
61	At Virden highway bridge	9.0	26.2			41.3	44	12	34	214	32	13	1.3	1.4	243	.33	159	0	31
62	At Virden, N. Mex	12.5	33.5			44.8	49	13	34	231	33	15	1.5	.8	260	.35	176	0	30
	July 8:																		
63	At Virden, N. Mex	12.5	31.1			44.3	50	12	34	230	33	14	1.6	.4	258	.35	174	0	29
64	At New Mexico-Arizona State line	15.5	15.9			61.6	58	14	63	310	49	21	1.6	1.8	361	.49	202	0	42
65	At Duncan highway bridge	20.2	41.9			66.4	39	13	103	288	81	30	1.7	7.8	417	.57	151	0	60
	July 9:																		
66	At Duncan highway bridge	20.2	40.9			71.0	68	14	75	320	77	30	1.7	1.8	425	.58	227	0	42
67	Below Colmenero Canal head	24.5	37.5			74.1	64	16	87	315	97	35	1.6	2.0	458	.62	226	0	45
68	At Sandia Wash	27.7	28.0			68.6	47	16	88	261	101	34	1.7	2.0	418	.57	183	0	51
69	At Sheldon, Ariz	31.7	18.8			72.4	60	19	76	288	97	35	1.7	2.0	433	.59	228	0	42
	July 10:																		
70	At Sheldon, Ariz	31.7	12.5			74.8	62	20	80	303	101	36	1.8	1.4	452	.61	237	0	42
71	Near Apache Grove, Ariz	35.6	32.1			61.1	40	12	83	235	80	34	1.1	2.0	368	.50	149	0	54
72	At York, Ariz	37.1	30.1			59.3	38	14	75	222	81	31	1.7	1.8	352	.48	152	0	52
73	3 miles below York, Ariz	40.1	28.6			57.7	34	10	83	210	81	33	1.1	1.4	347	.47	126	0	59

	July 11:																		
74	3 miles below York, Ariz.	40.1	23.8	--------	--------	59.8	42	12	77	234	76	33	1.3	1.4	358	.49	154	0	52
75	At Rustlers Canyon	44.5	34.2	--------	--------	58.7	36	11	82	227	72	33	1.6	1.0	348	.47	135	0	57
76	At gaging station near Clifton, Ariz.	50.6	39.6	--------	--------	57.2	35	10	82	223	71	32	1.6	.8	342	.47	128	0	58
	1943																		
	June 15:																		
77	At gaging station near Clifton, Ariz.	50.6	23	--------	--------	53.6	------	------	--------	--------	------	30	------	------	------	------	------	------	------
	1944																		
	Aug. 1:																		
78	At New Mexico-Arizona State line	15.5	-------	--------	--------	51.2	50	12	50	262	35	17	2.5	1.5	297	.40	174	0	38
79	At gaging station near Clifton, Ariz.	50.6	-------	--------	--------	53.8	39	5.9	77	230	56	26	2.3	.5	320	.44	122	0	58
	Nov. 1:																		
80	At New Mexico-Arizona State line	15.5	-------	--------	--------	44.6	45	9.6	45	229	30	17	2.4	1.0	263	.36	152	0	39
81	At gaging station near Clifton, Ariz.	50.6	-------	--------	--------	50.6	44	9.0	60	229	47	24	2.4	1.0	300	.41	147	0	47

Chemical character of ground waters in the Gila River Basin, Grant County, N. Mex.

[Analyses in parts per million]

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (° F.)	Specific conductance (K×10[5] at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Total hardness as $CaCO_3$	Percent sodium
82	Spring in bed of Bitter Creek	T. 16 S., R. 21 W.: SW¼ sec. 20	Sept. 20, 1941		1	69	255	536	67	62	164	1,519	21	1.1	0.8	2,288	3.11	1,613	8
83	Thanksgiving Mine Spring	T. 17 S., R. 20 W.: N½ sec. 16	Oct. 5, 1941		100		70.3	79	35	35	379	61	27	1.5	.4	426	.58	341	18
84	Dug well	T. 17 S., R. 21 W.: NE¼ sec. 19	Sept. 17, 1941	20			182	268	52	109	144	914	31	1.4	2.5	1,449	1.97	883	21
85	Spring at fault in volcanic rocks.	NE¼ sec. 18	do		1	69	118	56	93	83	439	283	21	.9	20	773	1.05	522	26
86	Spring at mouth of wash at Fuller Ranch.	T. 19 S., R. 19 W.: NE¼SW¼ sec. 18	July 7, 1941			75	43.9	47	13	37	236	32	13	2.0	1.8	262	.36	171	32

Chemical character of ground waters in the Gila River Basin, Hidalgo County, N. Mex.

[Analyses in parts per million]

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (° F.)	Specific conductance (K×10⁵ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Total hardness as $CaCO_3$	Percent sodium
87	Floyd Johns domestic well	T. 19 S., R. 20 W.: NE¼NW¼ sec. 18	Feb. 29, 1940	60		69	47				163	56	37	1.2	2.7			27	
88	A. Biarano domestic well	T. 19 S., R. 21 W.: SE¼NW¼ sec. 2	do	52			104				538	70	31	3.4	5.5			105	
89	do	do	Oct. 22, 1941	52			145	44	14	314	828	87	38	4.4	20	929	1.26	167	80
90	Otto Gale domestic well	SW¼NW¼ sec. 5	Jan. 30, 1940	38			82				448	40	27	.4	3.5			172	
91	R. Skaggs domestic well	NE¼SE¼ sec. 12	Feb. 29, 1940			60	77				440	20	24	1.7	.8			240	
92	do	NE¼NE¼ sec. 13	do	17		54	52				264	20	17	.7	2.0			195	
93	Seep on right bank of Gila River.	NW¼NE¼ sec. 5	July 8, 1941		0.1	72	88.5	66	17	123	448	72	37	2.8	1.6	540	.73	235	53
94	Spring on right bank of Gila River.	SE¼NE¼ sec. 4	do		10	73	46.3	56	12	38	232	36	20	1.3	14	292	.40	189	30
95	Spring on Gila River bank	SW¼SE¼ sec. 3	July 7, 1941		5		62.0	73	18	43	337	40	19	1.5	.2	361	.49	256	27
96	Spring in Gila River Channel	NE¼SE¼ sec. 11	do		20	75	49.4	54	14	39	249	31	22	2.0	5.0	290	.39	192	31
97	do	SW¼NE¼ sec. 13	do			80	69.7	72	15	62	274	72	51	1.3	1.8	410	.56	241	36
98	Developed spring in canyon wall.	T. 18 S., R. 21 W.: NW¼SE¼ sec. 12	Aug. 24, 1941		.5	69	54.0	21	20	79	315	26	13	.3	.6	315	.43	135	56
99	P. Lunt stock well	SW¼NW¼ sec. 32	Jan. 30, 1940	114			530	456	289	666	337	3,070	100		199	4,950	6.73	2,325	38
100	John Pierce domestic well	SE¼SE¼ sec. 32	Feb. 29, 1940	30		56	110				406	50	83	2.6	62			172	

Chemical character of ground waters in the Gila River Basin above bridge on

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (° F.)
		T. 9 S., R. 32 E.:				
101	Dug well	NE¼NW¼ sec. 9	Oct. 21, 1941			67
		T. 8 S., R. 32 E.:				
102	Driven observation well	SW¼SE¼ sec. 34	Feb. 26, 1941	15		
103	do	NE¼SW¼ sec. 34	do	9		
104	do	SE¼NW¼ sec. 34	do	9		
105	do	NW¼SW¼ sec. 34	do	15		
106	R. Davis domestic well	SW¼SE¼ sec. 17	Jan. 31, 1940	71		
107	Luis Deane stock well	NW¼NW¼ sec. 19	Feb. 29, 1940	30		63
108	do	do	Oct. 31, 1941	30		66
109	W. M. Zumwalt domestic well	SW¼SE¼ sec. 19	Feb. 29, 1940	36		61
110	Franklin irrigation district well	SE¼SW¼ sec. 28	Aug. 7, 1940	77		58
111	J. D. Wilkins domestic well	SE¼NW¼ sec. 29	Mar. 4, 1940	27		60
112	J. D. Wilkins stock well	SE¼SE¼ sec. 30	July 26, 1940	20		
113	Delbert Moyers stock well	SE¼SW¼ sec. 32	Feb. 29, 1940	110		66
114	do	do	Oct. 20, 1941	110		66
115	V. L. Crotts irrigation well	SW¼SE¼ sec. 33	Aug. 7, 1940	50		
116	G. A. Moffett irrigation well	SE¼NW¼ sec. 34	Oct. 1, 1940	55		61
117	Franklin irrigation district well [1]	SW¼NE¼ sec. 34	Sept. 10, 1940	92		53
118	do	do	Mar. 3, 1941	92		64
119	do	do	do	92		64
120	do	do	do	92		64
121	do	do	do	92		64
122	do	do	do	92		63
123	do	do	Mar. 4, 1941	92		63
124	do	do	do	92		64
125	do	do	Mar. 5, 1941	92		63
126	do	do	Mar. 6, 1941	92		63
127	do	do	Mar. 7, 1941	92		63
128	do	do	Mar. 8, 1941	92		
129	do	do	Mar. 9, 1941	92		64
130	Spring in Rainville Wash	NW¼NW¼ sec. 32	Jan. 30, 1940		70	
131	do	do	July 8, 1941		10	
132	do	do	Aug. 1, 1944		25	
133	Seep on right bank of Gila River	NW¼SW¼ sec. 34	July 8, 1941		1	80
134	Spring near mouth of Railroad Wash.	SW¼NE¼ sec. 33	do			
135	Seep on Gila River bank	SE¼SW¼ sec. 20	do		1	72
136	D. E. Wilkins unused well	NE¼NW¼ sec. 32	Feb. 29, 1940	18		54
		T. 7 S., R. 32 E.:				
137	Drilled stock well	NW¼ sec. 33	Sept. 15, 1941			
		T. 8 S., R. 31 E.:				
138	Franklin irrigation district well	SW¼NE¼ sec. 11	Aug. 8, 1940	71		53
139	do	do	Aug. 12, 1941	71		
140	do	NW¼SE¼ sec. 11	Aug. 8, 1940	75		51
141	do	do	July 9, 1941	75		
142	J. C. Campbell domestic well	SE¼SE¼ sec. 12	Jan. 31, 1940	60		67
143	do	do	Oct. 23, 1941	60		68
144	O. W. Claridge irrigation well	NE¼SE¼ sec. 13	July 8, 1940	50		
		T. 7 S., R. 31 E.:				
145	Z. A. Woods irrigation well	NE¼NE¼ sec. 16	Oct. 3, 1940	29		
146	M. M. Casper domestic well	NE¼NW¼ sec. 16	Mar. 1, 1940	27		53
147	E. Campbell domestic well	NE¼SW¼ sec. 21	Jan. 31, 1940	38		
148	W. M. Zumwalt domestic well	NE¼NW¼ sec. 34	do	52		61
149	Spring on left bank of Gila River	SE¼NE¼ sec. 8	July 10, 1941		3	81
150	Spring on right bank of Gila River	NE¼NE¼ sec. 8	do		5	62
		T. 6 S., R. 31 E.:				
151	Driven observation well	SE¼NW¼ sec. 7	Mar. 2, 1941	15		68
152	J. H. Chapman domestic well	SW¼NW¼ sec. 20	Jan. 31, 1940	36.3		63
153	Seepage in Gila River channel	NW¼NE¼ sec. 18	July 10, 1941		1	80
154	Spring in Gila River channel	SW¼NE¼ sec. 7	do		10	
		T. 5 S., R. 31 E.:				
155	Dug well	SE¼NW¼ sec. 6	Oct. 7, 1941			
		T. 6 S., R. 30 E.:				
156	Spring at mouth of small wash	NE¼SW¼ sec. 1	July 11, 1941		1	
157	Spring on right bank of Gila River	SW¼SW¼ sec. 1	do		15	
		T. 5 S., R. 30 E.:				
158	Spring at contact, volcanics-fill	S½NE¼ sec. 11	Sept. 24, 1941		2	70

[1] Samples for analyses 118 to 129 were taken at intervals during a pumping test.

United States Highway 666 south of Clifton, Greenlee County, Ariz.

[Analyses in parts per million]

Specific conductance ($K \times 10^5$ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Flouride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Total hardness as $CaCO_3$	Per cent sodium	Analysis No.
222	45	39	436	295	893	15	3.5	24	------	1,601	2.18	273	78	101
100	88	19	124	471	99	37	4.0	20	------	623	.85	298	48	102
99.0	86	20	124	494	91	36	3.9	6.7	------	611	.83	297	48	103
104	90	19	130	512	99	35	3.7	5.0	------	634	.86	303	48	104
80.5	74	1.3	117	384	74	31	3.1	------	------	489	.67	190	57	105
133	------	------	------	61	569	11	1.8	.8	2	------	------	255	------	106
167	------	------	------	365	350	205	3.1	10	------	------	------	578	------	107
194	------	------	------	392	------	246	------	------	------	------	------	------	------	108
88	------	------	------	272	60	117	1.9	1.0	------	------	------	60	------	109
99	83	25	109	397	153	44	------	------	------	610	.83	310	43	110
300	------	------	------	602	850	125	4.6	.5	------	------	------	278	------	111
130	------	------	------	614	60	44	4.6	90	------	------	------	120	------	112
400	------	------	------	349	1,600	480	3.1	1.0	------	------	------	94	------	113
409	------	------	------	349	------	472	------	------	------	------	------	------	------	114
360	------	------	------	280	1,305	225	------	------	------	------	------	300	------	115
141	62	27	210	331	368	45	2.0	------	------	877	1.19	266	63	116
126	95	21	179	486	247	41	------	------	------	822	1.12	323	55	117
117	86	18	160	467	185	43	------	------	------	722	.98	289	55	118
115	86	18	157	473	181	38	------	------	------	713	.97	289	54	119
114	86	17	155	468	178	38	------	------	------	704	.96	285	54	120
115	86	18	152	468	175	38	------	------	------	700	.95	289	53	121
115	86	18	151	468	173	37	------	------	------	696	.95	289	53	122
113	86	19	151	466	179	37	------	------	------	702	.95	293	53	123
121	88	22	164	473	186	60	------	------	------	753	1.02	310	53	124
115	88	19	156	473	187	39	------	------	------	722	.98	298	53	125
117	89	20	153	471	188	39	------	------	------	721	.98	304	52	126
119	86	19	164	473	197	40	------	------	------	739	1.01	293	55	127
119	92	23	150	474	199	38	------	------	------	736	1.00	324	50	128
121	94	23	154	478	205	41	------	------	------	752	1.02	329	50	129
201	32	35	389	603	376	131	------	------	------	1,260	1.71	224	79	130
398	26	48	847	504	953	490	2.8	1.5	------	2,620	3.56	262	88	131
277	36	40	563	570	615	255	4.6	.0	------	1,790	2.43	254	83	132
66.3	73	16	49	330	46	23	1.3	.2	------	371	.50	248	30	133
88.6	79	38	63	417	83	40	1.8	1.2	------	511	.69	353	28	134
140	103	33	182	361	359	80	.9	5.0	------	941	1.28	393	50	135
250	------	------	------	1,762	15	79	2.6	.6	------	------	------	270	------	136
42.2	20	7.2	68	198	42	11	.8	5.3	------	252	.34	80	65	137
154	130	29	195	490	307	104	------	------	------	1,006	1.37	444	49	138
133	103	23	176	427	247	85	1.6	4.0	------	850	1.16	352	52	139
72	80	17	63	282	99	52	------	------	------	450	.61	270	34	140
68.6	64	13	72	270	91	35	1.1	1.0	------	410	.56	213	42	141
78	------	------	------	238	150	55	2.0	1.4	------	------	------	142	------	142
124	------	------	------	243	------	185	------	------	------	------	------	------	------	143
192	------	------	------	486	340	184	------	------	------	------	------	405	------	144
54	56	14	42	248	53	22	------	------	------	309	.42	197	32	145
41	------	------	------	177	12	18	1.2	1.4	------	------	------	135	------	146
58	------	------	------	273	16	26	.0	1.8	------	------	------	202	------	147
74	------	------	------	315	30	34	1.1	3.8	------	------	------	240	------	148
62.6	70	22	40	284	70	29	1.3	1.6	------	374	.51	265	25	149
39.0	40	12	25	169	41	13	1.4	.6	------	216	.29	149	27	150
67.0	48	12	90	281	81	34	1.0	.6	------	405	.55	169	54	151
125	------	------	------	297	100	122	3.4	1.5	------	------	------	54	------	152
63.3	45	14	79	267	71	34	.1	1.4	------	376	.51	170	50	153
51.0	36	33	24	205	66	26	1.1	1.2	------	288	.39	225	19	154
75.9	87	33	34	372	81	24	.6	2.5	------	445	.61	353	17	155
55.8	24	7.4	94	229	58	29	1.6	1.2	------	328	.45	90	69	156
49.7	16	5.7	91	196	53	29	1.4	.8	------	294	.40	63	76	157
47.0	55	22	15	290	10	7.0	.4	2.5	------	255	.35	228	13	158

Chemical character of the water of Gila River between the bridge on United States Highway 666 south of Clifton, Ariz., and the mouth of Bonita Creek near Solomonsville, Ariz.

[Analyses in parts per million]

Analysis No.	Date sampled	Mean discharge (second-feet)	Specific conductance ($K \times 10^5$ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Borate (BO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Hardness as $CaCO_3$: Total	Hardness as $CaCO_3$: Noncarbonate	Percent sodium
1 mile below bridge on United States Highway 666 near Clifton, Ariz.															
159	Nov. 18, 1940	101	53.1	48	15	51	244	54	26	------	314	0.43	182	0	38
200 yards above Gillard Hot Springs, near Clifton, Ariz.															
160	Nov. 18, 1940	------	52.4	47	12	57	240	56	25	------	315	.43	167	0	43
½ mile below Gillard Hot Springs, near Clifton, Ariz.															
161	Nov. 18, 1940	------	54.4	45	14	59	242	55	30	0.8	322	.44	170	0	43
5 miles below bridge on United States Highway 666, near Clifton, Ariz.															
162	Nov. 18, 1940	------	53.4	45	15	56	242	58	28	------	322	.44	176	0	41
½ mile below San Francisco River near Clifton, Ariz.[1]															
163	Nov. 18, 1940	------	80.8	59	14	95	221	46	130	------	453	.62	205	24	50
1 mile below San Francisco River near Clifton, Ariz.															
164	Nov. 18, 1940	------	86.4	60	17	94	217	44	142	------	464	.63	220	42	48

[1] Sample collected near bank; not representative because of incomplete mixing of waters from San Francisco and Gila Rivers.

Chemical character of the water of San Francisco River and its tributaries and of Eagle and Bonita Creeks

[Analyses in parts per million]

Analysis No.	Date sampled	Discharge (second-feet)	Specific conductance (K×10⁵ at 25° C.)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids		Hardness as $CaCO_3$		Percent sodium
															Parts per million	Tons per acre-foot	Total	Noncarbonate	
	San Francisco River 3 miles above Clifton, Ariz.																		
165	Aug. 3, 1941		49.6			50	16	60	217	28	79	1.1	0.2		341	0.46	191	12	41
166	Aug. 1, 1944		64.4								92								
	San Francisco River 2 miles above Clifton, Ariz.																		
167	Oct. 29, 1940		56.2			48	14	60	218	27	71				327	0.44	177	0	42
168	Aug. 11, 1941	139	45.1			44	13	37	190	21	45	0.4	1.6		256	.35	163	7	33
169	June 15, 1943		56.4								76								
170	Jan. 10, 1944		54.7			44	12	58	204	17	70	.8	.2	0.4	302	.41	160	0	44
171	Aug. 1		63.7			48	14	68	213	21	92		.2		348	.47	178	3	46
172	Nov. 1		57.6			49	12	59	211	16	77	.8	.5	.2	318	.43	172	0	43
	San Francisco River at gaging station at Clifton, Ariz.																		
173	Sept. 28, 1940	81	118			72	16	154	209	27	270				642	0.87	245	74	58
174	Oct. 8	87	108			70	14	144	219	27	240				603	.82	232	53	57
175	Oct. 16	65	115			74	15	150	217	26	260				632	.86	246	68	57
176	Oct. 28	58	133			80	17	173	218	26	312				715	.97	270	91	58
177	Oct. 29	63	130			80	17	167	214	26	305				700	.95	270	94	57
178	Nov. 6	60.3	134			82	11	182	206	25	320				721	.98	250	81	61
179	Nov. 15	57.6	130			81	11	174	210	19	308				697	.95	247	75	61
180	Nov. 27	126	97.9			68	12	121	191	35	205				535	.73	219	62	55
181	Dec. 6	90.7	124			75	12	164	202	24	285				660	.90	237	71	60
182	Aug. 11, 1941	141.5	77.6			58	14	90	196	25	147	1.1	1.8		434	.59	202	41	49
183	Aug. 3		73.7			67	14	74	168	59	129	1.2	1.0		428	.58	225	87	42
184	Jan. 10, 1944	60	116			72	13	156	206	19	270	.8	.5	0.6	633	.86	233	64	59
185	Aug. 1	25	126			76	17	161	213	23	290	1.2	.2	.5	673	.92	260	85	57
186	Nov. 1	50	99.5			65	12	128	211	17	210	1.0	1.0	.5	538	.73	212	38	57
187	June 21–28, 1943 [1]	22	216	44	0.09	110	19	301	191	26	580	1.4	2.5	.6	1,178	1.60	352	196	65
188	Sept. 24–29 [2]	258	46.2	30	.19	38	9.3	40	113	42	58	.6	1.5	.5	275	.37	133	40	40
189	June 21–30, 1944 [3]	19.3	160	48	.06	82	14	226	190	24	400	1.0	2.0	.2	890	1.21	262	106	63
190	Sept. 25–29 [4]	705	31.3	35	.46	34	8.7	21	143	13	21	.5	.2	.0	204	.28	121	4	24
191	1943–44 [5]	70.1	91.8	41	.16	60	13	119	193	18	195	.7	1.3	.3	543	.74	203	45	53

See footnotes at end of table.

Chemical character of the water of San Francisco River and its tributaries and of Eagle and Bonita Creeks—Continued

[Analyses in parts per million]

Analysis No.	Date sampled	Discharge (second-feet)	Specific conductance ($K \times 10^5$ at 25° C.)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Hardness as $CaCO_3$: Total	Hardness as $CaCO_3$: Noncarbonate	Percent sodium
San Francisco River at mouth, near Clifton, Ariz.																			
192	Nov. 18, 1940	58	137	------	------	86	18	174	204	32	330	0.8	------	0.1	742	1.01	289	121	57
Blue River above Juan Miller Creek, near Clifton, Ariz.																			
193	June 25, 1944	3.3	64.1	------	------	61	20	44	227	22	85	------	------	3.2	344	0.47	234	48	29
Chase Creek 2.5 miles above Clifton, Ariz.																			
194	Aug. 1, 1944	------	276	------	6.0	------	------	------	(6)	1,730	23	------	------	------	------	------	------	------	------
Chase Creek at mouth, Clifton, Ariz.																			
195	Aug. 11, 1941	0.05	193	------	7.9	175	73	------	(7)	958	32	------	0.5	------	------	------	------	------	------
Eagle Creek at Phelps Dodge pumping plant, near Morenci, Ariz.																			
196	Sept. 11–20, 1943 [1]	------	47.9	47	0.09	43	21	31	258	8.1	28	0.6	0.1	0.5	306	0.42	194	0	26
197	Sept. 28 [2]	------	20.2	------	------	------	------	------	------	------	2.0	------	------	------	------	------	------	------	------
198	Oct. 28–31 [8]	------	45.7	42	.04	43	20	38	250	12	29	.6	6.9	.2	315	.43	190	0	27
199	Feb. 21–29,[9] 1944	------	45.1	45	.04	43	20	30	254	8.5	25	.5	.2	------	298	.41	190	0	22

Eagle Creek at mouth, near Morenci, Ariz.

200	Nov. 18, 1940	10	52.0			44	23	40	274	17	34	0.1		0.1	293	0.40	204	0	30
201	Nov. 19	35	21.3			24	8.3	10	104	16	10				119	.16	94	9	19

Bonita Creek 1/4 mile above mouth near Solomonsville, Ariz.

202	Nov. 19, 1940	10	25.0			28	14	5.6	138	16	7				139	0.19	127	14	9

1 Maximum concentration for period June 15 to Sept. 30, 1943.
2 Minimum concentration for period June 15 to Sept. 30, 1943.
3 Maximum concentration for year ended Sept. 30, 1944.
4 Minimum concentration for year ended Sept. 30, 1944.
5 Weighted average for year ended Sept. 30, 1944.
6 Total acidity as H_2SO_4, 256 parts per million.
7 Acid to methyl orange.
8 Maximum concentration for period Oct. 1, 1943, to Apr. 10, 1944.
9 Minimum concentration for period Oct. 1, 1943, to Apr. 10, 1944.

Chemical character of ground waters near Gila River between the bridge on United States Highway 666 south of Clifton, Ariz., and the mouth of Bonita Creek near Solomonsville, Ariz.

[Analyses in parts per million]

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (° F.)	Specific conductance (K x 10⁵ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Total hardness as $CaCO_3$	Percent sodium
203	Seepage in Gila River bed	T. 5 S., R. 29 E. SE¼SE¼ sec. 21	Nov. 18, 1940		10		114	71	19	140	239	62	212			0.6	622	0.85	255	54
204	Spring at Gillard Hot Springs	NE¼NE¼ sec. 27	do		6	181	217	27	3.5	437	228	174	470			.8	1,224	1.66	82	92
205	Seep at Gillard Hot Springs	do	do		1	170	225	26	3.1	448	196	178	500			.9	1,252	1.70	78	93
206	Spring at Gillard Hot Springs	do	do		2	181	222	22	2.2	450	215	182	480			.7	1,242	1.69	64	94
207	do	do	May 22, 1944				224	28	4.7	449	217	183	475	10	1.0	3.0	1,260	1.71	90	92
208	Well at Gillard Hot Springs	do	Nov. 18, 1940	26			239	24	3.9	494	224	193	520	12		.8	1,357	1.85	76	93
209	Seep on Gila River, right bank.	NW¼NW¼ sec. 27	do			86	231	50	9.6	442	281	195	490				1,325	1.80	164	85
210	Spring on Gila River, left bank.	do	do		20		115	56	15	174	212	109	200	4.3			662	.90	201	65
211	Spring in canyon bottom at corral.	T. 6 S., R. 28 E.: NE¼NE¼ sec. 2	Nov. 19, 1940		10	71	46.5	44	35	8.9	260	26	19	2.3		.1	263	.36	254	7
212	Spring in canyon bottom 1 mile west of corral.	SW¼SW¼ sec. 2	do		2	74	54.1	50	38	11	282	33	27	.5		.1	298	.41	281	8

Chemical character of ground waters in the drainage basins of San

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (° F.)
		T. 4 S., R. 30 E.:				
213	Seep at Clifton Hot Springs	NW¼SE¼ sec. 30	Oct. 29, 1940			120
214	do	do	do			104
215	do	do	Aug. 11, 1941			100
216	do	do	do			105
217	do	do	Jan. 10, 1944			110
218	Clifton Mineral Hot Springs well.	NE¼SE¼ sec. 30	Aug. 11, 1941	22		120
219	do	do	June 15, 1943	22		
220	do	do	Aug. 1, 1944	79		
221	do	do	Nov. 1	79		
222	Phelps Dodge Corp. Clifton well.	NE¼NW¼ sec. 30	Aug. 11, 1941	90		
223	do	do	July 21, 28, 1943			
224	do	do	Aug. 4, 11, 18, 25			
225	do	do	Sept. 1, 8, 15, 22, 29			
226	do	do	Oct. 6			
227	do	do	Oct. 13			
228	do	do	Oct. 20			
229	do	do	Oct. 27			
230	do	do	Nov. 3			
231	do	do	Nov. 17			
232	do	do	Dec. 1			
233	do	do	Dec. 8			
234	do	do	Dec. 15			
235	do	do	Dec. 29			
236	do	do	Jan. 5, 1944			
237	do	do	Jan. 12			
238	do	do	Jan. 19			
239	do	do	Jan. 26			
240	do	do	Feb. 9			
241	Pool in old tailings dump south of Clifton.	NE¼ sec. 31	Aug. 11, 1941			
		T. 4 S., R. 29 E.:				
242	Seepage from tailings dump, new Phelps Dodge mill.	Sec. 8	May 9, 1942			
243	Spring in bed of Chase Creek	SE¼ sec. 3	Nov. 1, 1944		15	
244	Drainage from abandoned copper mine.	do	do			
245	do	do	Nov. 27, 1943		127	
		T. 4 S., R. 28 E.:				
246	Phelps Dodge Corp. well at Eagle Creek pumping station.	Sec. 9	July 27			
247	do	do	Aug. 4, 11, 18, 25			
248	do	do	Sept. 1, 8, 15, 22, 29			
249	do	do	Oct. 6			
250	do	do	Oct. 13			
251	do	do	Oct. 20			
252	do	do	Oct. 27			
253	do	do	Nov. 3			
254	do	do	Nov. 17			
255	do	do	Dec. 1			
256	do	do	Dec. 8			
257	do	do	Dec. 15			
258	do	do	Dec. 29			
259	do	do	Jan. 5, 1944			
260	do	do	Jan. 12			
261	do	do	Jan. 19			
262	do	do	Jan. 26			
263	do	do	Feb. 9			

[1] Includes 142 parts per million potassium (K).
[2] Includes 58 parts per million silica (SiO_2) and 0.19 part per million iron (Fe).
[3] Includes 74 parts per million potassium (K).
[4] Includes 57 parts per million silica (SiO_2) and 0.55 part per million iron (Fe).
[5] Includes 55 parts per million silica (SiO_2) and 0.16 part per million iron (Fe).
[6] Includes 51 parts per million silica (SiO_2) and 0.16 part per million iron (Fe).
[7] Includes 37 parts per million potassium (K).
[8] Includes 42 parts per million silica (SiO_2) and 0.16 part per million iron (Fe).

Francisco River and Eagle Creek, Greenlee County, Ariz.

[Analyses in parts per million]

Specific conductance (K x 10⁵ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Total hardness as $CaCO_3$	Percent sodium	Analysis No.
1,520	767	37	2,540	111	110	5,230	4.3	------	------	8,740	11.9	2,066	73	213
1,520	782	43	2,570	136	138	5,280	4.1	------	------	8,880	12.1	2,128	72	214
1,500	754	41	2,620	129	178	5,280	5.0	------	------	8,940	12.2	2,050	74	215
1,300	619	38	2,212	152	68	4,470	3.6	------	------	7,490	10.2	1,701	74	216
1,650	860	41	[1] 2,810	109	153	5,800	3.0	7.5	4.0	[2] 9,790	13.3	2,310	70	217
1,445	711	48	2,426	126	75	5,000	4.0	4.0	------	8,330	12.5	1,972	73	218
1,580	750	33	2,600	128	120	5,260	------	------	------	8,830	12.0	2,007	74	219
918	355	17	[3] 1,670	168	99	3,030	4.1	1.0	2.5	[4] 5,320	7.24	956	77	220
1,180	------	------	------	------	------	------	------	------	------	------	------	------	------	221
311	145	13	583	181	46	1,050	1.8	2.0	------	1,930	2.62	415	75	222
342	133	9.2	564	197	34	990	1.0	1.0	1.0	1,829	2.49	370	77	223
502	231	24	763	132	50	1,540	.8	.5	2.0	[5] 2,730	3.71	675	71	224
943	574	45	1,353	141	67	3,100	.9	.5	2.0	[6] 5,260	7.15	1,618	65	225
856	465	38	1,310	121	59	2,830	.9	1.0	1.0	4,760	6.47	1,320	68	226
649	317	23	1,030	190	50	2,070	.9	1.0	1.0	3,590	4.88	886	72	227
559	258	19	891	204	48	1,730	.8	1.0	1.5	3,050	4.15	722	73	228
537	237	18	865	205	44	1,650	1.3	.5	1.0	2,920	3.97	666	74	229
531	231	16	869	205	45	1,640	1.3	.5	1.0	2,900	3.94	642	75	230
475	199	14	781	210	44	1,440	1.3	.5	1.0	2,580	3.51	554	75	231
425	185	13	706	207	44	1,300	------	1.0	------	2,350	3.20	515	75	232
412	175	12	692	207	42	1,260	------	1.0	------	2,280	3.10	486	76	233
470	204	17	754	202	44	1,420	1.1	.5	.6	2,540	3.45	579	74	234
430	184	17	[7] 689	208	44	1,300	1.0	.5	1.5	[8] 2,380	3.24	529	71	235
391	168	16	[9] 626	209	43	1,160	1.0	.5	1.2	[10] 2,160	2.94	486	71	236
433	189	14	712	210	41	1,320	------	1.0	------	2,380	3.24	529	75	237
439	194	16	708	208	40	1,330	------	1.0	------	2,390	3.25	550	74	238
391	170	13	633	208	43	1,160	.9	.5	.4	2,120	2.88	478	74	239
395	170	13	624	206	40	1,150	1.0	1.0	.6	2,100	2.86	478	74	240
855	------	------	------	7.0	9,330	------	------	------	------	([11])	------	------	------	241
193	402	17	36	34	1,027	38	------	------	------	1,537	2.09	1,073	7	242
87.0	133	26	26	205	299	8.0	1.4	2.0	.0	596	.81	439	11	243
111	165	43	28	40	565	10	4.1	5.0	.5	840	1.14	589	9	244
110	------	------	------	202	------	25	------	------	------	------	------	------	------	245
56.0	42	16	58	255	29	36	2.0	1.0	.2	310	.42	171	42	246
58.2	34	13	80	257	26	46	3.6	.5	.5	[12] 378	.51	138	56	247
52.6	35	14	63	247	19	37	2.4	.4	.5	[12] 341	.46	145	49	248
48.0	40	16	44	241	15	31	2.0	.8	.5	268	.36	166	37	249
50.3	40	16	51	248	18	34	2.0	1.5	.5	285	.39	166	40	250
51.1	40	16	53	251	18	36	2.0	.5	.5	289	.39	166	41	251
50.8	40	16	49	251	17	33	1.6	.3	.5	280	.38	166	39	252
52.6	39	15	58	254	18	36	2.4	.3	.5	294	.40	159	44	253
53.5	40	16	55	257	17	37	2.0	.2	.5	294	.40	166	42	254
57.2	40	15	63	261	19	42	2.4	.3	.3	310	.42	162	46	255
54.7	40	15	60	261	18	39	2.0	.3	.3	303	.41	162	45	256
52.1	43	17	48	254	16	36	2.0	.2	.3	287	.39	178	37	257
56.3	40	14	[13] 65	260	20	42	2.4	.2	.1	[14] 353	.48	158	46	258
54.6	39	14	[15] 66	260	19	41	2.4	.2	.1	[16] 352	.48	155	46	259
54.6	40	15	61	262	19	42	------	.2	------	306	.42	162	45	260
55.1	40	14	62	260	20	41	------	.2	------	305	.41	158	46	261
56.4	40	14	66	260	20	43	2.2	.1	.3	313	.43	158	48	262
56.6	39	14	67	260	21	42	2.4	.1	.3	314	.43	155	48	263

[9] Includes 35 parts per million potassium (K).
[10] Includes 39 parts per million silica (SiO_2) and 0.19 part per million iron (Fe).
[11] Sample contained 4,230 parts per million copper (Cu).
[12] Includes 48 parts per million silica (SiO_2) and 0.04 part per million iron (Fe).
[13] Includes 3.2 parts per million potassium (K).
[14] Includes 41 parts per million silica (SiO_2) and 0.07 part per million iron (Fe).
[15] Includes 3.0 parts per million potassium (K).
[16] Includes 42 parts per million silica (SiO_2) and 0.06 part per million iron (Fe.)

Chemical character of waters of San Simon Creek as

Analysis No.	Date sampled	Mean discharge (second-feet)	Specific conductance (K x 10⁵ at 25° C.)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)
264	July 15-16, 1942	12.0	122	22	0.14	48	12	189	228
265	Aug. 1, 3-8	138	114	38	.11	50	10	175	227
266	Aug. 1-6, 10, 1943	333	107	36	.21	40	8.3	180	200
267	Aug. 15-20	299	119	34	.05	43	10	201	215
268	Aug. 8, 9, 1944	45.0	147	39	.24	56	10	249	256
269	Aug. 16-19	1,706	81.3	28	.16	20	3.6	153	133

shown by analyses of Gila River at Safford, Ariz.[1]

[Analyses in parts per million]

Analysis No.	Date sampled	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Total	Hardness as $CaCO_3$: Noncarbonate	Percent sodium
264	July 15-16, 1942	105	198	1.6	1.0		689	0.94	22	170	0	71
265	Aug. 1, 3-8	110	172	1.2	2.0		670	.91	351	166	0	70
266	Aug. 1-6, 10, 1943	130	154	1.9	5.0	1.8	654	.89	588	134	0	75
267	Aug. 15-20	149	170	1.5	5.0	.8	719	.98	580	148	0	74
268	Aug. 8, 9, 1944	174	230	1.3	3.0	2.0	889	1.21	108	181	0	75
269	Aug. 16-19	127	100	1.7	4.9	1.4	503	.68	2,320	65	0	82

[1] Flow in the Gila River at the time these samples were taken was 75 to 95 percent from San Simon Creek.

Chemical character of ground waters in the drainage

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (°F.)
		T. 14 S., R. 32 E.:				
270	Robert Page stock well	SE¼NW¼ sec. 30	Dec. 9, 1940	560		78
		T. 15 S., R. 32 E.:				
271	Domestic well	Sec. 27	Apr. 5, 1941			
272	Well at dam site	SE¼ sec. 27	do	4		
273	San Simon Cienaga	do	do			
274	do	do	Sept. 15, 1941			
		T. 13 S., R. 31 E.:				
275	Pat Neil unused well	SE¼ sec. 10	May 1, 1941			75
276	E. A. Olsen stock well	NW¼NW¼ sec. 19	Nov. 20, 1940			80
277	Thomas Nelson stock well	NE¼SW¼ sec. 19	do	840		
278	J. K. Burch irrigation well	NE¼SE¼ sec. 20	do	615		81
279	John M. Cameron domestic well	NE¼NW¼ sec. 28	do	763		82
280	C. A. Metzger stock well	SE¼SW¼ sec. 28	do	625		79
281	R. S. Andrews domestic well	SW¼ sec. 30	Apr. 29, 1941	700		84
282	Domestic well, San Simon town site.	SW¼SW¼ sec. 30	do	850		82
283	San Simon grade school well	SW¼ sec. 30	May 3, 1941	700		
284	Mrs. L. Sullivan unused well	do	Dec. 1, 1940	72		61
285	A. A. Waldie irrigation well	NE¼SW¼ sec. 31	May 1, 1941	884		83
286	A. A. Waldie domestic well	SW¼SE¼ sec. 31	do	850		80
287	J. E. Davis stock well	NE¼NE¼ sec. 33	Nov. 20, 1940	590		79
288	J. E. Davis irrigation well	NE¼ sec. 33	do	648		77
289	Mrs. Flossy Buchannan domestic well.	SW¼NE¼ sec. 33	Apr. 29, 1941	663		80
290	A. R. Herrell domestic well	SE¼ sec. 33	do	662		80
291	Ed Gentner domestic well	SW¼ sec. 33	do	730		80
292	Phil Ebsen domestic well	SE¼ sec. 33	Apr. 30, 1941	700	10	80
293	J. L. Schad domestic well	do	do	600		79
294	Charles Record domestic well	SE¼NW¼ sec. 34	Apr. 29, 1941	600	6	78
		T. 14 S., R. 31 E.:				
295	Harrington irrigation well	SW¼ sec. 3	Apr. 30, 1941	714		79
296	Stella E. Ebsen irrigation well	SW¼NE¼ sec. 4	do	760		80
297	George Ebsen irrigation well	NE¼ sec. 4	Apr. 29, 1941	730		80
298	Mr. L. Sullivan domestic well	SW¼ sec. 4	Apr. 30, 1941	825		76
299	John Riggs unused well	SW¼SW¼ sec. 7	Dec. 11, 1940	760		84
300	J. R. Summerville stock well	NE¼NE¼ sec. 10	Apr. 30, 1941	738		79
301	I. L. Fulcher irrigation well	SW¼ sec. 10	do	690	60	67
302	Davis McDonald domestic well	SW¼NE¼ sec. 10	May 2, 1941	600		79
303	Dr. Scott stock well	NW¼ sec. 10	May 1, 1941			74
304	A. B. Hulsey irrigation well	SW¼ sec. 14	Dec. 9, 1940	700		81
305	M. H. Barnes irrigation well	do	Dec. 11, 1940	690	60	80
306	do	do	Dec. 9, 1940	705	82	81
307	I. L. Fulcher domestic well	NW¼NW¼ sec. 15	May 1, 1941	822	30	78
308	Harry Birlenbach domestic well	SE¼ sec. 16	do	2,000	62	88
309	Unused well	NW¼NW¼ sec. 17	Dec. 11, 1940			84
310	CCC camp domestic well	SE¼NE¼ sec. 21	May 1, 1941	730	13	85
311	A. W. Cooper domestic well	SW¼NW¼ sec. 22	do	700		83
312	M. Calloway irrigation well	SW¼SE¼ sec. 22	do	770	6	83
313	L. T. Davis unused well	SE¼SE¼ sec. 23	Dec. 11, 1940	620		80
314	Stanley irrigation well	SE¼ sec. 24	May 2, 1941	630		77
315	J. L. Freeman domestic well	SW ¼ sec. 25	Dec. 11, 1940	615		78
316	Claytor irrigation wells (composite of 2).	NW¼NW¼ sec. 26	May 1, 1941			82
		T. 13 S., R. 30 E.:				
317	R. B. Murchison domestic well	SE¼NW¼ sec. 3	Nov. 19, 1940	860		85
318	do.[1]	do	Apr. 29, 1941	860		
319	T. P. Garrett stock well	SE¼NE¼ sec. 9	Nov. 19, 1940	900		92
320	do	SW¼NW¼ sec. 11	do	950		90
321	M. G. Ebsen stock well	SW¼NE¼ sec. 13	do	760		81
322	S. M. Morse stock well	SE¼SE¼ sec. 14	May 1, 1941	900	10	90
323	T. P. Garrett domestic well	SE¼NE¼ sec. 15	Apr. 29, 1941	975		95
324	Mrs. Lizzie Lewis unused well	SE¼NE¼ sec. 25	Nov. 19, 1940	880		65
325	do	do	Apr. 29, 1941	880		65
326	Mrs. Lizzie Lewis domestic well	SW¼NE¼ sec. 25	Nov. 19, 1940	880	4	87
327	J. R. Hall domestic well	SE¼NE¼ sec. 25	May 1, 1941	900	4	84
328	Wollston domestic well	SE¼sec. 25	Dec. 10, 1940	68		64
329	Melvis Smith domestic well	do	Dec. 11, 1940	88		
330	Lawhan stock well	SW¼NW¼ sec. 30	Nov. 19, 1940	960		104
		T. 13 S., R. 29 E.:				
331	Stock well	SW¼ sec. 6	May 2, 1941	835		80
332	do	NE¼NW¼ sec. 18	do	860		78
333	A. R. Spikes irrigation well	SE¼SW¼ sec. 24	Nov. 19, 1940	960	24	105

[1] After treatment to remove fluoride.

basin of San Simon Creek, Cochise County, Ariz.

[Analyses in parts per million]

Specific conductance (K×10⁵ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Total hardness as $CaCO_3$	Percent sodium	Analysis No.
37.6	45	8.3	27	153	64	5	1.7	0.8	227	0.31	147	28	270
60.5	------	------	------	------	------	------	------	------	------	------	------	------	271
144	------	------	------	------	------	------	------	------	------	------	------	------	272
92.0	------	------	------	------	------	------	------	------	------	------	------	------	273
86.4	------	------	------	324	202	17	------	------	------	------	270	------	274
38.9	35	6.1	46	135	81	7.0	2.6	------	245	.33	112	47	275
43.0	5.0	4.8	95	184	65	5	4.6	.5	271	.37	32	87	276
39.2	37	6.6	41	143	72	6	2.5	2.0	237	.32	120	43	277
41.1	50	7.4	32	152	80	10	1.0	1.5	257	.35	155	31	278
39.2	48	10	24	156	66	9	.9	1.0	236	.32	161	24	279
42.2	44	8.3	38	151	77	11	1.7	2.0	256	.67	144	36	280
42.1	7.0	4.4	83	142	76	6.0	4.8	------	251	.34	36	84	281
42.1	14	4.8	76	135	85	6.0	4.4	------	257	.35	55	75	282
40.9	14	4.8	73	135	85	7.0	1.8	------	253	.34	55	75	283
94.9	30	11	186	174	232	89	4.7	2.8	642	.87	120	77	284
42.5	14	4.4	77	130	88	8.0	4.5	------	260	.35	53	76	285
43.1	16	4.4	75	142	80	7.0	4.5	------	257	.35	58	74	286
41.4	50	7.0	32	154	80	8	.8	1.4	255	.35	154	31	287
41.2	50	6.6	34	154	78	9	1.7	.8	256	.35	152	33	288
42.3	52	7.9	28	150	81	9.0	1.3	------	253	.34	162	27	289
42.1	50	8.7	32	155	81	9.0	2.0	------	259	.35	161	30	290
38.9	28	7.0	48	138	69	6.0	3.4	------	229	.31	99	51	291
41.8	50	8.7	33	148	90	9.0	1.6	------	265	.36	161	31	292
42.4	53	9.2	31	152	92	9.0	1.8	------	271	.37	170	28	293
43.1	44	7.4	42	150	86	9.0	2.3	------	265	.36	140	39	294
41.4	48	8.7	31	150	82	7.0	1.8	------	252	.34	156	30	295
38.3	32	8.3	38	133	68	7.0	2.8	------	222	.30	114	42	296
40.9	44	8.3	34	148	81	7.0	1.3	------	249	.34	144	34	297
36.7	22	4.8	58	127	72	7.0	4.8	------	232	.32	75	63	298
34.9	13	3.5	68	140	43	7	9.2	.8	214	.29	47	76	299
42.0	52	9.2	27	153	81	9.0	1.6	------	255	.35	168	26	300
38.8	33	7.0	44	135	76	9.0	2.0	------	238	.32	111	47	301
42.3	54	9.2	22	148	77	11	1.4	------	248	.34	173	22	302
36.6	18	4.8	60	124	72	5.0	4.1	------	225	.31	65	67	303
41.9	54	6.6	29	159	74	10	1.0	1.0	254	.35	162	28	304
40.8	52	7.4	29	155	77	9	.8	1.8	253	.34	160	28	305
39.7	50	6.1	30	153	71	8	.9	1.4	242	.33	150	30	306
39.8	38	10	35	141	75	7.0	3.6	------	238	.32	136	36	307
42.3	22	5.2	71	139	98	5.0	3.2	------	272	.37	76	67	308
35.5	11	3.1	69	130	56	5	6.1	2.0	216	.29	40	79	309
39.5	26	7.9	49	140	72	6.0	2.5	------	232	.32	97	53	310
42.3	42	8.3	39	155	82	5.0	1.6	------	254	.35	139	38	311
43.9	50	9.6	31	153	89	7.0	1.2	------	263	.36	164	29	312
41.0	52	7.9	27	158	75	6	1.4	1.0	248	.34	162	26	313
40.5	46	7.9	32	148	79	5.0	2.4	------	245	.33	147	32	314
41.5	54	7.9	27	154	79	8	1.7	2.0	256	.35	167	26	315
43.4	52	7.4	36	150	84	18	1.4	------	273	.37	160	33	316
51.0	4.5	6.6	114	136	94	17	20	1.0	324	.44	38	87	317
64.7	16	12	114	149	146	35	5.2	------	401	.55	89	74	318
46.5	3.0	3.9	105	127	86	14	14	.5	289	.39	23	91	319
44.2	4.5	4.4	97	170	58	8	11	1.5	268	.36	29	88	320
39.0	4.0	5.2	87	151	66	7	6.2	1.0	250	.34	31	86	321
43.8	8.5	4.8	88	147	78	9.0	7.0	------	267	.36	41	82	322
49.1	6.0	5.2	100	164	71	10	12	------	285	.39	36	86	323
64.2	4.0	6.1	161	279	43	7	38	2.5	400	.54	35	91	324
66.0	5.5	4.4	157	340	42	10	32	------	389	.53	32	91	325
41.4	8.0	4.4	84	128	86	9	4.7	1.4	260	.35	38	83	326
39.8	9.0	3.5	81	125	78	9.0	6.4	------	249	.34	37	83	327
142	92	24	201	266	385	93	5.2	2.7	934	1.27	328	57	328
106	64	12	145	276	188	56	6.0	9.1	616	.84	209	60	329
58.9	4.0	6.6	128	239	80	13	6.8	.2	355	.48	37	88	330
38.7	11	3.9	68	102	62	28	1.5	------	224	.30	43	77	331
34.6	14	5.2	58	133	45	15	2.3	------	205	.28	56	69	332
55.8	2.0	4.8	128	248	67	11	5.5	.2	340	.46	25	92	333

Chemical character of ground waters in the drainage basin of San Simon Creek, Graham County, Ariz.

[Analyses in parts per million]

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (° F.)	Specific conductance (K x 10⁵ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Total hardness as $CaCO_3$	Percent sodium
		T. 10 S., R. 29 E.:																	
334	Fault spring	SE¼SE¼ sec. 23	Sept. 7, 1941		10	79	226	12	7.6	516	526	366	245	8.5	5.0	1,419	1.93	61	95
335	Whitlock No. 1 oil test well, flowing.	NW¼NW¼ sec. 31	Sept. 3, 1941	1,925	300	106	159	12	7.4	334	205	301	195	11	1.0	962	1.31	60	92
336	do	do	Nov. 10, 1941	1,925			159												
		T. 9 S., R. 29 E.:																	
337	Seely Ranch well	SW¼NW¼ sec. 13	Sept. 4, 1941			65	182	32	22	348	229	395	225	3.6	2.0	1,140	1.55	170	82
338	Seely Cienaga	NW¼ sec. 13	do				28.9				171								
339	Stock well	NW¼SE¼ sec. 33	do			67	110	6.5	5.9	244	318	153	100	1.7	5.3	673	.92	40	93
		T. 9 S., R. 28 E.:																	
340	W. E. Ellsworth stock well.	SW¼NW¼ sec. 23	Jan. 20, 1942	250			149	9.5	5.9	299	258	244	150	7.7		843	1.15	48	93
341	Double L Ranch stock well.	SE¼ sec. 31	do				172	7.0	4.8	375	331	313	168	6.6		1,038	1.41	37	96
		T. 9 S., R. 27 E.:																	
342	Spring at San Simon Creek.	NE¼ sec. 11	Mar. 1, 1940				208	16	5.2	412	173	167	455			1,140	1.55	62	94
		T. 8 S., R. 29 E.:																	
343	W. Ellsworth stock well	SE¼ sec. 22	Mar. 27, 1942	150			155				139		172					202	

Chemical character of the water of Gila River between the mouth of Bonita Creek, near Solomonsville, Ariz., and the Southern Pacific Railroad bridge at Calva, Ariz.

[Analyses in parts per million]

Analysis No.	Date sampled	Mean discharge (second-feet)	Specific conductance (K×10[5] at 25° C.)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids		Hardness as $CaCO_3$		Percent sodium
															Parts per million	Tons per acre-foot	Total	Noncarbonate	
	Gila River below Bonita Creek, near Solomonsville, Ariz.																		
344	Oct. 7, 1940	190	78.8			53	14	99	221	42	128				445	0.61	190	8	53
345	Oct. 17	140	91.9			65	17	115	251	46	162				529	.72	232	26	52
346	Oct. 29	111	102			66	17	130	237	49	192				571	.78	235	40	55
347	Nov. 7	137	97.3			64	14	123	235	44	181				537	.73	217	33	55
348	Nov. 16	159	89.0			62	12	114	236	47	149				500	.68	204	11	55
349	Nov. 27	344	65.1			51	12	71	165	63	92				370	.50	177	41	47
350	Dec. 6	262	71.0			55	9.6	86	208	38	109				400	.54	177	6	51
	Gila River near Solomonsville, Ariz.																		
351	Oct. 30, 1940	124	101			67	19	125	247	52	185				570	0.78	245	43	53
352	Feb. 6, 1941	1,110	42.6			39	8.3	40	134	49	41				243	.33	131	22	40
353	July 11, 1943 [1]	64	116			71	16	141	198	72	220		1.0		618	.84	243	80	56
354	Aug. 10 [2]	1,960	38.4			34	10	33	195	11	18		.5		203	.28	126	0	36
355	June 11–20, 1944 [3]	49.5	125	39	0.14	65	19	[4] 177	209	60	262	1.6	4.3	0.4	750	.99	240	68	58
356	Sept. 25, 27–30 [5]	1,680	31.2	37	.60	33	8.7	[6] 24.3	158	18	17	.6	.1	.0	217	.30	118	0	27
357	1943–44 [7]	188	74.3	39	.17	51	12	[8] 93	204	39	117	1.3	1.1	.4	454	.62	177	10	51
	Gila River above San Jose Dam, near Solomonsville, Ariz.																		
358	May 1, 1940		82			59	14	102	223	49	136				470	0.64	205	22	52
359	July 26	809	148			96	24	156	327	4.1	288				729	.99	338	70	50
360	Aug. 29	200	82			62	15	84	212	31	135	1.0			433	.59	216	42	46
361	Sept. 2	166	62			57	15	43	163	58	72	.5			326	.44	204	70	31
362	Sept. 4	148	85			54	15	88	201	30	135	.5			422	.57	196	32	49
363	Sept. 7	515	33			44	11	12	155	16	26	.2			185	.25	155	28	14
364	Sept. 11, 12	95.0	85.5			80	16	72	210	36	151				458	.62	266	93	37
365	Oct. 2, 4, 7, 11, 14, 22, 26, 28		87.2		0.10	63	16	104	214	52	153	1.3	1.0		495	.73	223	48	50
366	Oct. 16	151	81.3			64	15	109	237	48	152		.5		506	.69	221	27	52
367	Nov. 4, 11, 25, 29		77.4		.10	56	15	89	199	49	125	1.8	1.0		435	.64	202	38	49
368	Dec. 2, 5, 9, 16, 20, 23, 30		54.8		.10	48	13	52	167	43	71	1.3	1.0		312	.47	173	36	40
369	Jan. 3, 6		43.6		.10	40	12	37	133	48	46	1.5	1.0		251	.46	149	40	35
370	May 25, 1942		91.4			58	17	71	172	65	112		1.0		410	56	214	73	42

See footnotes at end of table.

Chemical character of the water of Gila River between the mouth of Bonita Creek, near Solomonsville, Ariz., and the Southern Pacific Railroad bridge at Calva, Ariz.—Continued

[Analyses in parts per million]

Analysis No.	Date sampled	Mean discharge (second-feet)	Specific conductance ($K \times 10^5$ at 25° C.)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids		Hardness as $CaCO_3$		Percent sodium
															Parts per million	Tons per acre-foot	Total	Noncarbonate	
	Gila River above San Jose Wash near Solomonsville, Ariz.																		
371	Apr. 24, 1941		45.4			38	12	42	141	51	47	0.3	0.8		260	0.35	144	28	39
372	May 2, 9, 16, 23, 29		33.7		0.30	31	9.3	30	127	25	34	.6	.6		194	.31	116	12	36
373	June 5, 10, 17, 19		72.9		.12	53	14	84	192	45	116	.9	1.0		409	.62	190	32	49
374	July 16, 23		80.2		.20	62	16	86	211	44	131	1.2	.80		445	.65	221	48	46
375	Aug. 6, 13, 27		72.8		.12	53	12	85	191	38	118	1.1	1.0		402	.60	182	25	50
376	Sept. 3, 6, 17, 23		70.7		.16	54	13	75	199	35	105	1.3	1.5		383	.58	188	26	46
	Gila River above San Simon Creek, near Solomonsville, Ariz.																		
377	June 18, 1940	2	154			90	26	203	327	102	283				865	1.18	332	63	57
	Gila River at Safford, Ariz.																		
378	July 30, 1940	670	83			60	7.6	110	276	4.5	134				452	0.61	181	0	57
379	June 23–25, 1941 [9]	31	205		0.15	80	29	325	246	190	438	2.2	3.6		1,189	1.62	318	117	69
380	Mar. 15–20 [10]	6,010	26.0		.30	29	7.3	20	117	25	14	.8	2.0		156	.21	102	6	30
381	1940–41 [11]	1,117	39.1		.27	35	9.5	36	137	35	39	.8	1.4		224	.31	126	14	38
382	June 11–13, 15–20, 1942 [12]	6.3	220	36	.05	100	31	326	312	209	428	1.9	4.4		1,290	1.75	377	121	65
383	Oct. 1–10 1941 [13]	2,579	45.1		.16	41	10	42	160	37	43	1.1	2.5		256	.35	144	12	39
384	1941–42 [14]	358	62.8	37	.15	49	12	69	194	47	78	1.2	1.5		357	.49	172	13	47
385	May 21–31, 1943 [15]	2.4	189	48	.18	66	24	302	244	160	385	2.3	4.0	1.0	1,112	1.51	263	63	71
386	Sept. 26–30 [16]	868	42.1	25	.05	31	8.1	48	150	35	38	.9	.8	.4	261	.35	111	0	49
387	1942–43 [17]	123	72.1	36	.12	45	11	95	194	62	96	1.3	1.9		444	.60	158	0	57
388	July 8, 1944 [3]	64	224								450								
389	Sept. 26–30 [5]	2,166	39.4	37	.31	36	9.7	38	183	23	26	.7	.2	.1	261	.35	130	0	39
390	1943–44 [7]	103	66.2	36	.21	41	9.9	90	186	57	86	1.2	1.8	.5	415	.56	143	0	58

	Gila River near Thatcher, Ariz.																		
391	June 18, 1940	2	212	......	......	96	32	320	362	170	421	......	......	......	1,217	1.66	371	74	65
392	Sept. 16, 1943 [1]	3.2	196	......	......	84	33	291	306	166	390	......	5.0	......	1,120	1.52	345	94	65
393	Sept. 28–30 [2]	......	42.0	......	......	39	11	35	147	42	36	0.8	2.0	1.5	238	.32	142	22	35
394	Nov. 25 [18]	4.0	205	......	......	114	32	298	443	162	375	......	4.0	......	1,200	1.63	416	52	61
395	Oct. 2, 21 [19]	34.0	71.4	......	......	......	......	......	......	......	114	......	......	......	......	......	......	......	......
	Gila River at Pima, Ariz.																		
396	Feb. 4, 1940	......	53	......	......	64	12	32	256	37	21	......	......	......	292	0.40	209	0	25
397	Aug. 29	29	122	......	......	74	20	159	276	81	212	1.4	......	......	683	.93	267	41	56
398	Aug. 31	10	181	......	......	82	26	285	386	130	338	1.0	......	......	1,052	1.43	312	0	67
399	Sept. 2	192	72	......	......	57	14	72	176	90	83	.8	......	......	404	.55	200	56	44
400	Sept. 3	72	94	......	......	67	17	111	211	85	152	.8	......	......	537	.73	237	64	50
401	Sept. 4	40	123	......	......	79	20	152	267	72	222	.8	......	......	677	.92	280	61	41
402	Sept. 6	1,690	47	......	......	40	10	55	215	21	44	.2	......	......	276	.38	141	0	46
403	Sept. 7, 8	......	37.5	......	......	47	13	20	172	21	36	......	......	......	222	.30	171	30	20
404	Sept. 10, 11	80.5	85.0	......	......	66	15	89	198	50	145	......	......	......	463	.63	226	94	46
405	Sept. 12, 13	......	126	......	......	83	20	158	279	77	230	......	......	......	705	.96	290	61	46
406	Sept. 14, 15		187	......	......	103	27	279	388	136	365	......		......	1,101	1.50	368	50	62
407	Oct. 30	......	142	......	......	76	20	201	300	86	265	......	......	......	796	1.08	272	26	62
408	Sept. 16, 1943 [1]	5.8	279	......	......	80	34	498	498	234	540	......	12	......	1,643	2.23	340	0	76
409	Sept. 28–30, 1943 [2]	......	44.3	......	......	40	11	40	149	47	40	.8	2.1	1.0	254	.35	145	23	37
410	Nov. 25 [18]	13	248	......	......	96	32	420	472	214	475	......	5.0	......	1,470	2.00	371	0	71
411	Oct. 2, 21 [19]	65.0	83.9	......	......	......	......	......	......	......	134	......	......	......	......	......	......	......	......
	Gila River above Fort Thomas Consolidated Canal heading, near Glenbar, Ariz.																		
412	June 19, 1940	......	330	......	......	32	38	653	279	370	739	......	......	......	1,969	2.68	236	75	86
	Gila River near Glenbar, Ariz.																		
413	Sept. 17, 1943 [1]	1.9	355	......	......	91	44	647	469	371	735	1.8	5.0	10	2,126	2.89	408	24	78
414	Sept. 28–29 [2]	......	41.3	......	......	38	11	36	146	51	30	.8	1.6	1.0	240	.33	140	20	36
415	Aug. 7, 1944 [3]	.7	370	......	......	54	41	703	342	392	810	......	.5	......	2,170	2.95	304	23	83
416	Aug. 10–11, 17, 21–24, 25 [5]	......	61.4	......	......	39	8.5	87	214	49	64	1.4	2.0	......	356	.48	132	0	59
	Gila River at Eden crossing near Eden, Ariz.																		
417	June 19, 1940	1	320	......	......	93	37	561	396	297	688	......	......	......	1,871	2.54	384	60	76
418	Oct. 30	......	184	......	......	83	30	258	343	147	360	......	......	......	1,047	1.42	330	49	60

See footnotes at end of table.

Chemical character of the water of Gila River between the mouth of Bonita Creek, near Solomonsville, Ariz., and the Southern Pacific Railroad bridge at Calva, Ariz.—Continued

[Analyses in parts per million]

Analysis No.	Date sampled	Mean discharge (second-feet)	Specific conductance (K×10^5 at 25° C.)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Hardness as $CaCO_3$: Total	Hardness as $CaCO_3$: Noncarbonate	Percent sodium
Gila River near Ashurst, Ariz.																			
419	Sept. 17, 1943 [1]	1.4	573	----	----	196	86	990	401	672	1,390	1.9	3.0	8.0	3,540	4.81	842	514	72
420	Sept. 29 [2]	----	50.5	----	----	----	----	----	----	----	42	----	----	----	----	----	----	----	----
421	Aug. 7, 1944 [3]	.2	891	----	----	330	155	1,540	336	1,120	2,390	----	.5	----	5,700	7.75	1,460	1,190	70
422	Aug. 10–11, 22, 24–25 [5]	----	65.0	----	----	40	9.2	81	209	35	72	1.2	2.0	----	338	.46	138	0	56
Gila River at Fort Thomas, Ariz.																			
423	July 27, 1940	81	110	----	----	46	12	191	378	32	168	----	----	----	635	0.86	164	0	72
424	July 14, 1941 [9]	10	658	----	----	----	----	----	----	----	1,850	----	----	----	----	----	----	----	----
425	Dec. 13, 1940 [10]	2,300	30.7	----	----	----	----	----	----	----	14	----	----	----	----	----	----	----	----
426	June 29, 1942 [12]	4	700	----	----	----	----	----	----	----	1,770	----	----	----	----	----	----	----	----
427	Oct. 2, 1941 [13]	3,490	44.9	----	----	----	----	----	----	----	59	----	----	----	----	----	----	----	----
428	Sept. 17, 1943 [1]	2.9	748	----	----	374	114	1,180	338	802	2,020	1.7	2.0	5.0	4,660	6.34	1,402	1,125	65
429	Sept. 28–29 [2]	----	48.2	----	----	41	11	48	150	60	44	.8	1.9	1.5	281	.38	148	24	41
430	Aug. 7, 1944 [3]	.1	1,000	----	----	533	182	1,540	220	1,100	2,900	----	.5	----	6,360	8.65	2,080	1,900	62
431	Aug. 22 [5]	320	47.2	----	----	42	9.2	47	172	38	46	----	.2	----	267	.36	143	2	42
Gila River near Geronimo, Ariz.																			
432	Sept. 17, 1943 [1]	6.0	732	----	----	329	106	1,187	259	809	1,970	1.5	2.0	9.0	4,530	6.16	1,257	1,044	67
433	Sept. 29 [3]	----	55.1	----	----	----	----	----	----	----	41	----	----	----	----	----	----	----	----
434	May 30, 1944 [4]	7.3	793	----	----	311	117	1,330	146	909	2,180	1.6	2.0	2.0	4,920	6.69	1,260	1,140	70
435	Aug. 22 [5]	----	48.3	----	----	40	8.7	48	154	42	49	----	2.5	----	266	.36	136	10	42

Gila River at Black Point, Ariz.

436	Sept. 17, 1943 [1]	8.7	510			217	70	815	253	551	1,290		2.0		3,070	4.18	830	622	68
437	Sept. 29 [2]		50.5								40								
438	July 9, 24, 1944 [3]	37.0	628			302	86	1,000	218	727	1,660	1.5	7.4	2.0	3,890	5.29	1,100	928	66
439	Aug. 11, 21-22, 24 [5]		64.1								65								

Gila River at Bylas, Ariz.

440	Sept. 3, 1940	144	112			72	16	139	218	106	182	0.8			623	0.85	246	67	55
441	Sept. 21-25, 1943 [1]	9.6	484	38	0.04	204	64	[20] 782	246	500	1,210	1.4	1.0	5.0	2,920	3.97	772	570	69
442	Sept. 27-30 [2]		47.5	25	.07	33	8.2	[21] 54.2	138	47	44	.9	1.6	.4	282	.38	116	3	50
443	May 5, 1944 [3]	20.7	548			205	78	889	178	605	1,410		.5		3,280	4.46	832	686	70
444	Sept. 26-30 [5]	3,013	50.6	34	.40	36	8.6	[22] 60.6	176	42	49	.8	1.0	.2	319	.43	126	0	49
445	1943-1944 [7]	111	157	36	.22	69	21	246	212	161	316	1.2	2.2	1.6	957	1.30	258	85	67

Gila River at Calva, Ariz.

446	Sept. 3, 1940	134	96			61	15	115	190	82	157	0.2			524	0.71	214	58	54
447	Sept. 18, 1943 [1]	4	510			209	72	804	218	486	1,330	1.6	2.0	5.0	3,010	4.09	818	639	68
448	Sept. 29 [2]	446	45.2								33								
449	May 26, 1944 [3]	9.0	551			210	73	899	195	536	1,460		.5		3,270	4.45	824	664	70
450	Sept. 6-7, 26, 29 [5]	2,228	64.4								64								

[1] Maximum concentration for period July 1, to Sept. 30, 1943.
[2] Minimum concentration for period July 1, to Sept. 30, 1943.
[3] Maximum concentration for year ended Sept. 30, 1944.
[4] Includes 165 parts per million of Na and 12 parts per million of K.
[5] Minimum concentration for year ended Sept. 30, 1944.
[6] Includes 21 parts per million of Na and 3.3 parts per million of K.
[7] Weighted average for year ended Sept. 30, 1944.
[8] Includes 87 parts per million of Na and 6.0 parts per million of K.
[9] Maximum concentration for year ended Sept. 30, 1941.
[10] Minimum concentration for year ended Sept. 30, 1941.
[11] Weighted average for year ended Sept. 30, 1941.
[12] Maximum concentration for year ended Sept. 30, 1942.
[13] Minimum concentration for year ended Sept. 30, 1942.
[14] Weighted average for year ended Sept. 30, 1942.
[15] Maximum concentration for year ended Sept. 30, 1943.
[16] Minimum concentration for year ended Sept. 30, 1943.
[17] Weighted average for year ended Sept. 30, 1943.
[18] Maximum concentration for period Oct. 1, 1943, to Jan. 30, 1944.
[19] Minimum concentration for period Oct. 1, 1943, to Jan. 30, 1944.
[20] Includes 764 parts per million of Na and 18 parts per million of K.
[21] Includes 50 parts per million of Na and 4.2 parts per million of K.
[22] Includes 58 parts per million of Na and 2.6 parts per million of K.

Changes in the chemical character of the water of Gila River between the mouth of Bonita Creek near Solomonsville, Ariz., and the Southern Pacific Railroad bridge at Calva, Ariz.

[Analyses in parts per million]

Analysis No.	Date sampled and sampling point	Miles below initial point	Discharge (second-feet)	Change in discharge from preceding measuring point (second-feet): Inflow (+) or diversion (−)	Change in discharge: Net gain (+) or loss (−) (unadjusted)	Specific conductance (K×10[5] at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Hardness as $CaCO_3$: Total	Hardness as $CaCO_3$: Noncarbonate	Per cent sodium
	1940																		
	May 20:																		
451	At gaging station below Bonita Creek	0	95	------	------	95	45	16	135	149	44	215	------	------	529	0.72	178	54	62
452	Below Brown wasteway	3.7	108	0	13+	99	44	15	139	151	46	214	------	------	533	.72	171	47	64
453	Below San Jose wasteway	9.3	33	49−	26−	99	37	16	145	123	52	220	------	------	536	.73	158	49	67
454	Below San Simon Creek	14.5	39	19−	25+	101	42	17	147	158	53	220	------	------	557	.76	175	45	65
455	At Safford, Ariz	18.5	22	11−	6−	111	42	19	158	160	67	230	------	------	595	.81	183	52	65
456	At Thatcher, Ariz	23.5	21	1−	0	137	42	21	215	184	96	290	------	------	754	1.03	191	41	71
	May 21:																		
457	At Thatcher, Ariz	23.5	32	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------
458	At Pima, Ariz	28.3	25	18−	11+	206	85	28	336	401	155	402	------	------	1,204	1.64	327	0	69
459	Above Fort Thomas Canal head	33.0	22	5−	2+	260	35	33	493	261	263	569	------	------	1,524	2.07	223	5	83
460	At Fort Thomas	44.2	8 1	7.5−	7−	510	194	79	851	307	520	1,323	------	------	3,120	4.24	809	557	70
461	2 miles above Geronimo	48.2	15	2+	5+	530	240	68	897	351	574	1,378	------	------	3,330	4.53	879	591	69
462	At Hinton farm	51.2	4	0	11−	460	196	79	738	272	500	1,188	------	------	2,840	3.86	814	591	66
463	5 miles below Geronimo	55.2	17	0	13+	430	122	62	709	102	451	1,098	------	------	2,492	3.39	559	476	73
464	10 miles below Geronimo	58.7	15	0	2−	430	122	62	709	78	426	1,129	------	------	2,487	3.38	559	495	73
465	At Calva, Ariz	67.2	14	0	1−	420	130	63	713	76	416	1,162	------	------	2,520	3.43	583	521	73
	Sept. 16:																		
466	At gaging station below Bonita Creek	0	166	------	------	81.1	58	15	95	206	42	138	1.8	2.5	454	.62	206	38	50
467	Below Brown wasteway	3.7	163	7.3−	4.3+	82.1	60	14	99	212	39	145	1.2	1.0	463	.63	207	34	51
468	Above Tidwell Canal	5.0	152	0	11.0−	82.6	59	14	103	211	40	148	1.5	1.0	470	.64	205	32	52
469	Above San Jose Dam	5.5	143	7.7−	1.3−	83.1	58	11	110	210	41	148	1.6	2.0	475	.65	190	18	56

	Sept. 17:																		
470	Above San Jose Dam	5.5	130			88.1	60	13	113	202	45	165	1.2	1.5	499	.68	203	38	55
471	Below San Jose wasteway	9.3	78.8	37.2−	14.0−	89.8	62	18	108	212	46	168	1.6	1.5	510	.69	229	55	51
472	Above Union Canal	12.3	70.6	0	8.2−	91.0	61	14	118	213	46	170	1.0	1.5	516	.70	210	35	55
473	Below San Simon Creek	14.5	38.1	40−	7.5+	96.8	66	17	121	230	51	178	1.4	2.0	549	.75	235	46	53
474	Above Graham Canal	17.5	38.5	0	.4+	97.4	72	24	96	214	50	178	.9	5.0	532	.72	278	102	43
475	At Safford, Ariz	18.5	11.4	24.8−	2.3−	93.2	63	16	113	217	51	165	1.0	2.0	518	.70	223	45	52
	Sept. 19:																		
476	At Safford, Ariz	18.5	11.4			103	70	17	128	231	55	192	1.2	1.5	579	.79	245	55	53
477	Above Smithville Canal	21.2	12.5	0	1.1+	118	76	21	150	260	74	215	2.8	1.5	668	.91	276	63	54
478	At Thatcher, Ariz	23.5	8.6	9.7−	5.8+	171	104	26	238	359	123	322	2.2	2.0	994	1.35	366	72	58
479	Above Dodge-Nevada Canal	25.4	8.7	0	.1+	164	92	26	240	349	118	315	1.5	2.0	966	1.31	337	50	61
480	At Pima, Ariz	28.3	12.5	3.4−	7.2+	208	99	30	322	427	151	395	1.9	2.5	1,211	1.65	370	21	65
	Sept. 20:																		
481	At Pima, Ariz	28.3	16.0			230	107	33	364	474	170	440	2.2	3.0	1,352	1.84	403	14	66
482	Above Fort Thomas Canal	33.0	13.1	11.9−	9.0+	275	66	36	485	334	272	570	2.1	2.0	1,598	2.17	313	39	77
483	At Eden crossing	35.7	16.0	0	2.9+	286	114	35	490	482	275	570	2.7	1.0	1,725	2.35	428	33	71
484	Above Colvin-Jones Canal	42.6	19.0	0	3.0+	366	167	53	569	384	352	840	2.0	1.0	2,173	2.96	635	320	66
485	At Fort Thomas	44.2	19.3	0	.3+	346	124	54	561	256	351	830	1.4	1.0	2,048	2.79	531	322	70
	Oct. 9:																		
486	At Fort Thomas	44.2	59.1			189	98	27	286	319	147	395	1.9	2.0	1,114	1.52	356	94	64
487	At Geronimo crossing	50.2	68 4	0	9.3+	220	114	30	322	283	191	475	1.9	2.0	1,276	1.74	408	176	63
488	At Bylas, Ariz	56.7	75.5	0	7.1+	219	126	31	311	311	184	470	2.1	3.0	1,280	1.74	442	187	60
489	At Calva, Ariz	67.2	72.0	0	3.5−	205	117	28	297	307	168	440	1.9	2.0	1,205	1.64	407	156	61
	Oct. 16:																		
490	At gaging station below Bonita Creek	0	154			90.3	63	17	105	226	39	162		.5	498	.68	227	42	50
491	Above Brown Canal	2.2	157	0	3.0+	89.2	62	17	106	237	41	155		.5	498	.68	225	31	51
492	Below Brown wasteway	3.7	157	0.2−	.2+	91.2	62	17	103	221	40	160		.5	492	.67	225	44	50
493	Above Tidwell Canal	5.0	157	0	0	91.0	62	18	109	239	49	155		1.0	512	.70	229	33	51
494	Above San Jose Dam	5.5	150	8.2−	1.2+	91.3	64	15	109	237	48	152			506	.69	221	27	52
	Oct. 17:																		
495	Above San Jose Dam	5.5	142			90.4	62	18	106	237	47	152		1.0	503	.68	229	34	50
496	Below San Jose wasteway	9.3	138	6.9−	2.9+	91.8	63	17	107	239	47	152		.5	504	.68	227	31	51
497	Above Union Canal	12.3	129	0	9.0−	91.1	62	16	111	239	46	155		.5	508	.69	221	25	52
498	Below San Simon Creek	14.5	82.5	47.3−	.8+	93.2	71	17	104	242	46	160		1.0	518	.70	247	49	48
499	Above Graham Canal	17.5	86.9	0	4.4+	93.3	64	18	109	246	45	158		.5	515	.70	234	32	50
500	At Safford, Ariz	18.5	53.0	26.1−	7.8+	95.5	64	17	115	243	49	162		.5	528	.72	230	30	52
	Oct. 18:																		
501	At Safford, Ariz	18.5	54.7			97.0	67	17	108	223	47	170		.5	519	.71	237	54	50
502	Above Smithville Canal	21.2				104	69	16	130	260	54	178		1.5	576	.78	238	25	54
503	At Thatcher, Ariz	23.5	46.7	18.3−	10.3+	114	72	16	151	264	63	205		4.0	641	.87	245	29	57
504	Above Dodge-Nevada Canal	25.4	48.9	0	2.2+	115	74	17	149	270	68	202		2.0	645	.88	255	33	56
505	At Pima, Ariz	28.3	48.4	4.1−	3.6+	131	74	21	190	302	85	245		2.0	766	1.04	271	24	60

Changes in the chemical character of the water of Gila River between the mouth of Bonita Creek near Solomonsville, Ariz., and the Southern Pacific Railroad bridge at Calva, Ariz.—Continued

[Analyses in parts per million]

Analysis No.	Date sampled and sampling point	Miles below initial point	Discharge (second-feet)	Change in discharge from preceding measuring point (second-feet)		Specific conductance (K×10[5] at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids		Hardness as $CaCO_3$		Percent sodium
				Inflow (+) or diversion (−)	Net gain (+) or loss (−) (unadjusted)										Parts per million	Tons per acre-foot	Total	Noncarbonate	
	1940																		
	Oct. 23:																		
506	At Pima, Ariz	28.3	27.7			170	87	24	258	360	119	325			990	1.35	316	22	64
507	Above Fort Thomas Canal	33.0	32.7	4.6−	9.6+	200	94	25	324	392	161	390		3.0	1,190	1.62	337	16	68
508	At Eden crossing	35.7	39.7	.1−	6.9+	205	102	28	318	386	165	405		3.0	1,211	1.65	370	53	65
509	Above Colvin-Jones Canal	42.6	44.0	0	4.3+	243	94	38	385	286	221	540		3.0	1,422	1.93	391	156	68
510	At Fort Thomas	44.2	38.8	0	5.2−	247	96	38	396	290	225	555		2.0	1,455	1.98	396	158	68
	Oct. 25:																		
511	At Fort Thomas	44.2	25.5			298	127	46	470	328	286	680		2.0	1,773	2.41	506	237	67
512	At Geronimo crossing	50.2	37.6	0	12.1+	330	146	48	532	335	328	780		2.0	2,001	2.72	562	287	67
513	At Bylas, Ariz	56.7	35.0	0	2.6−	309	137	44	485	322	300	710		1.0	1,836	2.50	523	259	67
514	At Calva, Ariz	67.2	34.1	0	.9−	309	128	44	491	276	289	740		2.0	1,830	2.49	500	274	68
	Nov. 6:																		
515	At gaging station below Bonita Creek	0	130			96.6	64	17	122	234	44	182			544	.74	230	38	54
516	Above Brown Canal	2.2	136	0	6.0+	96.2	66	17	119	233	44	182			543	.74	235	44	52
517	Below Brown wasteway	3.7	127	7.9−	1.1−	95.5	66	17	119	235	45	180			543	.74	235	42	52
518	Above Tidwell Canal	5.0	120	0	7.0−	95.6	67	17	119	232	48	182			547	.74	237	47	52
519	Above San Jose Dam	5.5	120	7.2−	7.2+														
	Nov. 7:																		
520	Above San Jose Dam	5.5	119			97.3	65	17	122	232	48	182			548	.74	232	42	53
521	Below San Jose wasteway	9.3	108	9.2−	1.8−	97.3	66	15	128	230	48	188			558	.76	226	38	55
522	Above Union Canal	12.3	99.2	0	8.8−	95.8	64	16	123	231	46	182			545	.74	226	36	54
523	Below San Simon Creek	14.5	86.2	26.5−	13.5+	99.0	68	15	123	234	49	182			552	.75	231	40	54
524	Above Graham Canal	17.5				99.0	67	15	121	233	49	178			545	.74	229	38	54
525	At Safford, Ariz	18.5	94.0	0	7.8+	99.6	66	16	125	237	51	180			555	.76	230	36	54
	Nov. 13:																		
526	At Safford, Ariz	18.5	126			89.0	66	14	104	236	45	148			493	.67	222	29	50
527	Above Smithville Canal	21.2				91.2	64	14	116	242	50	155			518	.70	217	19	54

528	At Thatcher, Ariz.	23.5	119	8.2−	1.2+	95.9	69	17	117	252	59	162			548	.74	242	36	51
529	Above Dodge-Nevada Canal	25.4	109	0	10.0−	96.4	66	16	125	252	61	165			557	.76	230	24	54
530	At Pima, Ariz.	28.3	101	23.5−	15.5+	110	69	18	147	272	72	190			630	.86	246	23	56
	Nov. 14:																		
531	At Pima, Ariz.	28.3	98.3			108	70	18	143	275	71	185			622	.85	249	23	56
532	Above Fort Thomas Canal	33.0	130	24.4+	7.3+	119	72	19	165	289	83	208			689	.94	258	22	58
533	At Eden crossing	35.7	115	5.4−	9.6−	128	74	20	181	300	94	225			742	1.01	267	21	60
534	Above Colvin-Jones Canal	42.6				140	82	21	200	302	105	262			818	1.11	291	43	60
535	At Fort Thomas	44.2	125	0	10.0+	142	82	22	200	301	109	262			823	1.12	295	48	60
	Nov. 15:																		
536	At Fort Thomas	44.2	124			141	85	21	193	300	101	260			808	1.10	298	53	58
537	At Geronimo crossing	50.2	133	0	9.0+	160	90	23	230	301	133	308			932	1.27	319	72	61
538	At Bylas, Ariz.	56.7	136	0	3.0+	160	90	23	228	304	127	308			926	1.26	319	70	61
539	At Calva, Ariz.	67.2	123	0	13.0−	169	93	23	249	306	136	338			990	1.35	327	76	62
	1941																		
	Feb. 21:																		
540	At gage near Solomonsville, Ariz.	3.8	1,960			30.0	31	10	16	116	26	22			162	.22	118	23	23
541	Above San Jose Dam	5.5				29.8	31	11	11	117	18	22			151	.21	123	27	16
542	Above Union Canal	12.3				30.4	32	9.6	18	117	27	24			169	.23	119	23	24
543	Below San Simon Creek	14.5				31.5	33	10	20	120	31	26			179	.24	123	25	26
544	At Safford, Ariz.	18.5	1,890	30.9−	39.1+	31.8	32	11	17	120	26	26			171	.23	125	27	23
	Apr. 23:																		
545	At gage near Solomonsville, Ariz.	3.8	955			41.2	36	13	40	139	44	50			251	.34	143	29	38
546	Above Tidwell Canal	5.0	977	0	22.0+	40.8	36	12	36	142	38	43			235	.32	139	23	36
547	Below San Jose wasteway	10.0	832	91.8−	53.2−	42.3	36	11	40	141	40	46			243	.33	135	20	39
	Apr. 24:																		
548	Below San Jose wasteway	10.0	816			43.6	38	12	39	144	41	48			249	.34	144	26	37
549	Above Union Canal	12.3	857	0	41.0+	43.6	38	12	38	144	40	47			246	.33	144	26	36
550	Below San Simon Creek	14.5	747	102.1−	7.9−	45.1	38	14	40	146	43	53			260	.35	152	33	36
551	At Safford, Ariz.	18.5	624	81.8−	41.2−	49.8	41	14	43	150	43	60			275	.37	160	37	37
	Apr. 25:																		
552	At Safford, Ariz.	18.5	642			52.0	42	15	45	154	46	64			288	.39	166	36	37
553	At Thatcher, Ariz.	23.5	634	29.7−	21.7+	56.7	44	14	64	185	49	73			335	.46	167	16	45
554	Above Dodge-Nevada Canal	25.4	634	0	0	59.2	45	14	59	164	53	77			329	.23	170	35	43
555	At Pima, Ariz.	28.3	596	22.2−	15.8−	63.7	47	14	69	171	56	90			360	.49	175	35	46
	July 8:																		
556	At gage near Solomonsville, Ariz.	3.8	120			105	66	16	144	216	57	212	2.2	1.0	605	.82	230	53	58
557	Above Tidwell Canal	5.0	113			105	67	15	139	210	53	210	2.2	1.0	591	.80	229	56	57
558	Above San Jose Wash	10.0	57.6			110	68	17	138	214	63	208	1.3	1.0	602	.82	240	64	56

Changes in the chemical character of the water of Gila River between the mouth of Bonita Creek near Solomonsville, Ariz., and the Southern Pacific Railroad bridge at Calva, Ariz.—Continued

[Analyses in parts per million]

Analysis No.	Date sampled and sampling point	Miles below initial point	Discharge (second-feet)	Change in discharge from preceding measuring point (second-feet): Inflow (+) or diversion (−)	Change in discharge from preceding measuring point (second-feet): Net gain (+) or loss (−) (unadjusted)	Specific conductance (K×10[5] at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Hardness as $CaCO_3$: Total	Hardness as $CaCO_3$: Noncarbonate	Percent sodium
	1941																		
	July 9:																		
559	Above San Jose Wash	10.0	78.0			110	67	16	144	214	63	212	2.1	1.0	610	.83	233	57	57
560	Above Union Canal	12.3	82.4			113	71	16	147	219	66	220	1.3	1.0	630	.86	243	63	57
561	Below San Simon Creek	14.5	32.2			121	80	19	153	245	78	228	1.8	1.0	682	.93	278	76	53
562	Above Graham Canal	17.5	28.6			126	79	20	159	246	85	232	2.5	1.0	700	.95	279	77	55
563	At Safford, Ariz	18.5	12.8			150	90	20	207	265	119	288	2.9	1.0	858	1.17	307	89	59
	July 10:																		
564	At Safford, Ariz	18.5	12.6			140	89	22	182	276	107	258	2.0	1.0	797	1.08	313	86	56
565	Above Smithville Canal	21.2	18.2			163	98	26	219	319	118	310	1.6	1.0	931	1.27	351	90	58
566	At Thatcher, Ariz	23.5	9.9			230	118	35	337	408	183	450	2.2	6.9	1,330	1.81	438	104	63
	July 11:																		
567	At Thatcher, Ariz	23.5	11.2			222	124	35	317	436	170	422	2.0	7.6	1,290	1.76	453	95	60
568	Above Dodge-Nevada Canal	25.4	14.0			228	116	35	333	400	179	450	2.9	2.5	1,320	1.79	433	106	63
569	At Pima, Ariz	28.3	24.2			269	112	35	438	480	216	530	2.5	4.0	1,570	2.14	423	30	69
570	Above Fort Thomas Canal	33.0	12.5			374	123	46	661	496	374	800	3.2	1.0	2,250	3.06	496	90	74
571	At Eden crossing	35.7	8.0			316	142	42	498	436	289	670	2.2	.5	1,860	2.53	527	170	67
572	Above Colvin-Jones Canal	42.6	12.1			633	300	100	987	362	623	1,670	2.2	.5	3,860	5.25	1,160	863	65
573	At Fort Thomas	44.2	11.6			685	338	109	1,031	350	661	1,810	2.4	.5	4,120	5.60	1,292	1,000	63
	July 12:																		
574	At Fort Thomas	44.2	10.6			719	366	114	1,085	373	693	1,920	2.2	.5	4,360	5.94	1,382	1,080	63
575	At Geronimo crossing	50.2	25.4			569	274	81	872	346	571	1,440	1.5	.5	3,410	4.64	1,017	733	65
576	At Bylas, Ariz	56.7	24.8			507	250	73	760	281	514	1,280	2.1	.5	3,020	4.11	924	694	64
577	At Calva, Ariz	67.2	22.3			514	258	78	754	256	452	1,360	1.8	.5	3,030	4.12	965	755	63
	Sept. 9:																		
578	At gaging station below Bonita Creek	0	208			80.5	61	15	94	218	45	132	2.0	1.0	457	.62	214	35	49

579	Above Brown Canal	2.2	218	----	----	80.8	62	16	92	219	44	135	1.5	.5	459	.62	221	41	48
580	At gage near Solomonsville, Ariz.	3.8	214	----	----	81.4	61	15	97	218	44	138	1.5	1.0	465	.63	214	35	50
581	Above Tidwell Canal	5.0	211	----	----	82.2	61	16	94	219	45	135	1.7	1.5	462	.63	218	38	48
582	Above San Jose Wash	10.0	101	----	----	82.8	63	15	96	224	49	132	1.7	3.5	470	.64	219	36	49
	Sept. 10:																		
583	Above San Jose Wash	10.0	90.0	----	----	92.8	65	16	111	223	51	162	1.6	1.0	518	.70	228	44	52
584	Above Union Canal	12.3	80.8	----	----	93.0	66	16	110	225	46	165	1.8	.5	516	.70	230	46	51
585	Below San Simon Creek	14.5	40.3	----	----	101	73	15	121	238	56	175	1.8	1.5	560	.76	244	48	52
586	Above Graham Canal	17.5	36.8	----	----	102	72	17	118	240	58	172	2.1	1.5	559	.76	250	52	51
587	At Safford, Ariz.	18.5	20.3	----	----	116	78	17	146	255	79	202	1.5	2.0	651	.89	265	55	54
	Sept. 11:																		
588	At Safford, Ariz.	18.5	25.6	----	----	107	73	17	134	255	72	180	1.6	1.5	605	.82	252	42	54
589	Above Smithville Canal	21.2	20.9	----	----	143	88	21	194	304	101	260	2.0	1.5	817	1.11	306	57	58
590	At Thatcher, Ariz.	23.5	15.5	----	----	174	105	26	247	374	133	322	2.0	2.5	1,020	1.39	369	62	59
591	Above Dodge-Nevada Canal	25.4	22.1	----	----	188	108	28	275	386	147	358	1.8	2.5	1,110	1.51	385	68	61
592	At Pima, Ariz.	28.3	26.8	----	----	218	104	29	341	434	166	412	2.0	6.2	1,270	1.73	379	23	66
	Sept. 12:																		
593	At Pima, Ariz.	28.3	20.6	----	----	237	86	31	412	456	189	465	2.0	6.7	1,420	1.93	342	0	72
594	Above Fort Thomas Canal	33.0	16.8	----	----	330	109	41	586	508	321	680	1.6	2.5	1,990	2.71	441	25	74
595	At Eden crossing	35.7	6.7	----	----	318	104	43	552	426	299	690	.9	.5	1,900	2.58	436	87	73
596	At Colvin-Jones Canal	42.6	21.2	----	----	498	186	78	828	397	500	1,230	1.1	2.0	3,020	4.11	785	460	70
597	At Fort Thomas	44.2	20.5	----	----	498	225	77	777	348	494	1,250	1.3	1.0	3,000	4.08	878	593	66
	Sept. 22:																		
598	At Fort Thomas	44.2	57.4	----	----	248	115	34	379	372	207	512	2.5	2.5	1,436	1.95	427	121	66
599	At Geronimo crossing	50.2	73.0	----	----	342	164	46	529	379	318	780	2.4	2.0	2,028	2.76	598	288	66
600	At Bylas, Ariz.	56.7	67.1	----	----	327	138	46	506	306	306	750	1.7	2.0	1,900	2.58	534	282	67
601	At Calva, Ariz.	67.2	62.1	----	----	300	133	44	466	315	264	700	2.0	2.0	1,766	2.40	513	255	66
	1943																		
	June 23:																		
602	At gage near Solomonsville, Ariz.[1]	0	46.2	----	----	135	76	17	178	196	60	300	----	----	728	.99	260	99	60
603	Above Tidwell Canal	1.2	41.8	0	4.4−	137	----	----	----	----	----	300	----	----	----	----	----	----	----
604	Below San Jose wasteway	5.6	0	38.5−	3.3−	----	----	----	----	----	----	----	----	----	----	----	----	----	----
605	Above Union Canal	9.0	0	0	0	----	----	----	----	----	----	----	----	----	----	----	----	----	----
606	Below San Simon Creek	11.1	3.4	0	3.4+	142	----	----	----	----	----	255	----	----	----	----	----	----	----
607	Above Graham Canal	13.7	.5	0	2.9−	----	----	----	----	----	----	----	----	----	----	----	----	----	----
608	At Safford, Ariz.	15.9	0	.5−	0	----	----	----	----	----	----	----	----	----	----	----	----	----	----
609	Below Smithville Canal	17.7	.7	0	.7+	213	64	33	414	276	185	550	----	----	1,382	1.88	295	69	75
610	Near Thatcher, Ariz.	19.9	1.6	0	.9+	226	----	----	----	----	----	485	----	----	----	----	----	----	----
	June 24:																		
611	Near Thatcher, Ariz.	19.9	1.6	----	----	222	----	----	----	----	----	445	----	----	----	----	----	----	----
612	Above Dodge-Nevada Canal	22.6	.1	0	1.5−	282	----	----	----	----	----	545	----	----	----	----	----	----	----
613	At Pima, Ariz.	25.2	4.0	.5+	3.4+	289	----	----	----	----	----	565	----	----	----	----	----	----	----
614	Above Fort Thomas Canal	29.3	2.7	2.7−	1.4+	379	96	45	686	469	401	790	----	----	2,249	3.06	424	40	78
615	Near Glenbar, Ariz.	30.5	.6	1.1−	1.0−	319	----	----	----	----	----	660	----	----	----	----	----	----	----

[1] The gaging station below Bonita creek was abandoned in 1941, and the gage near Solomonsville, Ariz., was the initial point for measurements made after that time.

Changes in the chemical character of the water of Gila River between the mouth of Bonita Creek near Solomonsville, Ariz., and the Southern Pacific Railroad bridge at Calva, Ariz.—Continued

[Analyses in parts per million]

Analysis No.	Date sampled and sampling point	Miles below initial point	Discharge (second-feet)	Change in discharge from preceding measuring point (second-feet): Inflow (+) or diversion (−)	Change in discharge: Net gain (+) or loss (−) (unadjusted)	Specific conductance (K×10⁵ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Hardness as $CaCO_3$: Total	Hardness as $CaCO_3$: Noncarbonate	Percent sodium
	1943																		
	June 24—Continued																		
616	At Eden crossing	32.2	.2	0	.4−	351						770							
617	Near Ashurst	37.7	.7	0	.5+	574	174	95	1,121	302	770	1,570			3,880	5.28	824	577	75
618	Above Colvin-Jones Canal	39.9	1.0	0	.3+	802						2,100							
619	At Fort Thomas	41.6	.5	0	.5−	862	480	148	1,276	416	970	2,290			5,370	7.30	1,806	1,466	70
620	At Geronimo crossing	48.0	5.5	0	5.0+	434	87	25	752	254	228	1,070			2,287	3.11	320	112	84
621	At Black Point	51.5	2.1	0	3.4−	443						1,080							
	June 25:																		
622	Near Geronimo	45.5	3.5			718						1,850							
623	At Black Point	51.5	2.8	0	.7−	410						1,000							
624	At Bylas, Ariz	55.6	2.3	0	.5−	417						1,015							
625	At Calva, Ariz	65.7	0	0	2.3−														
	Sept. 15:																		
626	At gage near Solomonsville, Ariz	0	61.9			102	64	16	127	220	47	190	1.2	.5	554	.75	226	45	55
627	Above Tidwell Canal	1.2	58.4	0	3.5−	101						188							
628	Above San Jose Wash	7.4	22.7	35.9−	.2+	105	66	17	132	232	56	192		.5	578	.79	234	44	55
629	Above Union Canal	9.0	24.1	.4+	1.0+	107	67	18	129	230	54	196		.5	578	.79	241	52	54
	Sept. 16:																		
630	Above Union Canal	9.0	23.3			106	67	18	129	230	53	196		1.0	577	.78	241	52	54
631	Below San Simon Creek	11.1	14.6	12.1−	3.4+	126	83	21	158	278	82	226		5.0	712	.97	294	66	54
632	Above Graham Canal	13.7	10.1	.3+	4.8−	124	78	20	155	268	77	222		2.0	686	.93	276	57	55
633	At Safford, Ariz	15.9	7.1	2.5−	.5−	122	75	20	163	273	78	222	1.6	2.0	696	.95	269	46	57
634	Above Smithville Canal	17.7	7.8	1.0+	.3−	133	64	19	191	239	81	262		3.0	738	1.00	238	42	64
635	Near Thatcher, Ariz	19.9	3.1	8.2−	3.5+	196	84	33	291	306	166	390		5.0	1,120	1.52	345	94	65
636	Above Dodge-Nevada Canal	22.6	2.9	.3+	.5−	210	72	30	342	309	188	420		5.0	1,209	1.64	303	50	71
637	At Pima, Ariz	25.2	5.4	0	2.5+	279	80	34	498	498	234	540		12	1,643	2.23	340	0	76

	Sept. 17:																		
638	At Pima, Ariz.	25.2	9.2			275	98	35	474	526	231	520	1.9	11	1,630	2.22	388	0	73
639	Above Fort Thomas Canal	29.3	5.6	7.4−	3.8+	359	99	45	641	481	383	730		5.0	2,140	2.91	432	0	76
640	Near Glenbar	30.5	2.1	2.6−	.9−	355	91	44	647	469	371	735	1.8	5.0	2,126	2.89	408	24	78
641	At Eden crossing	32.2	2.7	0	.6+	341	78	42	624	410	356	720		2.0	2,024	2.75	367	31	79
642	Near Ashurst	37.7	1.7	0	1.0−	573	196	86	990	401	672	1,390	1.9	3.0	3,540	4.81	842	514	72
643	Above Colvin-Jones Canal	39.9	2.9	0	1.2+	731	332	119	1,137	287	825	1,910		2.0	4,470	6.08	1,318	1,083	65
644	At Fort Thomas	41.6	2.5	0	.4−	748	374	114	1,180	338	802	2,020	1.7	2.0	4,660	6.34	1,402	1,125	65
645	Near Geronimo	45.5	6.0	0	3.5+	732	329	106	1,187	259	809	1,970	1.5	2.0	4,530	6.16	1,257	1,044	67
646	At Geronimo crossing	48.0	10.6	0	4.6+	516	214	72	826	224	556	1,320		2.0	3,100	4.22	830	646	68
647	At Black Point	51.5	6.6	0	4.0−	510	217	70	815	253	551	1,290		2.0	3,070	4.18	830	622	68
	Sept. 18:																		
648	At Black Point	51.5	9.3			490	220	68	781	276	526	1,240	1.4	2.0	2,970	4.04	828	602	67
649	At Bylas, Ariz.	55.6	9.0	0	0.3−	468	206	64	734	236	486	1,185		2.0	2,790	3.79	777	584	67
650	At Calva, Ariz.	65.7	3.7	0	5.3−	510	209	72	804	218	486	1,330	1.6	2.0	3,010	4.09	818	639	68
	Nov. 4:																		
651	Near Thatcher, Ariz.	19.9	6.1			140	86	26	181	312	105	248		1.5	801	1.09	322	66	55
652	Above Dodge-Nevada Canal	22.6	35.3	28.1+	1.1+	104	66	20	129	253	68	176		1.5	585	.80	246	39	53
653	At Pima, Ariz.	25.2	20.9	21.8−	7.4+	203	78	30	330	407	160	375		7.9	1,180	1.60	318	0	66
654	Above Fort Thomas Canal	29.3	37.3	8.9+	7.5+	180	80	26	281	338	158	335		3.0	1,050	1.43	306	29	67
655	Near Glenbar	30.5	1.7	36.9−	1.3+	275	84	35	481	433	249	555		4.0	1,620	2.20	354	0	75
	Nov. 5:																		
656	Near Glenbar	30.5	1.8			266	69	36	478	395	239	555		5.0	1,580	2.15	320	0	77
657	At Eden crossing	32.2	16.7	13.1+	1.8+	215	90	31	340	370	185	420		4.0	1,250	1.70	352	48	67
658	Near Ashurst	37.7	31.4	15.4+	.7−	228	100	33	358	358	209	460		3.0	1,340	1.82	385	91	67
659	Above Colvin-Jones Canal	39.9	32.9	0	1.5+	269	109	39	426	315	256	590		2.5	1,580	2.15	432	174	68
660	At Fort Thomas	41.6	36.0	4.5+	1.4−	307	118	48	489	291	300	710		2.5	1,810	2.46	492	254	68
	Nov. 9:																		
661	At Fort Thomas	41.6	29.0			317	148	46	495	340	298	740		3.0	1,900	2.58	558	280	66
662	Near Geronimo	45.5	40.0	4.7+	6.3+	365	164	52	566	333	352	860		4.0	2,160	2.94	624	351	66
663	At Geronimo crossing	48.0	49.7	1.8+	7.9+	322	136	43	505	306	305	740		3.0	1,880	2.56	516	266	68
664	At Black Point	51.5	50.8	0	1.1+	323	144	42	519	336	312	750		3.0	1,940	2.64	532	256	68
665	At Bylas, Ariz.	55.6	52.9	0	2.1+	308	134	40	494	308	298	715		3.0	1,840	2.50	499	246	68
666	At Calva, Ariz.	65.7	46.8	0	6.1−	350	150	47	568	321	338	840		3.0	2,100	2.86	568	304	69
	Dec. 13:																		
667	Near Thatcher, Ariz.	19.9	10.8			140	84	22	200	325	105	252		3.5	827	1.12	300	34	59
668	Above Dodge-Nevada Canal	22.6	32.4	22.9+	1.3−	112	68	16	164	273	81	200		3.0	666	.91	236	12	60
669	At Pima, Ariz.	25.2	41.9	2.5−	12.0+	172	84	22	269	369	135	310		5.0	1,010	1.37	300	0	66
670	Above Fort Thomas Canal	29.3	67.8	5.2+	20.7+	182	84	24	290	348	152	350		4.0	1,080	1.47	308	23	67
671	Near Glenbar	30.5	2.3	66.9−	1.4+	269	96	36	464	445	240	550		6.8	1,610	2.19	328	23	70
	Dec. 16:																		
672	Near Glenbar	30.5	1.8			303	72	41	558	418	286	650		5.0	1,820	2.48	348	6	78
673	At Eden crossing	32.2	34.2	30.1+	2.3+	195	90	28	309	373	167	375		4.0	1,160	1.58	340	34	66
674	Near Ashurst	37.7	44.7	6.0+	4.5+	211	96	32	331	373	189	415		3.5	1,250	1.70	371	65	66

Changes in the chemical character of the water of Gila River between the mouth of Bonita Creek near Solomonsville, Ariz., and the Southern Pacific Railroad bridge at Calva, Ariz.—Continued

[Analyses in parts per million]

Analysis No.	Date sampled and sampling point	Miles below initial point	Discharge (second-feet)	Change in discharge from preceding measuring point (second-feet)		Specific conductance (K×10⁵ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids		Hardness as $CaCO_3$		Percent sodium
				Inflow (+) or diversion (−)	Net gain (+) or loss (−) (unadjusted)										Parts per million	Tons per acre-foot	Total	Noncarbonate	
	1943																		
	Dec. 16—Continued																		
675	Above Colvin-Jones Canal	39.9	48.4	0	3.7+	254	122	40	395	377	237	545	------	4.0	1,530	2.08	469	160	65
676	At Fort Thomas	41.6	56.8	8.1+	.3+	271	132	40	426	374	255	600	------	4.0	1,640	2.23	494	188	65
	Dec. 14:																		
677	At Fort Thomas	41.6	50.7	------	------	280	135	40	431	376	256	610	------	3.5	1,660	2.26	502	194	65
678	At wash below Fort Thomas	43.4	50.6	0	.1−														
679	Near Geronimo	45.5	62.2	3.8+	7.8+	305	150	43	484	372	295	700	------	5.0	1,860	2.53	552	246	66
680	1 mile below Goodwin Wash	47.3	78.6	8.0+	8.4+	301	146	43	476	367	294	685	------	3.5	1,830	2.49	542	240	66
681	At Geronimo crossing	48.0	76.0	0	2.6−	289	140	40	448	364	274	640	------	3.5	1,720	2.34	514	216	65
682	At Black Point	51.5	79.2	0	3.2+	281	134	37	444	360	268	620	------	4.0	1,680	2.28	486	191	66
683	At Bylas, Ariz	55.6	79.1	0	.1−	282	132	37	445	352	263	625	------	5.0	1,680	2.28	482	193	67
684	At Calva, Ariz	65.7	84.3	0	5.2+	274	120	36	446	323	257	625	------	3.5	1,650	2.24	448	183	68
	1944																		
	Feb. 14:																		
685	Near Thatcher, Ariz	19.9	23.9	------	------	125	74	18	174	290	93	214	------	1.5	717	.98	258	21	49
686	Above Dodge-Nevada Canal	22.6	39.3	15.9+	.5−	126	72	17	179	291	93	214	------	1.5	720	.98	250	11	61
687	At Pima, Ariz	25.2	63.2	.6+	23.3+	150	80	21	218	321	114	265	------	6.9	863	1.17	286	23	62
688	Above Fort Thomas Canal	29.3	76.7	3.2+	10.3+	183	84	21	295	352	153	345	------	2.5	1,070	1.46	296	8	68
689	Near Glenbar	30.5	6.1	75.0−	4.4+	241	86	27	423	414	213	485	------	2.0	1,440	1.96	326	0	74
	Feb. 15:																		
690	Near Glenbar	30.5	3.1	------	------	305	111	34	549	540	278	620	------	3.5	1,860	2.53	417	0	74
691	At Eden crossing	32.2	26.4	19.3+	4.0+	269	114	32	452	465	242	540	------	4.0	1,610	2.19	416	34	70
692	Near Ashurst	37.7	34.8	3.7+	4.7+	273	120	36	436	416	260	555	------	3.0	1,610	2.19	448	107	68
693	Above Colvin-Jones Canal	39.9	38.2	0	3.4+	329	152	47	516	411	320	725	------	3.0	1,970	2.68	573	236	66
694	At Fort Thomas	41.6	46.2	4.3+	3.7+	370	172	55	570	390	365	845	------	4.0	2,200	2.99	655	336	65

	Feb. 18:																		
695	At Fort Thomas	41.6	24.6	--------	--------	550	245	84	884	403	589	1,370	------	4.0	3,370	4.58	957	626	67
696	At wash below Fort Thomas	43.4	26.1	1.0+	0.5+	558	265	86	879	447	599	1,370	------	5.0	3,420	4.65	1,020	648	65
697	Near Geronimo	45.5	33.0	0	6.9+	562	270	79	914	452	613	1,400	------	3.0	3,500	4.76	999	628	67
698	1 mile below Goodwin Wash	47.3	42.7	.7+	9.0+	527	240	73	851	422	570	1,280	------	5.0	3,230	4.39	899	553	67
699	At Geronimo crossing	48.0	46.8	0	4.1+	492	226	67	797	403	525	1,200	------	3.0	3,020	4.11	840	509	67
700	At Black Point	51.5	48.0	0	1.2+	485	214	67	787	365	519	1,190	------	2.5	2,960	4.03	810	510	68
701	At Bylas, Ariz	55.6	53.4	0	5.4+	455	187	63	734	312	478	1,110	------	4.0	2,730	3.71	726	452	69
702	At Calva, Ariz	65.7	57.5	0	4.1+	428	168	59	707	303	435	1,060	------	3.0	2,580	3.51	662	414	70
	Apr. 12:																		
703	Near Thatcher, Ariz	19.9	4.3	--------	--------	234	130	39	340	476	193	445	------	6.3	1,390	1.89	485	94	60
704	Above Dodge-Nevada Canal	22.6	16.9	11.3+	1.3+	169	89	25	246	342	128	315	------	2.5	974	1.32	325	44	62
705	At Pima, Ariz	25.2	27.8	1.9+	9.0+	244	106	33	393	478	200	460	------	8.4	1,440	1.96	400	8	68
706	Above Fort Thomas Canal	29.3	13.1	21.3−	6.6+	353	106	45	631	466	377	740	------	4.0	2,130	2.90	450	68	75
707	Near Glenbar	30.5	2.7	12.4−	2.0+	326	82	41	601	434	323	700	------	1.5	1,960	2.67	373	15	78
	Apr. 13:																		
708	Near Clenbar	30.5	2.8	--------	--------	315	93	39	574	486	298	660	------	2.5	1,910	2.60	392	0	76
709	At Eden crossing	32.2	4.4	0	1.6+	336	120	43	586	516	326	700	------	1.0	2,030	2.76	476	54	73
710	Near Ashurst	37.7	8.9	0	4.5+	467	176	71	792	486	534	1,060	------	3.0	2,880	3.92	731	332	70
711	Above Colvin-Jones Canal	39.9	12.3	0	3.4+	582	246	90	949	408	654	1,440	------	1.0	3,580	4.87	984	650	68
712	At Fort Thomas	41.6	8.9	4.0−	.6+	744	331	119	1,210	351	817	1,990	------	1.0	4,640	6.31	1,320	921	67
	Apr. 14:																		
713	At Fort Thomas	41.6	9.6	--------	--------	733	331	118	1,180	363	805	1,950	------	1.5	4,560	6.20	1,310	1,010	66
714	At wash below Fort Thomas	43.4	11.2	0	1.6+	747	356	118	1,200	399	848	1,970	------	3.0	4,690	6.38	1,370	1,050	66
715	Near Geronimo	45.5	17.4	0	6.2+	719	330	108	1,170	367	810	1,890	------	3.0	4,490	6.11	1,270	966	67
716	½ mile below Goodwin Wash	46.9	22.4	0	5.0+	639	262	93	1,060	287	723	1,670	------	3.0	3,950	5.37	1,040	802	69
717	1 mile below Goodwin Wash	47.3	24.0	0	1.6+	599	254	85	983	300	674	1,540	------	3.0	3,690	5.02	984	738	68
718	At Geronimo crossing	48.0	23.6	0	.4−	568	232	80	927	264	635	1,450	------	2.0	3,460	4.71	908	692	69
719	At Black Point	51.5	21.2	0	2.4−	561	230	79	923	274	623	1,440	------	1.5	3,430	4.66	899	674	69
720	At Bylas, Ariz	55.6	25.6	0	4.4+	526	228	74	849	302	571	1,330	------	1.0	3,200	4.35	874	626	68
721	At Calva, Ariz	65.7	25.1	0	.5−	521	202	74	852	224	537	1,360	------	.5	3,140	4.27	808	625	70
	May 1:																		
722	At gage near Solomonsville, Ariz	0	122.9	--------	--------	98.3	------	------	------	------	------	176	------	------	------	------	------	------	------
723	Above Tidwell Canal	1.2	123.5	0	.6+	98.6	------	------	------	------	------	176	------	------	------	------	------	------	------
	May 10:																		
724	Below Tidwell Canal	1.2	95.6	--------	--------	115	66	16	151	205	58	234	------	0	626	.85	230	62	59
725	Above San Jose Wash	7.4	45.2	44.6−	5.8−	115	65	16	151	213	60	226	------	0	623	.85	228	53	59
726	Above Union Canal	9.0	42.4	.4+	3.2−	114	64	15	155	214	63	224	------	.5	627	.85	221	46	60
	May 1:																		
727	Below Union Canal	9.0	0	--------	--------	------	------	------	------	------	------	------	------	------	------	------	------	------	------
728	Below San Simon Creek [2]	11.1	27.5	23.7+	3.8+	146	79	24	201	266	118	274	------	5.0	832	1.13	296	77	60
729	Above Graham Canal	13.7	24.7	.2+	3.0−	106	56	16	146	211	74	194	------	.5	590	.80	206	33	61
730	At Safford, Ariz	15.9	16.3	6.8−	1.6−	110	58	17	150	217	74	202	------	1.0	609	.83	214	36	60

[2] Sample taken above San Simon Creek, flow measured below.

Changes in the chemical character of the water of Gila River between the mouth of Bonita Creek near Solomonsville, Ariz., and the Southern Pacific Railroad bridge at Calva, Ariz.—Continued

[Analyses in parts per million]

Analysis No.	Date sampled and sampling point	Miles below initial point	Discharge (second-feet)	Change in discharge from preceding measuring point (second-feet): Inflow (+) or diversion (−)	Change in discharge: Net gain (+) or loss (−) (unadjusted)	Specific conductance (K×10[5] at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Hardness as $CaCO_3$: Total	Hardness as $CaCO_3$: Noncarbonate	Percent sodium
	1944																		
	May 2:																		
731	At Safford, Ariz.	15.9	19.4			115	62	19	155	231	80	210		.5	640	.87	232	43	59
732	Above Smithville Canal	17.7	13.6	1.2+	7.0−	140	74	21	198	287	100	256		2.5	793	1.08	271	36	61
733	Near Thatcher, Ariz.	19.9	3.4	13.6−	3.4+	221	60	37	359	278	193	460		5.0	1,250	1.70	302	74	72
	May 3:																		
734	Near Thatcher, Ariz.	19.9	3.9			232	91	38	357	380	191	455		7.8	1,330	1.81	383	72	67
735	Above Dodge-Nevada Canal	22.6	6.4	2.2+	.3+	219	52	35	364	261	197	455		7.1	1,240	1.69	274	60	74
736	At Pima, Ariz.	25.2	7.5	3.8−	4.9+	304						625							
737	At Pima, Ariz.	25.2	9.4			296	46	36	558	388	270	615		12	1,730	2.35	263	0	82
738	Above Fort Thomas Canal	29.3	15.9	.3−	6.8+	325	54	41	595	289	338	710		10	1,890	2.57	304	67	81
739	Near Glenbar	30.5	2.2	15.3−	1.6+	331	49	40	616	330	331	715		3.0	1,920	2.61	287	16	82
	May 4:																		
740	Near Glenbar	30.5	2.6			333	82	40	605	442	319	700		3.5	1,970	2.68	369	6	78
741	At Eden crossing	32.3	5.6	1.3+	1.7+	352	58	43	652	314	356	785		5.0	2,050	2.79	322	64	82
742	Near Ashurst	37.7	9.0	2.3+	1.1+	432	84	64	768	232	491	1,020		3.0	2,540	3.45	472	282	78
743	Above Colvin-Jones Canal	39.9	11.9	0	2.9+	586	212	90	980	282	670	1,490		1.0	3,580	4.87	899	668	7[illegible]
744	At Fort Thomas	41.6	11.4	.5+	1.0−	700	257	109	1,150	196	778	1,860		1.0	4,250	5.78	1,090	929	70
	May 5:																		
745	At Fort Thomas	41.6	10.0			679	260	107	1,120	228	747	1,820		1.0	4,170	5.67	1,090	902	69
746	At wash below Fort Thomas	43.4	10.8	0	.8+	688	263	109	1,130	214	779	1,830		1.5	4,220	5.74	1,100	929	69
747	Near Geronimo	45.5	16.3	0	5.5+	683	262	103	1,130	233	768	1,800		2.0	4,180	5.68	1,080	886	69
748	1 mile below Goodwin Wash	47.3	21.0	0	4.7+	601	202	86	1,000	156	676	1,560		1.5	3,600	4.90	858	730	72
749	At Geronimo crossing	48.0	22.2	0	1.2+	557	204	79	929	212	622	1,440		1.0	3,380	4.60	834	660	71
750	At Black Point	51.5	19.9	0	2.3−	571	227	81	932	253	634	1,460		.5	3,460	4.71	900	692	69
751	At Bylas, Ariz.	55.6	20.7	0	.8+	548	205	78	889	178	605	1,410		.5	3,280	4.46	832	686	70
752	At Calva, Ariz.	65.7	18.5	0	2.2−	539	206	74	867	199	543	1,400		.5	3,190	4.34	818	655	70
	June 19:																		
753	At gage near Solomonsville	0	49.2			123	65	17	164	196	55	262		0	660	.90	232	72	61

754	Above Tidwell Canal	1.2	48.5	0	.7−	121	66	18	161	192	55	264	------	0	659	.90	238	81	59
755	Above San Jose Wash	7.4	0	48.2−	.3−	------	------	------	------	------	------	------	------	------	------	------	------	------	------
756	Above Union Canal	9.0	0	0	0	------	------	------	------	------	------	------	------	------	------	------	------	------	------
757	Below San Simon Creek	11.1	2.6	0	2.6+	142	56	27	206	190	134	284	------	5.0	806	1.10	251	96	64
758	Above Graham Canal	13.7	0	0	2.6−	------	------	------	------	------	------	------	------	------	------	------	------	------	------
759	At Safford, Ariz.	15.9	0	3.2+	3.2−	------	------	------	------	------	------	------	------	------	------	------	------	------	------
	June 20:																		
760	At Safford, Ariz.	15.9	0	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------
761	Above Smithville Canal	17.7	0	1.3+	1.3−	------	------	------	------	------	------	------	------	------	------	------	------	------	------
762	Near Thatcher, Ariz.	19.9	.9	0	.9+	255	106	43	391	363	220	535	------	12.0	1,490	2.03	442	144	66
	June 21:																		
763	Near Thatcher, Ariz.	19.9	.8	------	------	270	140	44	399	478	225	545	------	5.1	1,590	2.16	530	138	62
764	Above Dodge-Nevada Canal	22.6	0	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------
765	At Pima, Ariz.	25.2	2.7	.5+	2.2+	299	74	36	546	501	260	590	------	8.6	1,760	2.39	332	0	78
766	At Pima, Ariz.	25.2	3.0	------	------	301	------	------	------	------	------	595	------	------	------	------	------	------	------
767	Above Fort Thomas Canal	29.3	3.9	2.1−	3.0+	379	89	45	701	438	426	417	------	4.0	2,280	3.10	407	48	79
768	Near Glenbar	30.5	.8	3.2−	.1+	352	38	41	687	326	371	780	------	5.4	2,080	2.83	264	0	85
	June 22:																		
769	Near Glenbar	30.5	.8	------	------	362	56	43	691	372	382	790	------	2.5	2,150	2.92	317	12	83
770	At Eden crossing	32.2	.1	0	.7−	378	69	47	705	369	381	850	------	2.0	2,240	3.05	366	63	81
771	Near Ashurst	37.7	.5	0	.4+	778	263	132	1,360	364	1,000	2,000	------	1.0	4,940	6.72	1,200	901	71
772	Above Colvin-Jones Canal	39.9	1.8	0	1.3+	882	483	147	1,350	375	945	2,450	------	1.0	5,560	7.56	1,810	1,500	62
773	At Fort Thomas	41.6	1.1	0	.7−	952	485	164	1,490	264	1,030	2,720	------	2.5	6,020	8.19	1,880	1,670	63
	June 23:																		
774	At Fort Thomas	41.6	1.1	------	.5−	946	459	164	1,490	196	1,040	2,700	------	2.5	5,950	8.09	1,820	1,660	64
775	At wash below Fort Thomas	43.4	.6	0	.5−	947	452	160	1,520	209	1,110	2,670	1.1	1.5	6,020	8.19	1,790	1,610	65
776	Near Geronimo	45.5	2.9	0	2.3+	735	309	97	1,230	267	816	1,970	1.7	1.5	4,560	6.20	1,170	951	70
777	1 mile below Goodwin Wash	47.3	6.2	0	3.3+	513	211	61	854	304	556	1,280	------	2.0	3,110	4.23	778	528	70
778	At Geronimo crossing	48.0	7.2	0	1.0+	434	160	53	718	205	467	1,080	------	2.0	2,850	3.51	618	450	72
779	At Black Point	51.5	3.1	0	4.1−	433	164	55	713	232	454	1,080	------	1.0	2,580	3.51	636	446	71
780	At Bylas, Ariz.	55.6	2.1	0	1.0−	413	165	51	662	197	414	1,040	------	1.0	2,430	3.30	622	460	70
781	At Calva, Ariz.	65.7	0	0	2.1−	------	------	------	------	------	------	------	------	------	------	------	------	------	------
	Aug. 7:																		
782	Near Glenbar	30.5	.7	------	.7−	370	54	41	703	342	392	810	------	.5	2,170	2.95	304	23	83
783	At Eden crossing	32.2	0	0	.7−	386	84	42	722	424	423	825	------	.5	2,310	3.14	382	34	80
784	Near Ashurst	37.7	.3	0	.3+	891	330	155	1,540	336	1,120	2,390	------	.5	5,700	7.75	1,460	1,190	70
785	Above Colvin-Jones Canal	39.9	1.1	0	.8+	876	472	156	1,320	272	940	2,470	------	.5	5,490	7.47	1,820	1,600	61
786	At Fort Thomas	41.6	.3	.2−	.6−	1,000	533	182	1,540	220	1,100	2,900	------	.5	6,360	8.65	2,080	1,900	62
	Aug. 8:																		
787	At Fort Thomas	41.6	.7	------	------	936	488	171	1,390	175	1,010	2,650	------	.5	5,800	7.89	1,920	1,780	61
788	At wash below Fort Thomas	43.4	.3	0	.4	------	------	------	------	------	------	------	------	------	------	------	------	------	------
789	Near Geronimo	45.5	3.6	0	3.3+	640	293	80	1,030	309	685	1,660	------	.5	3,900	5.30	1,060	807	68
790	At Geronimo crossing	48.0	7.5	0	3.9+	400	144	46	659	194	416	985	------	.5	2,350	3.20	548	390	72

Changes in the chemical character of the water of Gila River between the mouth of Bonita Creek near Solomonsville, Ariz., and the Southern Pacific Railroad bridge at Calva, Ariz.—Continued

[Analyses in parts per million]

Analysis No.	Date sampled and sampling point	Miles below initial point	Discharge (second-feet)	Change in discharge from preceding measuring point (second-feet): Inflow (+) or diversion (−)	Change in discharge from preceding measuring point (second-feet): Net gain (+) or loss (−) (unadjusted)	Specific conductance (K×10[5] at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Hardness as $CaCO_3$: Total	Hardness as $CaCO_3$: Noncarbonate	Percent sodium
	1944																		
	Aug. 8—Continued																		
791	At Black Point	51.5	5.3	0	2.2−	376	139	42	613	202	388	910	------	.5	2,190	2.98	520	354	72
792	At Bylas, Ariz	55.6	4.2	------	1.1−	370	143	43	594	190	371	910	------	.0	2,150	2.92	534	378	71
793	At Calva, Ariz	65.7	0	0	4.2−	------	------	------	------	------	------	------	------	------	------	------	------	------	------
	Oct. 30:																		
794	Near Thatcher, Ariz	19.9	31.2	------	------	96.2	60	16	128	228	76	160	------	4.0	556	.76	216	28	56
795	Above Dodge-Nevada Canal	22.6	54.6	23.1+	.3+	93.9	56	14	126	224	65	154	------	4.0	529	.72	198	14	58
796	At Pima, Ariz	25.2	43.3	17.3−	6.0+	129	68	20	187	280	98	230	------	3.0	744	1.01	252	22	62
	Oct. 28:																		
797	At Pima, Ariz	25.2	33.7	------	------	154	80	21	234	327	118	285	------	3.0	902	1.23	286	18	64
798	Above Fort Thomas Canal	29.3	42.7	2.8+	6.2+	179	88	24	276	336	155	340	------	3.0	1,050	1.43	318	42	65
799	Near Glenbar	30.5	40.9	0	1.8−	182	87	25	275	337	154	340	------	3.0	1,050	1.43	320	44	65
	Oct. 26:																		
800	Near Glenbar	30.5	36.1	------	------	206	99	27	318	377	180	390	------	3.0	1,200	1.63	358	49	66
801	At Eden crossing	32.2	38.4	.6+	1.7+	206	------	------	------	------	------	400	------	------	------	------	------	------	------
802	Near Ashurst	37.7	37.8	.6+	1.2−	251	115	35	398	390	239	515	------	3.0	1,500	2.04	431	112	67
803	Above Colvin-Jones Canal	39.2	39.2	0	1.4+	302	121	45	485	308	390	685	------	1.0	1,800	2.45	487	234	68
804	At Fort Thomas	41.6	43.0	1.0+	2.8+	328	135	50	520	295	337	765	------	1.0	1,950	2.65	542	300	68
	Oct. 27:																		
805	At Fort Thomas	41.6	41.2	------	------	341	175	52	513	394	334	775	------	2.0	2,050	2.79	650	328	63
806	At wash below Fort Thomas	43.4	39.9	0	1.3−	355	168	56	558	341	403	825	------	2.0	2,180	2.96	650	370	65
807	Near Geronimo	45.5	42.1	0	2.2+	400	202	60	617	390	408	955	------	2.0	2,440	3.32	750	431	64
808	1 mile below Goodwin Wash	47.3	48.1	0	6.0+	397	186	58	619	360	403	945	------	2.0	2,390	3.25	702	408	66
809	At Geronimo crossing	48.0	50.7	0	2.6+	383	181	55	598	352	388	910	------	1.0	2,310	3.14	678	389	66
810	At Black Point	51.5	47.4	0	3.3−	376	160	58	591	287	388	910	------	1.0	2,250	3.06	638	403	67
811	At Bylas, Ariz	55.6	49.2	0	1.8+	383	------	------	------	------	------	925	------	------	------	------	------	------	------
812	At Calva, Ariz	65.7	48.7	0	.5−	435	200	62	674	298	434	1,080	------	1.0	2,600	3.54	754	510	66

Chemical character of the water of tributaries of and diversions from Gila River between the mouth of Bonita Creek near Solomonsville, Ariz., and the Southern Pacific Railroad bridge at Calva, Ariz.

[Analyses in parts per million]

Analysis No.	Date sampled	Mean discharge (second-feet)	Specific conductance (K×10[5] at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids		Hardness as $CaCO_3$		Percent sodium
													Parts per million	Tons per acre-foot	Total	Noncarbonate	
	Union Canal near Thatcher, Ariz.																
813	Sept. 6, 9, 13, 17, 23, 1943 [1]		195	58	21	337	320	178	355	2.7	11	7.5	1,120	1.52	231	0	76
814	Sept. 27, 30 [2]		44.6	38	11	42	165	33	42	.6	1.5	1.5	249	.34	140	5	39
815	Feb. 3, 7, 10, 14, 1944 [3]		93.9	62	15	125	238	64	157	1.6	1.0	.1	543	.74	216	21	56
816	Jan. 3, 6, 10, 13, 17, 20, 24, 28, 31 [4]		85.1						143								
	Union Canal diversion along Ray Lane near Thatcher, Ariz.																
817	Sept. 20, 1943 [1]		225	78	24	393	369	217	425	3.1	14	5.0	1,336	1.82	293	0	74
818	Sept. 30 [2]		46.8						48								
819	Oct. 4, 11, 14, 18 [3]		119						206								
820	Dec. 9, 13 [4]		85.5						139								
	Graham Canal near Thatcher, Ariz.																
821	Sept. 2, 6, 13, 17, 20, 23, 1943 [1]		200	94	34	285	266	210	390	1.7	4.0	6.0	1,150	1.56	374	156	62
822	Sept. 27 [2]		16.8				83		4.8								
823	Oct. 4, 7, 11, 14, 18, 21, 25, 28 [3]		141						260								
824	Jan. 27, 31, 1944 [4]		87.6						144								
	Stockton Wash above Rays Ranch road crossing near Artesia, Ariz.																
825	Mar. 4, 1941		23.2	24	8.3	14	86	44	6				138	0.19	94	24	24

See footnotes at end of table.

Chemical character of the water of tributaries of and diversions from Gila River between the mouth of Bonita Creek near Solomonsville, Ariz., and the Southern Pacific Railroad bridge at Calva, Ariz.—Continued

[Analyses in parts per million]

Analysis No.	Date sampled	Mean discharge (second feet)	Specific conductance ($K \times 10^5$ at 25°C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids		Hardness as $CaCO_3$		Percent sodium
													Parts per million	Tons per acre-foot	Total	Noncarbonate	
Stockton Wash above Cluff Ranch road crossing near Artesia, Ariz.																	
826	Mar. 4, 1941		24.8	26	7.4	16	91	41	9				144	0.20	95	21	27
Cuff Wash at Rays Ranch House near Artesia, Ariz.																	
827	Mar. 4, 1941		12.2	10	4.4	9.8	34	31	3				75	0.10	43	15	33
76 Wash at 76 Ranch house near Artesia, Ariz.																	
828	Mar. 4, 1941		11.3	10	5.2	8.7	32	32	4				76	0.10	46	20	29
Noon Creek at edge of Pinaleno Mountains near Artesia, Ariz.																	
829	Mar. 6, 1941		10.3	10	2.2	12	40	21	4				69	0.09	34	1	44
Noon Creek at United States Highway 666 near Artesia, Ariz.																	
830	Mar. 6, 1941		10.8	12	2.6	10	41	24	3				72	0.10	41	7	35
North Fork of Noon Creek above dam near Artesia, Ariz.																	
831	Mar. 5, 1941		10.9	13	6.1	.24	39	21	3				62	0.08	58	26	0.9

	South Fork of Noon Creek at dam spillway near Artesia, Ariz.																
832	Mar. 5, 1941	--------	10.8	14	7.9	<10	39	23	3	--------	--------	--------	67	0.09	67	35	--------
	Marijilda Wash at picnic grounds near Safford, Ariz.																
833	Mar. 6, 1941	--------	9.4	10	4.4	4.5	34	20	3	--------	--------	--------	59	0.08	43	15	19
	Marijilda Wash at United States Highway 666 near Safford, Ariz.																
834	Mar. 6, 1941	--------	20.5	14	3.1	32	50	43	22	--------	--------	--------	139	0.19	48	7	59
	Graveyard Wash at edge of Pinaleno Mountains near Safford, Ariz.																
835	Mar. 11, 1941	--------	13.2	16	8.3	<10	45	26	4	--------	--------	--------	76	0.10	74	37	--------
	Graveyard Wash at mouth near Safford, Ariz.																
836	Sept. 10, 1941	5	92.7	66	15	110	227	46	160	1.7	2.5	--------	513	0.70	226	40	52
	Left-Hand Canyon at edge of Pinaleno Mountains near Safford, Ariz.																
837	Mar. 5, 1941	--------	15.8	14	7.4	7.4	40	40	5	--------	--------	--------	94	0.13	65	33	20
	Left-Hand Canyon above junction with Graveyard Wash near Safford, Ariz.																
838	Mar. 5, 1941	0.1	16.1	14	8.3	2.7	37	36	5	--------	--------	--------	84	0.11	69	39	8
	Smithville Canal near Thatcher, Ariz.																
839	Sept. 16, 1943 [1]	--------	152	--------	--------	--------	--------	--------	280	--------	--------	--------	--------	--------	--------	--------	--------
840	Sept. 27 [2]	--------	35.7	--------	--------	--------	--------	--------	8.8	--------	--------	--------	--------	--------	--------	--------	--------
841	Feb. 3, 12, 17, 29, 1944 [3]	--------	117	70	19	165	274	86	206	1.6	2.5	--------	685	0.93	252	28	59
842	Oct. 7, 14, 21, 28, 1943 [4]	--------	91.1	--------	--------	--------	--------	--------	148	--------	--------	--------	--------	--------	--------	--------	--------

See footnotes at end of table.

Chemical character of the water of tributaries of and diversions from Gila River between the mouth of Bonita Creek near Solomonsville, Ariz., and the Southern Pacific Railroad bridge at Calva, Ariz.—Continued

[Analyses in parts per million]

Analysis No.	Date sampled	Mean discharge (second-feet)	Specific conductance (K×10[5] at 25°C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids		Hardness as $CaCO_3$		Percent sodium
													Parts per million	Tons per acre-foot	Total	Noncarbonate	
	Smithville Canal wasteway near Thatcher, Ariz.																
843	Sept. 9, 13, 20, 1943 [1]		212	66	29	352	314	186	415	1.9	7.8	7.5	1,212	1.65	284	26	73
844	Sept. 2 [2]		77.7						114								
845	May 24, 1944 [5]		269	172	44	369	538	219	505		38		1,610	2.19	610	168	57
846	Dec. 13, 1943 [6]		92.2	60	13	124	236	60	151		5.0		529	.72	203	10	57
847	Oct. 30, 1944		80.1	52	12	110	205	50	140		2.0		467	.64	180	12	57
	Frye Creek above reservoir near Thatcher, Ariz.																
848	Mar. 11, 1941		8.9	11	1.7	6.2	28	20	3				56	0.08	34	11	28
	Frye Creek below reservoir near Thatcher, Ariz.																
849	Mar. 11, 1941		9.7	12	1.3	9.2	33	23	3				64	0.09	35	8	36
	Unnamed canyon entering Frye Creek 3/4 mile below reservoir near Thatcher, Ariz.																
850	Mar. 11, 1941		13.0	14	5.7	6.1	40	32	4				82	0.11	58	26	19

Dodge-Nevada Canal near Glenbar, Ariz.																	
851	Sept. 17, 1943 [1]		339						795								
852	Sept. 28 [2]		109						218								
853	June 2, 5, 22, 26, 1944 [5]		469	66	21	948	220	353	1,240	3.9	7.1	4.2	2,750	3.74	251	70	89
854	Jan. 4, 7, 11, 14, 18, 21, 25, 28 [6]		116						208								
Central Wash at Dodge-Nevada Canal near Pima, Ariz.																	
855	July 11, 1941	2.0	283	64	41	528	570	235	520	3.2	27		1,699	2.31	328	0	7
Ash Creek below reservoir near Pima, Ariz.																	
856	Feb. 13, 1940		11	13			54	17	2						48		
857	Mar. 7, 1941		30.1	19	7.4	33	57	40	43				170	0.23	78	31	48
Ash Creek 1/8 mile above mouth near Pima, Ariz.																	
858	Sept. 11, 1941		160	68	22	251	348	102	285	1.7	10		911	1.24	260	0	68
Ash Creek at mouth near Pima, Ariz.																	
859	Apr. 25, 1941	14.7	74.6	44	14	98	201	59	109				423	0.58	167	3	56
860	Sept. 11	10	194	78	25	313	407	127	352	2.4	13		1,111	1.51	297	0	70
Cottonwood Wash at Granite Gorge near Pima, Ariz.																	
861	Jan. 15, 1941		28.9	30	12	12	103	49	10				164	0.22	124	40	17
Cottonwood Wash 1 mile below Granite Gorge near Pima, Ariz.																	
862	Jan. 15, 1941		29.3	32	13	8.9	102	50	12				166	0.23	133	50	13

See footnotes at end of table.

Chemical character of the water of tributaries of and diversions from Gila River between the mouth of Bonita Creek near Solomonsville, Ariz., and the Southern Pacific Railroad bridge at Calva, Ariz.—Continued

[Analyses in parts per million]

Analysis No.	Date sampled	Mean discharge (second-feet)	Specific conductance ($K \times 10^5$ at 25°C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids		Hardness as $CaCO_3$		Percent sodium
													Parts per million	Tons per acre-foot	Total	Noncarbonate	
	Cottonwood Wash above Left-Hand Canyon near Pima, Ariz.																
863	Mar. 14, 1940		12	18			47	24	2								
864	Feb. 28, 1941		12.0	14	6.1	2.5	43	25	3				72	0.10	60	25	8
	Cottonwood Wash 3 miles below Left-Hand Canyon near Pima, Ariz.																
865	Feb. 28, 1941		13.5	17	6.1	6.8	55	29	5				91	0.12	68	22	18
	Cottonwood Wash at Pima, Ariz.																
866	Feb. 28, 1941		19.5	22	5.2	13	73	30	10				116	0.16	76	16	27
867	Sept. 26, 29–30, 1943		49.0	46	12	43	185	43	41	0.8	1.7	2.0	279	.38	164	13	36
868	Nov. 4		89.5						147								
869	Oct. 30, 1944		69.7						106								
870	Feb. 14		138						234								
	Left-Hand Canyon above junction with Cottonwood Wash near Pima, Ariz.																
871	Feb. 28, 1941		9.6	10	4.8	3.7	32	20	4				58	0.18	45	18	15
	Taylor Canyon at road crossing near Pima, Ariz.																
872	Nov. 28, 1940		9.3	9.0	5.2	0.1	24	18	4				48	0.07	44	24	0.5
873	Feb. 28, 1941		11.9	12	5.7	5.7	40	25	5				73	.10	53	21	19

Carter Canyon above junction with Cottonwood Wash near Pima, Ariz.

874	Feb. 28, 1941	------	9.2	9.0	3.9	5.5	31	20	3	------	------	------	56	0.08	38	13	34

Curtis Canal near Glenbar, Ariz.

875	Sept. 10, 14, 21, 24, 1943[1]	------	376	68	49	701	326	484	790	2.0	5.0	10	2,260	3.07	371	104	80
876	Sept. 27[2]	------	42.6	------	------	------	------	------	19.	------	------	------	------	------	------	------	------
877	June 19, 22, 26, 1944[5]	------	577	72	64	1,170	278	911	1,270	2.0	8.0	4.8	3,630	4.94	442	214	85
878	Sept. 7, 18, 25[6]	------	69.9	------	------	------	------	------	86	------	------	------	------	------	------	------	------

Markham Wash at sheep ranch near Eden. Ariz.

879	Mar. 5, 1940	------	51	46	26	23	213	67	19	------	------	------	285	0.39	222	48	18

Markham Wash near Eden, Ariz.

880	Feb. 13, 1940	------	23	26	------	------	90	36	5	------	------	------	------	------	------	------	------
881	Sept. 26, 1943	------	18.0	26	14	<10	93	14	0	------	------	------	100	0.14	122	46	------

Matthews Wash near Glenbar, Ariz.

882	Feb. 23, 1940	------	175	65	16	222	199	115	385	------	------	------	878	1.19	228	.65	68
883	Aug. 7, 1943	------	73.2	28	11	122	239	84	66	0.9	1.5	2.5	431	.59	115	0	70
884	Sept. 26	------	71.8	12	9.4	138	214	68	87	------	------	------	420	.57	68	0	81
885	Aug. 8, 1944	0.5	169	24	7.6	346	329	168	275	1.9	6.2	------	991	1.35	91	0	89

Underwood Wash below junction with Tripp Canyon near Pima, Ariz.

886	Jan. 15, 1941	------	19.6	21	8.7	6.9	63	40	7	------	------	------	115	0.16	88	37	15

Underwood Wash at reservoir near Pima, Ariz.

887	Jan. 15, 1941	0.02	20.1	21	9.2	9.9	65	44	9	------	------	------	125	0.17	90	37	19

See footnotes at end of table.

Chemical character of the water of tributaries of and diversions from Gila River between the mouth of Bonita Creek near Solomonsville, Ariz., and the Southern Pacific Railroad bridge at Calva, Ariz.—Continued

[Analyses in parts per million]

Analysis No.	Date sampled	Mean discharge (second-feet)	Specific conductance (K×10⁵ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids		Hardness as $CaCO_3$		Percent sodium
													Parts per million	Tons per acre-foot	Total	Noncarbonate	
	Tripp Canyon at Smith Ranch road crossing near Pima, Ariz.																
888	Jan. 15, 1941		19.4	20	9.2	4.7	63	35	7				107	0.15	88	36	10
	Fort Thomas Consolidated Canal near Glenbar, Ariz.																
889	Sept. 17, 1943 [1]		357						755								
890	Sept. 29 [2]		46.5						36								
891	June 2, 5, 9, 12, 16, 19, 22, 26, 30, 1944 [5]		372	37	44	727	285	426	830	1.8	2.0	4.5	2,210	3.01	274	40	85
892	Aug. 10–11, 21, 24–25 [6]		59.6	39	8.7	78	193	44	67	1.2	1.5		334	.45	134	0	56
	Fort Thomas Consolidated Canal at Fort Thomas, Ariz.																
893	Sept. 17, 1943 [1]		384						880								
894	Aug. 6, 10, 13, 17, 21, 27, 31 [2]		148						244								
895	May 19–20, 1944 [5]		894	410	180	1,430	234	1,180	2,420	1.1	58	1.0	5,790	7.87	1,760	1,570	64
896	Sept. 7, 19 [6]		68.5						82								
	Colvin-Jones Canal near Fort Thomas, Ariz.																
897	July 16, 17, 23, 27, 1943 [1]		318	140	42	489	228	341	735		6.9		1,866	2.54	522	335	67
898	Aug. 10 [2]		93.1						110								
899	Aug. 7, 1944 [5]		884														
900	Aug. 11, 14, 21 [6]		62.6						82								

Black Rock Wash at Black Rock near Fort Thomas, Ariz.																	
901	Jan. 17, 1941	------	11.6	12	1.7	12	26	31	6	------	------	------	76	0.10	37	16	40
902	Mar. 26, 1944	------	9.9	------	------	------	17	28	2.5	------	0.2	------	------	------	27	------	------
Black Rock Wash 5 miles below Black Rock near Fort Thomas, Ariz.																	
903	Jan. 17, 1941	------	12.4	12	1.7	13	29	32	6	------	------	------	79	0.11	37	13	44
Black Rock Wash at Fort Thomas, Ariz.																	
904	Feb. 23, 1940	------	26	------	------	------	168	8.2	1	------	------	------	------	------	114	------	------
905	Jan. 17, 1941	0.1	14.8	17	2.6	10	45	30	5	------	------	------	87	0.12	53	16	29
906	Sept. 26, 1943	------	51.5	28	15	66	212	33	47	------	------	------	293	.40	132	0	52
Holyoak Wash at highway 70 near Geronimo, Ariz.																	
907	Aug. 10, 1940	------	22	30	7.9	7.6	124	20	1	------	------	------	128	0.17	108	6	13
Goodwin Wash at goat camp near Geronimo, Ariz.																	
908	Mar. 6, 1940	------	23	31	------	------	92	40	5	------	------	------	------	------	90	------	------
Goodwin Wash at Geronimo, Ariz.																	
909	Feb. 23, 1940 [7]	------	34	58	------	------	213	17	1	------	------	------	------	------	159	------	------
910	Feb. 23 [8]	------	16	26	------	------	62	32	3	------	------	------	------	------	72	------	------
Unnamed wash at Southern Pacific Railroad bridge, 4.7 miles west of Geronimo, Ariz.																	
911	Aug. 10, 1940	------	36	------	8.3	------	211	14	6	------	------	------	------	------	180	------	------

[1] Maximum concentration for period July 1, 1943, to Sept. 30, 1943.
[2] Minimum concentration for period July 1, 1943, to Sept. 30, 1943.
[3] Maximum concentration for period Oct. 1, 1943, to Feb. 29, 1944.
[4] Minimum concentration for period Oct. 1, 1943, to Feb. 29, 1944.
[5] Maximum concentration for year ended Sept. 30, 1944.
[6] Minimum concentration for year ended Sept. 30, 1944.
[7] At high stage of flow.
[8] At low stage of flow.

Chemical character of ground waters in the Gila River Basin, Graham County, Ariz., road bridge

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (°F.)
		T. 6 S., R. 28 E.:				
912	Seepage zone in conglomerate, Gila River Canyon.	N½SE¼ sec. 28	Sept. 9, 1941		20	
913	Seepage from mouth of wash	NE¼NE¼ sec. 29	do		20	
914	Brown Canal Co. well	NE¼NE¼ sec. 31	June 17, 1940	57		67
915	do	do	July 29, 1941	57		67
	Clonts irrigation well:					
916	USGS 455	NE¼SE¼ sec. 31	Mar. 13, 1944	70		
917	USGS 453	NW¼SE¼ sec. 31	do			
		T. 6 S., R. 27 E.:				
918	Gatlin Bros. well in volcanic strata	NW¼SW¼ sec. 16	Feb. 17, 1941	50		
919	Ruben Sanchez irrigation well	SW¼NE¼ sec. 35	July 15, 1940	52		76
920	Driven observation well, USGS 429.	SE¼NE¼ sec. 35	May 23, 1940	14		
921	USGS 430	do	do	14		
922	USGS 431	NE¼SE¼ sec. 35	do	14		
923	Seepage at mouth of Yuma Wash	SE¼SE¼ sec. 35	Sept. 9, 1941		5	
924	Small seep in right bank of Gila River.	SW¼SE¼ sec. 35	do		1	
		T. 7 S., R. 27 E.:				
925	Louis Michelena unused well	SE¼NW¼ sec. 1	Feb. 27, 1942	33		
926	Dug observation well	NE¼NE¼ sec. 2	June 6, 1940	18		
927	Sisto Molina artesian well	SW¼SW¼ sec. 2	Sept. 23, 1940	300	1.2	96
928	Don Curtis irrigation well	SE¼NE¼ sec. 3	Mar. 30, 1944			
929	Louis Michelena irrigation well, USGS 674.	NE¼SE¼ sec. 4	June 17, 1940	81		68
930	do	do	June 20, 1940	81		68
931	Mrs. E. L. Tidwell well	SE¼SE¼ sec. 7	Feb. 27, 1942	21		
932	Mrs. E. L. Tidwell irrigation well	do	June 20, 1940			65
933	W. F. Tidwell irrigation well	NW¼SE¼ sec. 8	June 17, 1940			67
934	do	do	June 20, 1940			67
935	do	do	July 30, 1941			68
936	Brown and Rabb irrigation well	SE¼SE¼ sec. 9	July 12, 1940	69		
937	do	do	July 8, 1941	69		68
938	Tom Gardner irrigation well	SW¼SW¼ sec. 9	Aug. 28, 1941	65		
939	Louis Michelena irrigation well, USGS 681-A.	NE¼NW¼ sec. 9	June 1, 1944			
940	San Jose Canal Co. well, USGS 689.	SW¼SW¼ sec. 16	July 11, 1940	11		
941	do	do	July 21, 1941	115		70
942	Seepage from gravel bar in Gila River channel.	NW¼NE¼ sec. 17	Sept. 10, 1941		5	
943	San Jose Canal Co. well, USGS 690	SE¼SE¼ sec. 17	July 8, 1940	100		
944	USGS 691	NE¼SE¼ sec. 17	July 11, 1940			
945	S. L. Claridge irrigation well, USGS 693.	NW¼SE¼ sec. 17	July 12, 1940			65
946	USGS 694	NE¼SW¼ sec. 17	do	71		67
947	USGS 695	SE¼SE¼ sec. 18	do			67
948	USGS 695	do	Mar. 27, 1944			
949	USGS 697	SW¼SE¼ sec. 18	July 12, 1940	74		68
950	Driven observation well, USGS 699.	SW¼NW¼ sec. 18	May 18, 1940	13		
951	USGS 701	NW¼SW¼ sec. 18	May 20, 1940	14		
952	Seepage zone in right bank of Gila River.	SE¼NW¼ sec. 18	Sept. 10, 1941		40	
953	William Waldron irrigation well	NW¼NW¼ sec. 19	June 18, 1940			67
954	do	do	Mar. 30, 1944			
955	L. Layton irrigation well	NW¼NE¼ sec. 20	Aug. 8, 1940			70
956	Willard Pace irrigation well	NE¼NE¼ sec. 20	Aug. 6, 1941	85		70
957	Clyde Kempton irrigation well	NE¼NW¼ sec. 20	July 12, 1940	81		69
958	do	do	Mar. 27, 1944	81		
959	E. E. Taylor stock well	NW¼NW¼ sec. 30	Feb. 27, 1942	39		
960	L. Layton unused well	SE¼ SE¼ sec. 30	do	42		

between the mouth of Bonita Creek near Solomonsville and the Southern Pacific Rail- at Calva

[Analyses in parts per million]

Specific conductance (K×10⁵ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Total hardness as $CaCO_3$	Percent sodium	Analysis No.
152	18	7.9	315	205	270	212	5.0	1.5		930	1.26	77	90	912
62.9	50	19	59	244	25	70	2.1	.8		346	.47	203	39	913
110				239	40	200						255		914
83.0	58	15	98	247	44	118	1.3	.8		457	.62	206	51	915
84.7	60	16	100	218	46	144	1.2	.5	0.0	475	.65	216	50	916
89.3	60	17	108	226	57	146	1.6	.5	0	501	.68	220	52	917
76.9	112	24	36	375	123	12	1.3	.2		494	.67	378	17	918
120				287	95	200						142		919
152	50	15	253	271	180	232				864	1.18	186	75	920
152						260								921
137	79	19	180	261	123	230				760	1.03	275	59	922
138	78	23	190	314	114	225	3.6	.5		789	1.07	289	59	923
143	78	22	208	317	113	248	2.9	1.0		829	1.13	285	61	924
249						340								925
300	46	9.2	622	422	428	505				1,818	2.47	153	90	926
174	9.5	6.6	369	259	275	230	11			1,029	1.40	51	94	927
114	60	15	167	236	102	188	3.1	2.0	0	653	.89	211	63	928
155				329	120	275						262		929
151				335	110	270						232		930
335						700								931
128				278	80	240						248		932
174				224	100	328						262		933
180				318	280	345						285		934
160	98	28	257	359	152	322	1.8	9.9		1,046	1.42	360	61	935
171				334	100	285						188		936
198	87	27	304	328	179	362	4.3	16		1,141	1.55	328	67	937
147	66	18	244	288	153	255	4.2	4.0		886	1.20	239	69	938
171	91	41	219	340	156	295	2.6	8.9	1.5	981	1.33	396	55	939
178				338	170	278						150		940
171	30	13	327	334	165	268	4.5	4.0		976	1.33	128	85	941
118	90	24	134	288	88	200	1.8	.5		680	.92	323	47	942
175				362	80	270						172		943
158				329	100	262						248		944
136				308	70	232						218		945
115				263	72	198						158		946
168				374	140	275						195		947
171	50	17	318	386	142	285	3.9	12	.1	1,020	1.39	195	78	948
178				390	158	292						128		949
128						198								950
128	62	11	211	352	108	182				747	1.02	200	70	951
70.3	50	12	80	192	41	102	1.5	.5		382	.52	174	50	952
178				329	120	315						135		953
194	65	21	345	422	173	315	3.9	23	1.5	1,150	1.56	248	75	954
182				400	190	290						142		955
165	22	12	329	325	165	258	3.8	7.8		958	1.30	104	87	956
175				392	150	280						120		957
168	47	14	316	370	145	275	3.9	13	.2	996	1.35	175	52	958
974						2,100								959
1,270						2,740								960

Chemical character of ground waters in the Gila River Basin, Graham County, Ariz., road bridge

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (°F.)
		T. 5 S., R. 26 E.:				
961	Big Spring in upper Big Spring, Wash.	SE¼ sec. 4	Feb. 10, 1941		100	80
		T. 6 S., R. 26 E.:				
962	J. A. Peterson irrigation well, USGS 412.	NW¼SW¼ sec. 31	July 8, 1940			68
963	do	do	Mar. 31, 1944			
964	F. Skinner irrigation well, USGS 413.	SW¼SW¼ sec. 31	July 29, 1940	41		
965	USGS 418	SE¼SW¼ sec. 31	Mar. 31, 1944			
966	Smith Dairy Spring	SW¼SW¼ sec. 32	Mar. 24, 1941			
		T. 7 S., R. 26 E.:				
967	Graham Canal Co. well, USGS 551	SE¼SE¼ sec. 5	Mar. 22, 1940	32		64
968	do	do	June 18, 1940	32		
969	USGS 554	SW¼SE¼ sec. 5	do	59		
970	USGS 555	SE¼SW¼ sec. 5	do	54		
971	Driven observation well, USGS 570.	SW¼SW¼ sec. 5	May 11, 1940	10		
972	USGS 573	do	May 6, 1940	[1] 28		
973	USGS 573	do	do	[1] 32		
974	USGS 573	do	do	[1] 35		
975	Bored observation well	do	Nov. 26, 1943			
976	Driven observation well, USGS 576.	do	May 15, 1940	[1] 12.9		
977	do	do	do	[1] 20.3		
978	do	do	do	[1] 24		
979	do	do	Nov. 9, 1944			66
980	USGS 579	NW¼SW¼ sec. 5	May 17, 1940	21		
981	Graham Canal well, USGS 583	SE¼SE¼ sec. 5	June 18, 1940	41		
982	J. A. Peterson irrigation well, USGS 558.	SW¼NE¼ sec. 6	do	48		65
983	do	do	Aug. 13, 1941	48		66
984	USGS 559	NE¼NW¼ sec. 6	do	50		66
985	Driven observation well, USGS 577.	SE¼SE¼ sec. 6	May 17, 1940	14		
986	do	do	Aug. 26, 1940	14		69
987	R. A. Smith irrigation well	NE¼NE¼ sec. 6	Aug. 10, 1940			63
988	do	do	Aug. 13, 1941			66
989	Graham Canal Co. well, USGS 646	SE¼SW¼ sec. 5	Mar. 31, 1944	106		
990	Seepage in Gila River channel	SW¼NW¼ sec. 6	Sept. 11, 1941			
991	Irrigation drain entering Gila River.	SW¼SE¼ sec. 6	do		25	
992	Pete Ramirez irrigation well	NW¼SW¼ sec. 7	July 19, 1940	98		65
993	do	do	Oct. 1, 1940	98		
994	Ed. Hoopes irrigation well	SE¼SW¼ sec. 7	June 20, 1940	84		66
995	do	do	Mar.. 14, 1944	84		
996	Henry Layton irrigation well	SE¼NE¼ sec. 7	Mar. 20, 1944			
997	Seepage from Prina Slough under Safford bridge.	NE¼NE¼ sec. 7	June 30, 1941			
998	Seepage entering Gila River at left bank.	do	do		4	
999	Driven observation well, USGS 564.	NW¼SW¼ sec. 8	May 22, 1940	29		
1000	USGS 565	SW¼NW¼ sec. 8	May 16, 1940	13.6		
1001	USGS 565-A	do	Feb. 24, 1941	13		
1002	USGS 566	do	May 16, 1940	14		
1003	USGS 566-A	do	Feb. 24, 1941	12		
1004	USGS 567	do	May 16, 1940	14		
1005	USGS 567-A	NW¼NW¼ sec. 8	Feb. 24, 1941	14		
1006	USGS 568	SW¼NW¼ sec. 8	May 16, 1940	14		
1007	USGS 568-A	do	Feb. 22, 1941	13		
1008	USGS 568-A	do	Nov. 9, 1943	13		
1009	USGS 569	NW¼NW¼ sec. 8	May 16, 1940	21		
1010	USGS 569-A	do	Feb. 22, 1941	13		
1011	USGS 569-A	do	Nov. 9, 1943	13		

[1] Depth at which sample was collected when well was driven.

between the mouth of Bonita Creek near Solomonsville and the Southern Pacific Rail-at Calva—Continued

[Analyses in parts per million]

Specific conductance (K×10[5] at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids		Total hardness as $CaCO_3$	Percent sodium	Analysis No.
										Parts per million	Tons per acre-foot			
45.3	39	30	24	274	26	11	.6	4.3		270	.37	221	19	961
270				440	266	555						375		962
356	209	61	495	418	360	785	2.2	22	.1	2,140	2.91	772	58	963
290				434	280	570						525		964
304	204	48	405	488	306	605	1.9	12	.1	1,820	2.48	706	55	965
391	56	2.2	807	227	416	900	5.5			2,299	3.13	149	92	966
104				225	80	188						168		967
128				255	135	245						285		968
270				396	420	560						472		969
202				324	300	430						450		970
320						604								971
290						624								972
320						640								973
290						628								974
272						530								975
330						690								976
300						675								977
310						675								978
346						735								979
250						480								980
234				232	480	520						420		981
235				207	300	565						420		982
283	208	50	361	542	242	570	2.0	6.0		1,706	2.32	725	52	983
257	129	50	366	320	241	570	1.1	5.0		1,520	2.07	528	60	984
260						494								985
238						466								986
280				448	340	555						488		987
265	136	43	390	374	251	558	1.2	7.4		1,571	2.14	516	62	988
271	163	40	383	444	296	510	1.9	9.2	1.0	1,620	2.20	572	59	989
217	120	31	323	456	146	425	1.2	.5		1,271	1.73	427	62	990
225	108	34	331	284	195	488	1.4	2.0		1,299	1.77	409	64	991
209				476	60	370						412		992
198	87	36	265	298	138	392				1,065	1.45	365	61	993
180				275	160	355						285		994
222	151	33	298	472	172	400	1.1	33	.1	1,320	1.80	512	56	995
237	104	44	377	398	251	465	1.5	16	.2	1,450	1.97	440	65	996
317	97	42	548	450	246	690	3.0	1.5		1,849	2.51	415	74	997
361	58	37	675	336	333	800	3.0	7.6		2,079	2.83	297	83	998
230	39	21	410	321	179	444				1,251	1.70	184	83	999
280						562								1000
297	111	34	512	558	224	590	2.6			1,749	2.38	417	73	1001
390	102	67	644	108	477	954				2,297	3.12	530	73	1002
308	145	43	478	512	237	640	3.8			1,799	2.45	539	66	1003
270						614								1004
299	125	43	490	534	239	610	2.8			1,773	2.41	489	69	1005
270						600								1006
310	121	40	517	534	246	630	2.9			1,820	2.48	466	71	1007
319						675								1008
300						610								1009
300	65	34	578	484	257	630	2.2			1,805	2.45	302	81	1010
318	107	45	542	416	291	680	1.9	27	10	1,900	2.58	452	72	1011

Chemical character of ground waters in the Gila River Basin, Graham County, Ariz., road bridge

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (°F.)
	Driven observation well—Continued					
1012	USGS 580	NE¼SW¼ sec. 8	Oct. 12, 1940	34		68
1013	USGS 580	do	Nov. 19, 1943	34		
1014	Z. C. Prina irrigation well	NW¼SE¼ sec. 8	July 13, 1940	76		64
1015	Seepage from gravel bar in Gila River.	NE¼NE¼ sec. 8	Sept. 10, 1941			
1016	Marvin Clifford and others irrigation well.	SW¼SW¼ sec. 9	Mar. 27, 1944			
1017	Seepage in high-water channel of Gila River along left bank.	SW¼SW¼ sec. 11	Sept. 10, 1941			
1018	Seepage from high-water channel of Gila River along right bank.	SE¼SE¼ sec. 11	do			
1019	Ted Tidwell domestic well	SE¼SE¼ sec. 12	Feb. 27, 1942	17		
1020	Driven observation well, USGS 587.	do	May 21, 1940	14		
1021	do	do	Nov. 9, 1943	14		
1022	Seepage in high water channel of Gila River along right bank.	SW¼SE¼ sec. 12	Sept. 10, 1941			
1023	Driven observation well, USGS 588.	NE¼NE¼ sec. 13	May 21, 1940	14		
1024	do	do	Nov. 9, 1943	14		
1025	USGS 590	do	May 20, 1940	14		
1026	Ed Claridge irrigation well, USGS 592.	SW¼SE¼ sec. 13	Mar. 23, 1940	95		67
1027	do	do	June 20, 1940	95		
1028	do	do	July 19, 1941	95		
1029	USGS 593	SE¼SW¼ sec. 13	June 18, 1940	90		66
1030	USGS 593	do	Mar. 27, 1944	90		
1031	USGS 595	SE¼SE¼ sec. 14	June 18, 1940	90		66
1032	USGS 595	do	Mar. 30, 1944	90		
1033	Union Canal Co. well, USGS 596.	NE¼SE¼ sec. 15	June 18, 1940			65
1034	USGS 598	do	Aug. 9, 1940	52		66
1035	USGS 599	SW¼NE¼ sec. 15	June 4, 1940			65
1036	USGS 599	do	June 18, 1940			
1037	USGS 599	do	July 19, 1941			
1038	USGS 600	SW¼NW¼ sec. 15	June 25, 1941	87		
1039	USGS 600	do	July 19, 1941	87		
1040	USGS 601	do	June 4, 1940			65
1041	USGS 601	do	June 18, 1940			
1042	USGS 601	do	July 19, 1941			
1043	N. W. Stevenson irrigation well	SW¼SE¼ sec. 15	Mar. 3, 1943			
1044	do	do	Mar. 30, 1944			
1045	Marvin Clifford irrigation well	SE¼NE¼ sec. 16	Apr. 14, 1944			
1046	L. A. Nelson irrigation well	SE¼SW¼ sec. 16	May 25, 1940	104		
1047	L. Fuller irrigation well, USGS 604	SW¼SW¼ sec. 16	June 19, 1940			64
1048	do	do	Apr. 26, 1944			
1049	USGS 605	NE¼SW¼ sec. 16	June 19, 1940			65
1050	Pedro Salas domestic well	NE¼NE¼ sec. 16	Mar. 25, 1940	11.3		
1051	Pat Cardon well	NW¼SE¼ sec. 17	Mar. 3, 1943			
1052	J. Higgins well	SE¼NW¼ sec. 17	May 1, 1942	27		
1053	Bob Burns irrigation well	NE¼NE¼ sec. 18	July 12, 1940			67
1054	Ivins Bentley irrigation well	NE¼SE¼ sec. 18	Mar. 30, 1944	75	200	
1055	Mrs. Bertha Gietz stock well	SE¼NE¼ sec. 19	Feb. 27, 1942	72		
1056	Harold Johns irrigation well	SW¼NW¼ sec. 22	Mar. 25, 1940	104		65
1057	do	do	June 20, 1940	104		
1058	do	do	Mar. 30, 1944	104		
1059	A. Montierth irrigation well	NW¼SW¼ sec. 22	May 15, 1941	105		
1060	Lee Johns irrigation well	NE¼NW¼ sec. 22	June 20, 1940	90		65
1061	do	do	Mar. 30, 1944	90		

between the mouth of Bonita Creek near Solomonsville and the Southern Pacific Rail-at Calva—Continued

[Analyses in parts per million]

Specific conductance (K×10⁵ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Total hardness as $CaCO_3$	Percent sodium	Analysis No.
310	128	38	497	546	201	638				1,771	2.41	476	69	1012
358	146	46	611	534	339	755	2.2	24	10	2,190	2.98	554	71	1013
320				530	300	662						278		1014
192	140	30	238	340	176	372	1.4	.5		1,125	1.53	473	52	1015
374	164	47	641	504	402	810	1.8	23	.5	2,340	3.18	603	70	1016
76.8	55	14	97	232	57	108	1.2	.5		447	.61	195	52	1017
125	82	19	164	306	94	200	2.6	.5		713	.97	283	56	1018
140						230								1019
160	48	32	254	127	209	342				948	1.29	251	69	1020
123	74	22	159	283	88	200	2.0	12	6.0	696	.95	275	56	1021
174	110	29	229	344	133	328	1.6	5.0		1,005	1.37	394	56	1022
127	68	19	177	252	87	238				713	.97	248	61	1023
113						192								1024
113						182								1025
199				423	180	320						180		1026
172				303	130	298						78		1027
158	49	14	328	393	139	288	3.6	13		1,028	1.40	180	80	1028
190				423	120	312						195		1029
178	54	15	328	382	141	300	3.9	19		1,050	1.43	196	78	1030
197				429	170	328						330		1031
181	65	19	331	394	153	320	3.9	19		1,100	1.50	240	75	1032
219				363	400	390						126		1033
260				496	240	480						188		1034
270				514	180	455						240		1035
250				514	320	450						225		1036
242	34	19	484	447	223	418	2.8	25		1,426	1.94	163	87	1037
257	30	17	524	460	257	430	6.7	18		1,510	2.05	145	89	1038
264				522										1039
380				558	450	695						465		1040
370				557	500	685						375		1041
343	108	29	633	548	385	630	3.6	21		2,080	2.83	389	78	1042
350				436		660								1043
323	60	17	667	520	370	585	3.8	30	2.5	1,990	2.71	220	87	1044
417	187	47	709	530	509	855	3.0	29	1.5	2,600	3.54	660	70	1045
195				452	100	355						510		1046
270				251	280	530						338		1047
300	158	40	472	342	431	600	1.4	7.0	1.0	1,880	2.56	559	65	1048
320				390	240	665						132		1049
280				486	280	500	3.3	10				218		1050
236				424		445								1051
235				611										1052
171				363	120	312						225		1053
253	185	40	341	462	237	500	1.1	43	.0	1,570	2.14	626	54	1054
347						750								1055
460				505	900	1,062						465		1056
500				392	450	1,150						285		1057
518	121	35	1,070	532	587	1,210	2.2	25	3.0	3,310	4.50	446	84	1058
198	102	26	294	449	128	340	1.7	20		1,183	1.54	361	64	1059
530				596	900	1,112						645		1060
493	196	44	941	590	681	1,060	3.2	25	2.5	3,240	4.41	670	75	1061

Chemical character of ground waters in the Gila River Basin, Graham County, Ariz., road bridge

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (°F.)
1062	Willard Welker irrigation well, USGS 624.	NW¼SW¼ sec. 22	Mar. 25, 1940			
1063	do	do	July 19, 1940			
1064	USGS 625	NE¼SE¼ sec. 22	Mar. 25, 1940			67
1065	USGS 625	do	June 20, 1940			
1066	USGS 625	do	July 18, 1940			
1067	Ed. Claridge irrigation well, USGS 626.	SW¼NW¼ sec. 24	June 8, 1940	98		66
1068	do	do	Mar. 30, 1944	98		
1069	Tilford Larson irrigation well	SE¼NW¼ sec. 24	June 20, 1940	98		66
1070	S. L. Claridge irrigation well	NW¼NE¼ sec. 24	June 18, 1940	85		67
1071	do	do	July 19, 1941	85		67
1072	do	do	Apr. 27, 1944	85		
1073	Willard Pace unused well	NW¼SE¼ sec. 24	July 13, 1940			
1074	do	do	July 16, 1940			
1075	E. S. Ellsworth unused well	NE¼NW¼ sec. 28	Feb. 27, 1942	49		
1076	M. Allred domestic well	SE¼SW¼ sec. 28	Mar. 26, 1940	33.25		63
1077	Amos Cook stock well	NW¼SE¼ sec. 31	do	70		72
		T. 8 S., R. 26 E.:				
1078	E. Harris unused well	NE¼NW¼ sec. 9	do	22.6		64
1079	Dug well at edge of river flood-plain.	NW¼SE¼ sec. 15	Sept. 15, 1940	10		
1080	Stock well	SW¼SE¼ sec. 29	Mar. 5, 1941	500		72
1081	Northwest well near head of main Artesia ditch.	SW¼SE¼ sec. 32	do			92
1082	South well near head of Artesia ditch.	do	do		200	92
1083	Small well near head of Artesia ditch.	do	do		5	86
		T. 9 S., R. 26 S.:				
1084	H. M. Robinson deep well	NE¼NW¼ sec. 5	do			79
1085	Unused well	NW¼NW¼ sec. 5	Mar. 11, 1941	400		85
1086	76 Ranch domestic well	NE¼SE¼ sec. 18	Mar. 4, 1941			
		T. 5 S., R. 25 E.:				
1087	Harvey Langham well, unused	NW¼SW¼ sec. 2	Mar. 12, 1943	93.5		
1088	Grapevine Spring	SE¼ sec. 9	Feb. 8, 1941		100	90
1089	YL Ranch stock well	SE¼SE¼ sec. 9	Mar. 15, 1943	70		
1090	Spring from hornblende andesite in ravine, Bryce Ranch.	NW¼NE¼ sec 17	Feb. 8, 1941		15	90
1091	East opening of spring in wash, Bryce Ranch.	NE¼SE¼ sec. 26	Feb. 26, 1941			
1092	Surface flow in wash at spring (see analysis 1091).	do	do		60	
1093	Walnut Spring	SE¼SE¼ sec. 26	do		10	
1094	Cottonwood Spring	SW¼SW¼ sec. 26	Feb. 27, 1941		2	
		T. 6 S., R. 25 E.:				
1095	Spring in Big Spring Wash	SE¼NW¼ sec. 5	Feb. 3, 1941		4	69
1096	Seep along Big Spring Road	NE¼SW¼ sec. 5	Feb. 13, 1941			
1097	do	do	Feb. 10, 1944			
1098	Spring from gravel in gully	NW¼SE¼ sec. 5	Feb. 13, 1941		3	60
1099	Spring zone in wash	do	Feb. 14, 1941		20	60
1100	do	do	Feb. 10, 1944			70
1101	Spring near lower end of seepage zone in wash.	do	do		2	70
1102	Most northerly of 6 seeps	SE¼SE¼ sec. 5	Feb. 14, 1941		3	
1103	J. Udall irrigation well	SW¼SW¼ sec. 6	Apr. 20, 1943		500	66
1104	Jack Bryce irrigation well	NW¼NE¼ sec. 7	Aug. 23, 1940	103		69
1105	Dick Bryce stock well	NW¼SE¼ sec. 7	Feb. 26, 1942	31		
1106	Driven observation well, USGS 321.	SW¼SE¼ sec. 7	Dec. 9, 1940	14		62
1107	do	do	Oct. 28, 1943	14		
1108	Ellis Weech irrigation well	SE¼NW¼ sec. 7	Feb. 14, 1941	72		
1109	do	do	May 5, 1943	72		

between the mouth of Bonita Creek near Solomonsville and the Southern Pacific Rail-at Calva—Continued

[Analyses in parts per million]

Specific conductance ($K \times 10^5$ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids		Total hardness as $CaCO_3$	Percent sodium	Analysis No.
										Parts per million	Tons per acre-foot			
186				503	160	308						270		1062
340				516	280	700						285		1063
650				543	1,200	1,500						132		1064
630				537	1,000	1,488						158		1065
				544										1066
310				467	400	540						510		1067
361	166	57	609	494	506	715	2.6	31	.1	2,330	3.17	649	67	1068
205				432	160	340						330		1069
201				433	160	320						225		1070
191	65	18	336	437	154	298	4.6	21		1,112	1.51	236	76	1071
194	61	18	348	422	163	315	4.3	13	.2	1,130	1.54	226	77	1072
						1,125								1073
						1,390								1074
380						770								1075
290				706	320	475	1.9	10				450		1076
181				164	700	300						645		1077
159				269	150	215	2.7	2.0				120		1078
228	208	49	234	22	937	165	1.4			1,605	2.18	721	41	1079
96.4	24	2.6	185	118	128	166	3.4			567	.77	71	85	1080
79.4	9.5	3.9	163	164	88	101	10			456	.62	40	90	1081
109	12	4.4	224	153	162	148	12			638	.87	48	91	1082
109	52	7.4	174	143	187	155	3.2			649	.88	160	70	1083
114	40	.87	210	149	187	160	7.0			678	.92	103	82	1084
195	20	1.7	404	87	257	400	12			1,138	1.55	57	94	1085
23.6	26	2.2	21	117	12	7	0.9			127	.17	74	39	1086
16.6				45		9.0								1087
48.5	48	28	23	284	28	11	1.2	5.2		284	.39	235	18	1088
22.4				84		6.0								1089
82.2	100	33	41	383	126	17	1.8	2.0		510	.69	385	19	1090
64.8	69	28	28	248	97	28	1.0	2.5		376	.51	287	18	1091
61.9	67	26	27	234	95	27	1.0	2.5		360	.49	274	18	1092
66.2	70	29	28	253	92	32	1.3	5.0		382	.52	294	17	1093
49.7	41	26	35	264	28	24	1.1	3.5		289	.39	209	27	1094
297	62	29	543	191	326	670	5.1			1,729	.42	274	81	1095
388	82	42	712	187	523	860	5.4			2,316	3.15	377	80	1096
310				194		703			3.5					1097
480	118	57	899	243	557	1,200	4.7			2,960	4.03	529	79	1098
308	68	30	573	213	337	710	4.3			1,827	2.48	293	81	1099
301				198		673			4.6					1100
305				192		683			4.6					1101
852	222	80	1,650	227	1,146	2,180	6.7			5,400	7.34	883	80	1102
940	176	89	1,990	802	1,834	1,790	8.2	24	5.0	6,310	8.58	805	84	1103
680	92	49	1,508	798	1,201	1,280				4,520	6.15	431	88	1104
562						1,080								1105
485	30	42	1,042	565	512	1,060	8.0			2,970	4.04	247	90	1106
424						820								1107
566	104	38	1,222	862	760	1,100	9.1			3,660	4.98	416	86	1108
573						1,035								1109

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Chemical character of ground waters in the Gila River Basin, Graham County, Ariz., road bridge

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (°F.)
1110	O. E. Bryce well, unused	NE¼SW¼ sec. 7	Mar. 8, 1943	27		
1111	Driven observation well, 5-32	SE¼SW¼ sec. 7	Apr. 2, 1943	18.5	15	
1112	do	do	Aug. 3, 1943	18.5	7	63
1113	do	do	Feb. 9, 1944	18.5		
1114	5-33	do	Aug. 20, 1943		8	63
1115	5-37	do	Apr. 2, 1943	18.4	15	
1116	5-37	do	Aug. 2, 1943	18.4	8	61
1117	5-38	do	Apr. 2, 1943	18.9	10	
1118	5-38	do	Aug. 20, 1943	18.9	8	63
1119	5-43	do	do		8	66
1120	5-44	do	Aug. 2, 1943		2	63
1121	5-48	SW¼SW¼ sec. 7	Aug. 3, 1943		12	66
1122	5-48	do	Jan. 4, 1944		10	65
1123	5-48	do	Aug. 29, 1944		10	77
1124	5-49	do	Aug. 20, 1943		8	65
1125	5-50	do	Apr. 2, 1943	18.6	20	
1126	5-50	do	Aug. 3, 1943	18.6	8	63
1127	5-51	NW¼SW¼ sec. 7	Apr. 2, 1943	18.7	12	
1128	5-51	do	Aug. 3, 1943	18.7		64
1129	5-55	SW¼SW¼ sec. 7	Aug. 4, 1943		8	68
1130	5-56	do	Aug. 20, 1943		8	64
1131	5-57	NW¼SW¼ sec. 7	Aug. 24, 1943		8	
1132	5-58	do	Apr. 2, 1943	18.8	3	
1133	5-58	do	Aug. 3, 1943	18.8	1	67
1134	5-59	NE¼SW¼ sec. 7	Apr. 2, 1943	23.8	1	
1135	5-59	do	Aug. 24, 1943	23.8	3	
1136	5-60	do	Apr. 2, 1943	28.9	8	
1137	5-63	SE¼NW¼ sec. 7	Oct. 16, 1943		8	63
1138	5-64	SW¼NW¼ sec. 7	Aug. 19, 1943		3	66
1139	5-65	NW¼NW¼ sec. 7	Aug. 20, 1943		4	67
1140	5-65	do	Feb. 9, 1944			65
1141	5-67	SE¼SE¼ sec. 7	Aug. 6, 1943		12	63
1142	5-68	do	Aug. 24, 1943		1	
1143	5-69	do	Aug. 20, 1943		6	65
1144	Seepage zone on west bank of Holyoke Wash.	NW¼SW¼ sec. 9	Feb. 14, 1941		3	
1145	Spring piped to farmhouse	SE¼SW¼ sec. 9	Feb. 13, 1941		1	
1146	Andy Bryce irrigation well	SW¼NE¼ sec. 16	Mar. 31, 1944	57		
1147	Wm. Wanslee stock well	NW¼SW¼ sec. 16	Mar 22, 1940	28		72
1148	Driven observation well, 3-39	NW¼NW¼ sec. 16	Aug. 24, 1943		1	
1149	3-40	SW¼NW¼ sec. 16	July 26, 1943			69
1150	3-40	do	Aug. 6, 1943		10	65
1151	3-41	NW¼NW¼ sec. 16	do		7	64
1152	3-42	SW¼SW¼ sec. 16	July 26, 1943			66
1153	3-42	do	Aug. 6, 1943		12	64
1154	3-42	do	Oct. 27, 1943		8	65
1155	3-42	do	Jan. 4, 1944		8	64
1156	3-42	do	Feb. 29, 1944		8	
1157	3-42	do	May 2, 1944		3	63
1158	3-42	do	July 10, 1944		4	64
1159	3-42	do	Aug. 29, 1944		2	65
1160	3-42	do	Oct. 27, 1944		2	64
1161	3-44	NW¼SW¼ sec. 16	Aug. 24, 1943		8	
1162	3-46	NE¼SW¼ sec. 16	Aug. 10, 1943		9	65
1163	3-54	SE¼SW¼ sec. 16	July 26, 1943			66
1164	3-54	do	Aug. 10, 1943		10	65

between the mouth of Bonita Creek near Solomonsville and the Southern Pacific Rail- at Calva—Continued

[Analyses in parts per million]

Specific conductance (K×10⁵ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Total hardness as $CaCO_3$	Percent sodium	Analysis No.
387						520								1110
445	101	29	910	852	458	800	8.7	27	12	2,750	3.74	371	84	1111
443						845								1112
429				868		772			7.5					1113
442						790								1114
499				892		965								1115
558	191	50	1,045	946	538	1,135	3.8	9.8	5.0	3,440	4.68	682	77	1116
408				798		705								1117
444						820								1118
510				918	1,015									1119
381						660								1120
314				598		615								1121
273	83	26	526	564	254	510	4.7	.5	15	1,680	2.28	314	78	1122
278						525								1123
470						910								1124
316				766		490								1125
298				750		460								1126
462	141	40	896	864	499	850	7.7	21	12	2,880	3.92	516	79	1127
458						840								1128
452				772		860								1129
476				882		940								1130
339						575								1131
484				866		830								1132
473				872		885								1133
374				668		730								1134
424						765								1135
506				898		920								1136
508														1137
349						610								1138
504				802		1,230								1139
591				830		1,160			8.8					1140
396				796	402	670								1141
296						720								1142
515				878		945								1143
414	76	27	804	241	449	970	5.6			2,450	3.33	301	85	1144
360	63	20	714	279	372	820	7.2			2,133	2.90	239	87	1145
455	88	38	956	816	598	795	7.7	26	4.0	2,910	3.96	376	85	1146
420				636	500	710	18	22				150		1147
460				806		805								1148
389						715								1149
439						795								1150
348						605								1151
405														1152
424	182	43	731	678	387	875	4.7	18	8.0	2,570	3.50	631	72	1153
390						805								1154
373						770								1155
389						800								1156
369	158	43	683	622	379	790	3.4	35	5.0	2,400	3.26	572	72	1157
375						730								1158
352						680								1159
337						670								1160
474						935								1161
436				696		900								1162
455	62	30	952	660	437	940		33		2,780	3.78	278	88	1163
469				720		970								1164

Chemical character of ground waters in the Gila River Basin, Graham County, Ariz., road bridge

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (°F.)
1165	Vance Marshall well, unused	SW¼NW¼ sec. 17	Feb. 26, 1943			
1166	Vance Marshall irrigation well, USGS 318.	NE¼NE¼ sec. 17	June 19, 1940	42		68
1167	do	do	Feb. 26, 1943	42		
1168	do	do	Apr. 14, 1944	42		
1169	USGS 319	SE¼NE¼ sec. 17	June 19, 1940			67
1170	USGS 319	do	Feb. 26, 1943			
1171	USGS 320	SE¼SE¼ sec. 17	July 23, 1940	46.3		64
1172	USGS 320	do	Feb. 26, 1943	46.3		
1173	USGS 320	do	Apr. 14, 1944	46.3		
1174	USGS 320	do	May 2, 1944	46.3		
1175	Driven observation well, 4-19	do	Aug. 10, 1943		8	66
1176	4-22	SW¼SE¼ sec. 17	Aug. 16, 1943		8	65
1177	4-25	NW¼NE¼ sec. 17	Aug. 17, 1943		8	63
1178	4-27	SW¼SE¼ sec. 17	July 28, 1943		3	64
1179	4-28	do	July 27, 1943		2.5	65
1180	4-28	do	Oct. 27, 1943		7	67
1181	4-28	do	Jan. 4, 1944		8	63
1182	4-28	do	Feb. 29, 1944		2	60
1183	4-28	do	May 2, 1944		2	61
1184	4-28	do	July 10, 1944		2	64
1185	4-28	do	Aug. 29, 1944		3	65
1186	4-28	do	Oct. 27, 1944		3	66
1187	4-31	SE¼SW¼ sec. 17	Aug. 16, 1943		8	64
1188	4-32	do	July 28, 1943		2.5	70
1189	4-33	NE¼NW¼ sec. 17	July 27, 1943		2	66
1190	4-35	SE¼SW¼ sec. 17	July 29, 1943		3	
1191	4-36	do	Aug. 16, 1943		8	66
1192	4-37	do	July 28, 1943		2	
1193	4-38	NE¼SW¼ sec. 17	Aug. 18, 1943		8	66
1194	4-40	SE¼SW¼ sec. 17	July 29, 1943		3	64
1195	4-40	do	Aug. 19, 1943		6	64
1196	4-41	do	July 28, 1943		1	65
1197	4-42	NE¼NW¼ sec. 17	do		2	66
1198	4-43	NW¼SW¼ sec. 17	Aug. 18, 1943		8	72
1199	4-45	SW¼SW¼ sec. 17	Aug. 19, 1943		6	68
1200	4-46	do	July 28, 1943		2.5	64
1201	4-47	NW¼SW¼ sec. 17	do		3	66
1202	4-49	SW¼SW¼ sec. 17	July 29, 1943		3	64
1203	4-50	do	July 28, 1943			
1204	4-51	NW¼SW¼ sec. 17	Aug. 18, 1943		8	69
1205	4-52	do	July 28, 1943		2	65
1206	4-53	SW¼NW¼ sec. 17	July 27, 1943		3	65
1207	4-54	SE¼NW¼ sec. 17	do			68
1208	4-55	NE¼NW¼ sec. 17	Aug. 20, 1943		6	65
1209	4-57	NE¼NE¼ sec. 17	Oct. 11, 1943		2	66
1210	4-58	SW¼NE¼ sec. 17	do		1.5	64
1211	4-59	SE¼NW¼ sec. 17	Aug. 6, 1943		10	64
1212	4-60	NW¼SE¼ sec. 17	do		9	65
1213	4-61	do	do		4	65
1214	4-62	SE¼NW¼ sec. 17	July 26, 1943			67
1215	4-62	do	Aug. 6, 1943		1.5	68
1216	USGS 322	NE¼NW¼ sec. 18	Apr. 15, 1940	21		
1217	USGS 322	do	May 27, 1940	21		
1218	USGS 322	do	Dec. 9, 1940	21		
1219	USGS 322	do	Oct. 28, 1943	21	10	63
1220	USGS 323	NW¼NE¼ sec. 18	May 27, 1940	14		
1221	USGS 323	do	Dec. 9, 1940	14		
1222	USGS 324	SW¼NE¼ sec. 18	May 25, 1940	14		63
1223	USGS 324	do	Dec. 17, 1940	14		
1224	USGS 324	do	Oct. 28, 1943	14		67

between the mouth of Bonita Creek near Solomonsville and the Southern Pacific Rail- at Calva—Continued

[Analyses in parts per million]

Specific conductance (K×10⁵ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Total hardness as $CaCO_3$	Percent sodium	Analysis No.
337														1165
430				676	500	738						81		1166
501	73	31	1,061	742	703	895		16	14	3,140	4.27	310	88	1167
552	58	35	1,210	660	870	1,030	6.0	8.5	2	3,540	4.81	288	90	1168
510				732	700	938						232		1169
530				814		920								1170
260				496	250	480						345		1171
255				616		425								1172
381	161	45	652	602	363	780	2.6	33	1.5	2,330	3.17	587	71	1173
368						765								1174
387						795								1175
422				708		885								1176
336						650								1177
406	137	38	735	670	344	835		14		2,433	3.31	498	76	1178
355						695								1179
363	162	45	630	684	329	730	3.9	21	10	2,260	3.07	590	70	1180
363						740								1181
351						700								1182
372						655								1183
360						705								1184
369						730								1185
372						765								1186
331														1187
269						520								1188
305						560								1189
297														1190
353						710								1191
310						620								1192
306				710		520								1193
312						575								1194
308						570								1195
344				558		715								1196
350														1197
243						435								1198
284						510								1199
320				702		595								1200
281						555								1201
271														1202
274						490								1203
274						480								1204
303						600								1205
302	106	31	551	633	281	535		29		1,845	2.51	392	75	1206
348						665								1207
518				920		925								1208
467						870								1209
403						720								1210
406				904		705								1211
316				746		540								1212
319														1213
370	66	19	791	762	348	660	8.8	26	10	2,294	3.12	370	88	1214
399				822	376	710								1215
550	172	45	1,030	962	524	1,078				3,320	4.52	614	78	1216
490	151	39	927	912	452	946				2,960	4.03	537	79	1217
419	137	33	814	802	394	820	8.8			2,600	3.54	478	79	1218
388	74	30	801	722	374	730	7.8	22	25	2,390	3.25	308	85	1219
480	26	33	1,038	531	484	1,076				2,920	3.97	200	92	1220
501	97	39	1,040	831	471	1,040	9.6			3,110	4,23	402	85	1221
240						424								1222
264	116	43	430	624	196	480	3.1			1,576	2.14	466	67	1223
209						370								1224

Chemical character of ground waters in the Gila River Basin, Graham County, Ariz., road bridge

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (°F.)
	Driven observation well—Con.					
1225	USGS 325	SW¼NE¼ sec. 18	May 25, 1940	14		61
1226	USGS 325	do	Dec. 9, 1940	14		
1227	USGS 325	do	Oct. 28, 1943	14		68
1228	USGS 326	do	May 27, 1940	14		
1229	USGS 326	do	Dec. 9, 1940	14		
1230	USGS 326	do	Oct. 28, 1943	14		70
1231	Seep in gravel pit at Pima bridge	NE¼NW¼ sec. 18	Feb. 3, 1940		20	61
1232	Dodge-Nevada Canal Co. well	NE¼SW¼ sec. 18	June 20, 1940	66		63
1233	do	do	Apr. 14, 1943	66		63
1234	do	do	Mar. 31, 1944	66		
1235	Seepage in Gila River channel	NE¼SE¼ sec. 18	Sept. 11, 1941		50	
1236	Driven observation well, 5-2	NW¼SE¼ sec. 18	July 30, 1943		1	64
1237	5-3	NE¼SW¼ sec. 18	do			64
1238	5-4	SE¼NE¼ sec. 18	do		2	66
1239	5-5	do	do		3	66
1240	5-6	NE¼NE¼ sec. 18	do		3.5	63
1241	5-7	NE¼SE¼ sec. 18	do		1	66
1242	5-7	do	Sept. 13, 1943		4	66
1243	5-8	do	Aug. 17, 1943		8	66
1244	5-9	SE¼NE¼ sec. 18	July 30, 1943		2	65
1245	5-10	do	do		3	63
1246	5-11	NE¼NE¼ sec. 18	Aug. 17, 1943		5	65
1247	5-12	do	July 30, 1943		2	66
1248	5-14	SE¼NE¼ sec. 18	do			67
1249	5-15	do	do		1	67
1250	5-16	NE¼NE¼ sec. 18	Aug. 17, 1943		3	64
1251	5-18	SW¼NE¼ sec. 18	Apr. 2, 1943	18.7	8	
1252	5-18	do	July 30, 1943	18.7	5	67
1253	5-18	do	Oct. 12, 1943	18.7	8	65
1254	5-19	do	Aug. 17, 1943		4	64
1255	5-20	NW¼NE¼ sec. 18	Aug. 19, 1943		2	65
1256	5-21	do	Aug. 20, 1943		2	62
1257	5-22	do	July 30, 1943		1.5	64
1258	5-23	do	do		3	63
1259	5-24	SW¼NE¼ sec. 18	do		3	66
1260	5-25	do	do		3	63
1261	5-26	NW¼NE¼ sec. 18	Aug. 20, 1943		12	63
1262	5-27	do	Aug. 17, 1493		6	67
1263	5-27	do	Oct. 27, 1943		8	66
1264	5-27	do	Jan. 4, 1944			62
1265	5-27	do	Feb. 9, 1944			
1266	5-28	SE¼NW¼ sec. 18	July 29, 1943		2	
1267	5-29	do	Aug. 19, 1943		8	62
1268	5-29	do	Oct. 27, 1943		1	66
1269	5-29	do	Jan. 4, 1944		2	49
1270	5-29	do	Feb. 29, 1944		4	51
1271	5-29	do	May 2, 1944		4	54
1272	5-34	do	Aug. 5, 1943		4	66
1273	5-35	NE¼NW¼ sec. 18	Aug. 20, 1943		.5	68
1274	5-36	do	do		8	
1275	5-36	do	July 10, 1944		1	65
1276	5-36	do	Aug. 29, 1944		5	68
1277	5-36	do	Oct. 27, 1944		3	67
1278	5-39	SE¼NW¼ sec. 18	Aug. 2, 1943		2	66
1279	5-40	do	Aug. 5, 1943		4	65
1280	5-41	NE¼NW¼ sec. 18	do		6	64
1281	5-42	do	Apr. 2, 1943	19	7	
1282	5-42	do	Aug. 3, 1943	19	6	76
1283	5-42	do	Oct. 27, 1943	19	5	73
1284	5-42	do	Jan. 4, 1944	19	5	60

between the mouth of Bonita Creek near Solomonsville and the Southern Pacific Rail- at Calva—Continued

[Analyses in parts per million]

Specific conductance (K×10⁵ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Total hardness as $CaCO_3$	Percent sodium	Analysis No.
157	68	18	270	498	96	228				925	1.26	244	71	1225
256	144	44	389	569	199	500	2.9			1,559	2.12	540	61	1226
230						450								1227
174						275								1228
250	117	35	386	548	191	440	2.5			1,442	1.96	436	66	1229
204	106	32	310	482	156	350	1.5	18	4.0	1,210	1.65	396	63	1230
470	35	20	1,004	601	472	965				2,800	3.81	170	93	1231
220				328	120	455						188		1232
164	61	18	270	388	113	260	1.4	8.6	1.0	922	1.25	226	72	1233
222	111	30	351	488	174	395	1.5	27	.2	1,330	1.81	440	66	1234
244	51	30	446	312	230	502	2.4	12		1,427	1.93	251	79	1235
305						580								1236
320						605								1237
340						610								1238
360	98	26	699	744	333	625		39		2,186	2.97	352	81	1239
395						685								1240
302						545								1241
303						550								1242
281						505								1243
269						465								1244
349														1245
364						625								1246
356						620								1247
235						390								1248
334						595								1249
367						640								1250
377				690		735								1251
265						585								1252
281						530								1253
271				568		480								1254
363				676		675								1255
383				788		675								1256
422	95	25	821	742	444	730		31		2,510	3.41	340	84	1257
420														1258
176						280								1259
224						370								1260
388						680								1261
418				956		710								1262
412	84	28	893	980	395	725	9.8	5.0	20	2,620	3.56	324	86	1263
468						775								1264
453				1,160		713			6.8					1265
156						240								1266
186						305								1267
82.8	24	12	155	231	61	136	.9	.2	2.0	503	.68	110	76	1268
109	65	22	147	268	78	188	2.0	.0	3.0	634	.86	252	56	1269
124				370		174								1270
185	110	30	263	406	150	335	1.5	5.7	1.0	1,100	1.50	398	59	1271
144						215								1272
169						290								1273
419				862		765								1274
374	91	22	755	774	335	675	8.8	1.5	8.0	2,270	3.09	318	84	1275
330						600								1276
318						595								1277
157						230								1278
155						230								1279
151														1280
139	52	16	233	352	99	220		1.0		794	1.08	196	72	1281
219						405								1282
161	62	22	275	356	138	285	1.9	.5	3.0	960	1.31	245	71	1283
189						350								1284

Chemical character of ground waters in the Gila River Basin, Graham County, Ariz., road bridge

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (°F.)
	Driven observation well—Con.					
1285	5-42	NE¼NW¼ sec. 18	Feb. 29, 1944	19	8	54
1286	5-42	do	May 2, 1944	19	8	56
1287	5-42	do	July 10, 1944	19	8	71
1288	5-42	do	Aug. 29, 1944	19	8	77
1289	5-42	do	Oct. 27, 1944	19	6	74
1290	5-45	SW¼NW¼ sec. 18	Aug. 2, 1943	------	2	65
1291	5-47	NW¼NW¼ sec. 18	Aug. 20, 1943	------	5	65
1292	5-54	do	Aug. 5, 1943	------	3	63
1293	5-61	SE¼SE¼ sec. 18	Aug. 9, 1943	------	11	65
1294	5-70	NE¼NE¼ sec. 18	Aug. 6, 1943	------	1	71
1295	5-73	SE¼SE¼ sec. 18	Aug. 9, 1943	------	12	65
1296	5-74	SW¼SE¼ sec. 18	do	------	3	68
1297	5-76	NE¼SW¼ sec. 18	Aug. 20, 1943	------	3	65
1298	5-77	SE¼SW¼ sec. 18	Aug. 9, 1943	------	8	66
1299	5-78	SW¼SE¼ sec. 18	do	------	10	67
1300	Arthur Lines irrigation well, USGS 331.	NW¼NW¼ sec. 19	July 30, 1940	------	------	------
1301	do	do	Apr. 29, 1943	------	330	63
1302	do	do	Mar. 31, 1944	------	------	------
1303	USGS 332	SW¼NW¼ sec. 19	Apr. 29, 1943	------	530	------
1304	W. Mattice irrigation well	NE¼NW¼ sec. 19	July 30, 1940	------	987	------
1305	Mattice Bros. irrigation well	SW¼NE¼ sec. 19	Mar. 31, 1944	------	------	------
1306	Pima city well	SW¼NW¼ sec. 19	May 11, 1943	------	------	65
1307	Driven observation well, 4-78	NE¼SE¼ sec. 19	Aug. 9, 1943	------	12	66
1308	5-72	NE¼NE¼ sec. 19	do	------	11	66
1309	5-75	NE¼NW¼ sec. 19	Aug. 19, 1943	------	5	67
1310	5-79	SW¼NE¼ sec. 19	Aug. 9, 1943	------	8	66
1311	George Reynolds domestic well	SE¼SW¼ sec. 20	Mar. 28, 1940	19.8	------	------
1312	do	do	Feb. 25, 1943	19.8	------	------
1313	Vance Marshall irrigation well, USGS 337.	NE¼NE¼ sec. 20	July 23, 1940	53		65
1314	do	do	Feb. 26, 1943	53	------	------
1315	do	do	May 2, 1944	53	------	63
1316	Allie Lines irrigation well	SE¼NW¼ sec. 20	Mar. 2, 1943	------	------	------
1317	Driven observation well, 4-1	NE¼SE¼ sec. 20	Aug. 19, 1943	------	8	66
1318	4-2	SE¼NE¼ sec. 20	July 22, 1943	------	3	65
1319	4-3	do	do	------	3	67
1320	4-4	do	do	------	3	66
1321	4-4	do	Oct. 27, 1943	------	10	67
1322	4-4	do	Jan. 4, 1944	------	10	65
1323	4-4	do	Feb. 29, 1944	------	10	64
1324	4-4	do	May 2, 1944	------	8	64
1325	4-4	do	July 10, 1944	------	8	67
1326	4-4	do	Aug. 29, 1944	------	6	70
1327	4-4	do	Oct. 27, 1944	------	4	69
1328	4-5	NE¼SE¼ sec. 20	Aug. 13, 1943	------	8	67
1329	4-5	do	Oct. 29, 1943	------	3	68
1330	4-5	do	Jan. 5, 1944	------	5	63
1331	4-5	do	Mar. 1, 1944	------	8	60
1332	4-5	do	May 3, 1944	------	4	59
1333	4-5	do	July 11, 1944	------	3	64
1334	4-5	do	Aug. 30, 1944	------	5	66
1335	4-5	do	Oct. 27, 1944	------	6	68
1336	4-6	SE¼NE¼ sec. 20	July 22, 1943	------	2	------
1337	4-7	do	Aug. 14, 1943	------	5	66
1338	4-8	NE¼NE¼ sec. 20	do	------	8	68
1339	4-9	do	July 22, 1943	------	3	63

between the mouth of Bonita Creek near Solomonsville and the Southern Pacific Rail- at Calva—Continued

[Analyses in parts per million]

Specific conductance (K×10⁵ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Total hardness as $CaCO_3$	Percent sodium	Analysis No.
179	--	--	--	--	--	330	--	--	--	--	--	--	--	1285
261	143	38	396	504	227	510	1.5	3.0	2.0	1,570	2.14	513	63	1286
305	--	--	--	--	--	600	--	--	--	--	--	--	--	1287
161	40	12	294	326	133	265	3.5	.5	4.0	909	1.24	150	81	1288
152	--	--	--	--	--	255	--	--	--	--	--	--	--	1289
191	92	26	298	482	150	300	--	12	--	1,115	1.52	336	66	1290
171	--	--	--	--	--	270	--	--	--	--	--	--	--	1291
198	--	--	--	--	--	325	--	--	--	--	--	--	--	1292
259	--	--	--	--	--	445	--	--	--	--	--	--	--	1293
383	--	--	--	--	--	820	--	--	--	--	--	--	--	1294
353	--	--	--	--	--	660	--	--	--	--	--	--	--	1295
264	--	--	--	--	--	585	--	--	--	--	--	--	--	1296
169	--	--	--	--	--	255	--	--	--	--	--	--	--	1297
252	--	--	--	--	--	--	--	--	--	--	--	--	--	1298
253	--	--	--	--	--	420	--	--	--	--	--	--	--	1299
210	--	--	--	486	200	360	--	--	--	--	--	315	--	1300
136	--	--	--	--	--	215	--	--	--	--	--	--	--	1301
163	85	28	239	434	116	250	1.1	18	.1	951	1.29	327	61	1302
129	--	--	--	--	--	190	--	--	--	--	--	--	--	1303
320	--	--	--	652	200	540	--	--	--	--	--	270	--	1304
259	61	34	494	644	205	420	2.3	33	.8	1,570	2.14	292	79	1305
188	36	43	302	404	149	310	--	--	--	1,039	1.41	267	71	1306
348	--	--	--	614	--	665	--	--	--	--	--	--	--	1307
334	--	--	--	--	--	630	--	--	--	--	--	--	--	1308
268	--	--	--	--	--	460	--	--	--	--	--	--	--	1309
325	--	--	--	692	--	575	--	--	--	--	--	--	--	1310
270	--	--	--	584	220	495	5.0	35	--	--	--	285	--	1311
283	--	--	--	614	--	500	--	--	--	--	--	--	--	1312
213	--	--	--	432	130	380	--	--	--	--	--	255	--	1313
329	180	43	490	566	285	655	--	9.9	1.6	1,942	2.64	626	63	1314
280	130	40	451	500	254	555	1.9	9.1	3.0	1,690	2.30	489	67	1315
266	104	37	432	586	192	460	1.1	24	1.0	1,539	2.09	412	70	1316
327	--	--	--	--	--	600	--	--	--	--	--	--	--	1317
322	--	--	--	--	--	600	--	--	--	--	--	--	--	1318
292	--	--	--	--	--	550	--	--	--	--	--	--	--	1319
215	--	--	--	--	--	380	--	--	--	--	--	--	--	1320
213	120	35	319	478	188	380	1.9	11	5.0	1,290	1.75	444	61	1321
195	--	--	--	--	--	325	--	--	--	--	--	--	--	1322
196	--	--	--	--	--	330	--	--	--	--	--	--	--	1323
201	--	--	--	--	--	360	--	--	--	--	--	--	--	1324
272	164	41	388	550	232	505	1.9	17	3.0	1,620	2.20	578	59	1325
296	--	--	--	--	--	560	--	--	--	--	--	--	--	1326
291	--	--	--	--	--	555	--	--	--	--	--	--	--	1327
328	--	--	--	--	--	605	--	--	--	--	--	--	--	1328
331	86	39	646	632	291	650	3.1	42	10	2,070	2.82	375	79	1329
271	--	--	--	--	--	495	--	--	--	--	--	--	--	1330
312	--	--	--	--	--	585	--	--	--	--	--	--	--	1331
369	--	--	--	--	--	630	--	--	--	--	--	--	--	1332
348	--	--	--	--	--	670	--	--	--	--	--	--	--	1333
353	106	47	631	628	312	675	2.3	39	5.0	2,120	2.88	458	75	1334
361	--	--	--	--	--	715	--	--	--	--	--	--	--	1335
320	--	--	--	--	--	600	--	--	--	--	--	--	--	1336
345	--	--	--	--	--	640	--	--	--	--	--	--	--	1337
377	--	--	--	--	--	730	--	--	--	--	--	--	--	1338
217	--	--	--	--	--	390	--	--	--	--	--	--	--	1339

Chemical character of ground waters in the Gila River Basin, Graham County, Ariz., road bridge

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (°F.)
	Driven observation well—Con.					
1340	4-10	SW¼NE¼ sec. 20	July 22, 1943	-------	2	66
1341	4-11	SE¼NE¼ sec. 20	Aug. 13, 1943	-------	8	67
1342	4-12	NE¼NE¼ sec. 20	July 22, 1943	-------	2	65
1343	4-13	do	do	-------	2	66
1344	4-14	do	Aug. 10, 1943	-------	8	65
1345	4-15	SW¼NE¼ sec. 20	July 22, 1943	-------	3	69
1346	4-16	do	Aug. 13, 1943	-------	8	67
1347	4-17	NW¼NE¼ sec. 20	Aug. 16, 1943	-------	8	66
1348	4-18	NE¼NE¼ sec. 20	do	-------	8	67
1349	4-18	NW¼NE¼ sec. 20	July 27, 1943	-------	-------	-------
1350	4-20	do	July 29, 1943	-------	2	64
1351	4-21	do	Aug. 16, 1943	-------	8	67
1352	4-24	do	Aug. 17, 1943	-------	8	70
1353	4-26	do	Aug. 28, 1943	-------	3	62
1354	4-29	NE¼NW¼ sec. 20	July 29, 1943	-------	2	64
1355	4-30	do	Aug. 16, 1943	-------	3	66
1356	4-30	do	July 29, 1943	-------	5	64
1357	4-34	do	do	-------	-------	64
1358	4-39	do	do	-------	3	62
1359	4-68	SE¼SE¼ sec. 20	Sept. 22, 1943	-------	6	-------
1360	4-69	do	Aug. 20, 1943	-------	2	69
1361	4-70	SW¼SE¼ sec. 20	Aug. 9, 1943	-------	9	65
1362	4-71	NW¼SE¼ sec. 20	Oct. 9, 1943	-------	5	-------
1363	4-72	NE¼SW¼ sec. 20	Sept. 22, 1943	-------	2	-------
1364	4-73	do	Aug. 9, 1943	-------	6	64
1365	4-74	SW¼NE¼ sec. 20	do	-------	13	65
1366	4-75	SE¼NW¼ sec. 20	do	-------	10	66
1367	4-76	SW¼NW¼ sec. 20	do	-------	2	68
1368	4-77	NW¼NW¼ sec. 20	do	-------	12	63
1369	Bored observation well, T-6 [2]	NW¼SW¼ sec. 21	Dec. 27, 1943	-------	-------	-------
1370	do [2]	do	Dec. 28, 1943	-------	-------	66
1371	do [2]	do	do	-------	-------	66
1372	do [2]	do	do	-------	-------	66
1373	Driven well 100 ft. north of T-6	SW¼NW¼ sec. 21	Dec. 27, 1943	12	-------	-------
1374	Driven well 100 ft. south of T-6	NW¼SW¼ sec. 21	do	12	-------	-------
1375	Bored observation well, T-6 [2]	do	Jan. 17, 1944	-------	-------	-------
1376	do [2]	do	do	-------	-------	-------
1377	do [2]	do	do	-------	-------	-------
1378	do [2]	do	do	-------	-------	-------
1379	do [2]	do	Jan. 18, 1944	-------	-------	-------
1380	do	do	do	-------	-------	-------
1381	Seepage from left bank of Gila River.	SE¼SE¼ sec. 21	Sept. 11, 1941	-------	5	-------
1382	Driven observation well, 2-55	NE¼SE¼ sec. 21	Aug. 19, 1943	-------	4	65
1383	3-8	SE¼SE¼ sec. 21	July 20, 1943	-------	-------	67
1384	3-9	do	Aug. 19, 1943	-------		73
1385	3-10	do	July 20, 1943	-------	-------	-------
1386	3-11	do	Aug. 18, 1943	-------	8	70
1387	3-12	SW¼SE¼ sec. 21	July 21, 1943	-------	3	66
1388	3-13	do	July 20, 1943	-------	-------	66
1389	3-14	do	July 21, 1943	-------	2	65
1390	3-15	do	Aug. 20, 1943	-------	2	68
1391	3-16	do	July 20, 1943	-------	-------	64
1392	3-17	do	Aug. 14, 1943	-------	8	66
1393	3-18	do	do	-------	8	70
1394	3-19	SE¼SW¼ sec. 21	July 21, 1943	-------	3	63

[2] Samples collected at intervals during a pumping test.

between the mouth of Bonita Creek near Solomonsville and the Southern Pacific Rail- at Calva—Continued

[Analyses in parts per million]

Specific conductance (K×10⁵ at 25°C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Total hardness as $CaCO_3$	Percent sodium	Analysis No.
316						590								1340
329						605								1341
326						605								1342
373						775								1343
246						455								1344
317	106	39	552	556	262	615		36		1,884	2.56	425	74	1345
337						645								1346
341						645								1347
398						800								1348
282						500								1349
331						620								1350
349						695								1351
296						550								1352
387						790								1353
296						530								1354
338						655								1355
333						645								1356
302						570								1357
272						490								1358
320						570								1359
321						645								1360
256						460								1361
286						540								1362
296	86	41	512	530	226	555	3.1	45	7.5	1,729	2.35	383	74	1363
246						455								1364
292						550								1365
254						445								1366
252														1367
320				650		580								1368
396						780								1369
405	126	51	783	824	367	810	4.2	20	14	2,570	3.50	524	76	1370
410						815								1371
418						830								1372
581	114	62	1,230	1,242	512	1,160	4.8	6.9	18	3,700	5.03	540	83	1373
356	67	35	739	782	284	685	4.7	1.0	12	2,200	2,99	311	84	1374
385						780								1375
389						800								1376
401						820								1377
403						840								1378
417						835								1379
411						930								1380
387	87	47	718	443	384	850	2.2	5.0		2,311	3.14	410	79	1381
338						615								1382
291						585								1383
283						530								1384
256						455								1385
160						255								1386
320														1387
254	128	29	408	514	227	470		5.3		1,520	2.07	438	67	1388
355						675								1389
343						670								1390
217						380								1391
368						695								1392
317						595								1393
358														1394

Chemical character of ground waters in the Gila River Basin, Graham County, Ariz., road bridge

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (°F.)
	Driven observation well—Con.					
1395	3-20	NE¼SW¼ sec. 21	July 20, 1943		2	64
1396	3-21	do	July 21, 1943		3	69
1397	3-22	SE¼SW¼ sec. 21	Aug. 14, 1943		8	66
1398	3-23	NE¼SE¼ sec. 21	July 20, 1943			65
1399	3-25	SW¼SW¼ sec. 21	July 21, 1943		1	67
1400	3-26	do	do		1.5	67
1401	3-27	NE¼SW¼ sec. 21	July 20, 1943		2.5	65
1402	3-28	SW¼NW¼ sec. 21	July 21, 1943		2	65
1403	3-29	NW¼SW¼ sec. 21	do		2	65
1404	3-30	do	Aug. 14, 1943		5	68
1405	3-31	SW¼NW¼ sec. 21	July 21, 1943			69
1406	3-32	do	do		1.5	66
1407	3-33	do	do		2	66
1408	3-34	do	do		2	64
1409	3-35	do	Aug. 14, 1943		8	65
1410	3-35	do	Oct. 27, 1943		2	66
1411	3-35	do	Jan. 4, 1944		2	62
1412	3-35	do	Feb. 29, 1944		5	62
1413	3-35	do	May 2, 1944		4	63
1414	3-35	do	July 10, 1944		1	65
1415	3-35	do	Aug. 29, 1944		6	65
1416	3-35	do	Oct. 27, 1944		2	66
1417	3-36	NW¼SW¼ sec. 21	July 21, 1943		.5	66
1418	3-37	SE¼SW¼ sec. 21	Aug. 14, 1943		8	65
1419	3-47	NW¼NW¼ sec. 21	Oct. 12, 1943		8	63
1420	3-48	SE¼NW¼ sec. 21	Oct. 11, 1943		2	66
1421	3-49	do	Aug. 24, 1943		4	
1422	3-50	SE¼NE¼ sec. 21	do		4	
1423	3-51	NW¼SE¼ sec. 21	Aug. 23, 1943		8	
1424	3-52	SW¼NE¼ sec. 21	Aug. 21, 1943		.5	67
1425	2-30	SW¼SW¼ sec. 22	Aug. 10, 1943		3	68
1426	2-30	do	Sept. 28, 1943		3	
1427	2-31	do	Aug. 10, 1943		8	69
1428	2-33	do	July 16, 1943			65
1429	2-33	do	Oct. 27, 1943		10	70
1430	2-33	do	Jan. 4, 1944		10	68
1431	2-33	do	Feb. 28, 1944		15	65
1432	2-33	do	May 2, 1944		10	64
1433	2-34	do	July 20, 1943			
1434	2-34	do	July 10, 1944		6	65
1435	2-34	do	Aug. 29, 1944		5	67
1436	2-34	do	Oct. 27, 1944		5	70
1437	2-35	SE¼SE¼ sec. 22	Aug. 10, 1943		8	67
1438	2-36	do	Aug. 16, 1943			69
1439	2-37	do	July 19, 1943			65
1440	2-38	NE¼SW¼ sec. 22	do			67
1441	2-39	SW¼SW¼ sec. 22	Aug. 12, 1943		8	63
1442	2-40	do	do		5	71
1443	2-41	NW¼SW¼ sec. 22	July 19, 1943			
1444	2-42	NE¼SW¼ sec. 22	Aug. 19, 1943		3	64
1445	2-43	SW¼SW¼ sec. 22	Aug. 13, 1943		8	67
1446	2-44	do	July 19, 1943			70
1447	2-45	NW¼SW¼ sec. 22	do			65
1448	2-46	SW¼SW¼ sec. 22	Aug. 12, 1943		8	65
1449	2-47	do	July 19, 1943			67
1450	2-48	NW¼SW¼ sec. 22	do			65
1451	2-51	SE¼SE¼ sec. 22	do			65
1452	2-58	do	Aug. 19, 1943		2	67
1453	Wallace and Palmer irrigation well	SE¼NW¼ sec. 22	Aug. 10, 1940	73		70
1454	do	do	Aug. 13, 1941	73		69

between the mouth of Bonita Creek near Solomonsville and the Southern Pacific Rail-at Calva—Continued

[Analyses in parts per million]

Specific conductance (K×10⁵ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Total hardness as $CaCO_3$	Percent sodium	Analysis No.
210	------	------	------	------	------	370	------	------	------	------	------	------	------	1395
373	------	------	------	------	------	705	------	------	------	------	------	------	------	1396
350	------	------	------	------	------	660	------	------	------	------	------	------	------	1397
253	------	------	------	------	------	475	------	------	------	------	------	------	------	1398
372	------	------	------	------	------	695	------	------	------	------	------	------	------	1399
374	------	------	------	------	------	------	------	------	------	------	------	------	------	1400
352	------	------	------	------	------	695	------	------	------	------	------	------	------	1401
237	------	------	------	------	------	410	------	------	------	------	------	------	------	1402
348	98	40	663	692	321	655	3.1	21	1.0	2,142	2.91	409	78	1403
356	------	------	------	------	------	665	------	------	------	------	------	------	------	1404
354	------	------	------	------	------	------	------	------	------	------	------	------	------	1405
364	------	------	------	------	------	------	------	------	------	------	------	------	------	1406
249	------	------	------	------	------	450	------	------	------	------	------	------	------	1407
348	------	------	------	------	------	655	------	------	------	------	------	------	------	1408
183	------	------	------	------	------	280	------	------	------	------	------	------	------	1409
193	103	31	298	482	180	300	2.3	26	4.0	1,180	1,60	384	63	1410
206	------	------	------	------	------	350	------	------	------	------	------	------	------	1411
216	------	------	------	------	------	375	------	------	------	------	------	------	------	1412
225	130	34	335	480	222	385	1.9	24	3.0	1,370	1.86	464	61	1413
211	------	------	------	------	------	330	------	------	------	------	------	------	------	1414
222	------	------	------	------	------	370	------	------	------	------	------	------	------	1415
237	------	------	------	------	------	420	------	------	------	------	------	------	------	1416
350	------	------	------	------	------	------	------	------	------	------	------	------	------	1417
337	------	------	------	------	------	630	------	------	------	------	------	------	------	1418
216	------	------	------	------	------	405	------	------	------	------	------	------	------	1419
189	------	------	------	------	------	295	------	------	------	------	------	------	------	1420
180	------	------	------	------	------	315	------	------	------	------	------	------	------	1421
219	------	------	------	------	------	390	------	------	------	------	------	------	------	1422
256	------	------	------	------	------	455	------	------	------	------	------	------	------	1423
482	------	------	------	------	------	1,080	------	------	------	------	------	------	------	1424
361	------	------	------	------	------	710	------	------	------	------	------	------	------	1425
341	------	------	------	------	------	680	------	------	------	------	------	------	------	1426
342	------	------	------	668	------	605	------	------	------	------	------	------	------	1427
257	78	22	474	428	230	500	6.9	1.0	1.6	1,523	2.07	285	78	1428
299	------	------	------	------	------	575	------	------	------	------	------	------	------	1429
336	144	47	582	622	350	660	4.6	.5	10	2,090	2.84	553	70	1430
319	------	------	------	------	------	610	------	------	------	------	------	------	------	1431
304	------	------	------	------	------	575	------	------	------	------	------	------	------	1432
333	------	------	------	------	------	625	------	------	------	------	------	------	------	1433
280	------	------	------	------	------	485	------	------	------	------	------	------	------	1434
285	------	------	------	------	------	480	------	------	------	------	------	------	------	1435
282	------	------	------	------	------	475	------	------	------	------	------	------	------	1436
364	------	------	------	648	------	695	------	------	------	------	------	------	------	1437
251	------	------	------	------	------	------	------	------	------	------	------	------	------	1438
321	------	------	------	------	------	615	------	------	------	------	------	------	------	1439
347	------	------	------	------	------	------	------	------	------	------	------	------	------	1440
287	------	------	------	------	------	515	------	------	------	------	------	------	------	1441
210	------	------	------	------	------	410	------	------	------	------	------	------	------	1442
370	120	33	687	634	371	725	------	1.0	------	2,249	3.06	435	77	1443
341	------	------	------	------	------	------	------	------	------	------	------	------	------	1444
217	------	------	------	------	------	405	------	------	------	------	------	------	------	1445
194	------	------	------	------	------	390	------	------	------	------	------	------	------	1446
368	------	------	------	------	------	740	------	------	------	------	------	------	------	1447
295	------	------	------	------	------	520	------	------	------	------	------	------	------	1448
227	------	------	------	------	------	450	------	------	------	------	------	------	------	1449
150	92	24	198	324	127	255	------	.5	------	856	1.16	328	57	1450
304	------	------	------	------	------	575	------	------	------	------	------	------	------	1451
353	------	------	------	------	------	735	------	------	------	------	------	------	------	1452
390	------	------	------	584	450	762	------	------	------	------	------	218	------	1453
423	91	34	830	581	481	825	3.0	28	------	2,580	3.51	367	83	1454

Chemical character of ground waters in the Gila River Basin, Graham County, Ariz., road bridge

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (°F.)
1455	Wallace and Palmer irrigation well	SE¼NW¼ sec. 22	Feb. 26, 1943	73		
1456	Ed Howard irrigation well	SW¼SW¼ sec. 23	July 13, 1940	90		69
1457	Driven observation well, 1-63	SW¼SW¼ sec. 25	Aug. 17, 1943		11	65
1458	1-31	SW¼SE¼ sec. 26	Aug. 9, 1943		8	66
1459	1-32	do	July 13, 1943		5	64
1460	1-33	do	Aug. 9, 1943		8	67
1461	1-34	do	Aug. 10, 1943		8	67
1462	1-35	SE¼SW¼ sec. 26	July 14, 1943		2	67
1463	1-36	do	July 13, 1943		15	65
1464	1-37	NE¼SW¼ sec. 26	do		10	66
1465	1-39	SE¼SW¼ sec. 26	Aug. 10, 1943		5	64
1466	1-40	NE¼SW¼ sec. 26	July 14, 1943		5	66
1467	1-41	SE¼SW¼ sec. 26	do		2	65
1468	1-42	do	July 13, 1943		10	65
1469	1-43	NW¼SW¼ sec. 26	July 14, 1943		5	64
1470	1-44	SW¼SW¼ sec. 26	do		10	65
1471	1-45	do	do		1	68
1472	1-46	do	do		5	65
1473	1-47	do	do			67
1474	1-48	do	do			65
1475	1-49	NW¼SW¼ sec. 26	July 13, 1943			68
1476	1-50	do	July 14, 1943			65
1477	1-52	SW¼SW¼ sec. 26	July 13, 1943		1	66
1478	1-53	do	do		10	64
1479	1-54	NW¼SW¼ sec. 26	Aug. 11, 1943		8	
1480	1-55	do	July 13, 1943		10	66
1481	1-55	do	Aug. 18, 1943		6	67
1482	1-55	do	Oct. 27, 1943		5	67
1483	1-55	do	Jan. 4, 1944		8	65
1484	1-55	do	Feb. 28, 1944		10	63
1485	1-55	do	May 2, 1944		8	62
1486	1-55	do	July 10, 1944		6	64
1487	1-55	do	Aug. 29, 1944		8	67
1488	1-56	do	July 13, 1943		5	65
1489	1-64	SE¼SE¼ sec. 26	Aug. 17, 1943		1	67
1490	1-65	do	Aug. 18, 1943		3	64
1491	1-66	do	Aug. 23, 1943		2	
1492	1-74	SW¼NW¼ sec. 26	Aug. 17, 1943		9	66
1493	1-75	NW¼NW¼ sec. 26	Aug. 23, 1943		2	
1494	1-78	NE¼SW¼ sec. 26	Aug. 11, 1943		8	67
1495	1-78	do	Oct. 8, 1943		8	63
1496	Old Stewart Spring	NW¼NE¼ sec. 26	May 2, 1940			73
1497	do	do	Feb. 14, 1941		8	
1498	Spring piped to stock trough	NE¼NE¼ sec. 26	do		1	66
1499	Driven observation well, USGS 346.	SE¼NE¼ sec. 27	May 24, 1940	14		
1500	do	do	Oct. 28, 1943	14		70
1501	USGS 347	do	May 24, 1940	13		
1502	2-1	SE¼SE¼ sec. 27	July 13, 1943		10	70
1503	2-2	do	do		5	67
1504	2-3	do	do		5	66
1505	2-4	NE¼SW¼ sec. 27	Aug. 11, 1943		.5	75
1506	2-5	NE¼SE¼ sec. 27	July 15, 1943			
1507	2-6	SE¼NE¼ sec. 27	July 13, 1943			74
1508	2-6	do	Aug. 10, 1943		8	67
1509	2-7	SE¼SE¼ sec. 27	July 13, 1943			68
1510	2-8	do	Aug. 11, 1943		8	66
1511	2-9	NE¼SE¼ sec. 27	do		3	65
1512	2-10	do	July 15, 1943			64
1513	2-11	do	do			69
1514	2-13	NW¼SE¼ sec. 27	July 16, 1943			64

between the mouth of Bonita Creek near Solomonsville and the Southern Pacific Rail-at Calva—Continued

[Analyses in parts per million]

Specific conductance (K×10⁵ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Total hardness as $CaCO_3$	Percent sodium	Analysis No.
506	138	51	972	632	769	940	4.0	17	8.0	3,200	4.35	554	79	1455
339				524	350	675						255		1456
280						545								1457
265						505								1458
210						355								1459
268						510								1460
200						330								1461
260						495								1462
213						375								1463
201						335								1464
237				552		400								1465
195														1466
326						665								1467
224														1468
219						345								1469
230														1470
228														1471
313						630								1472
370	205	51	565	612	321	785	2.3	1.0	.8	2,232	3.04	721	63	1473
228						375								1474
245						455								1475
285						555								1476
219														1477
205						370								1478
306						620								1479
302	169	41	469	592	286	585		2.0		1,844	2.51	590	63	1480
278						495								1481
235						405								1482
233	112	33	390	584	202	400	3.5	.5	8.0	1,430	1.94	415	67	1483
244						430								1484
261						475								1485
254						440								1486
252						445								1487
290						540								1488
324						670								1489
258						495								1490
236						445								1491
395						775								1492
310						600								1493
251						490								1494
243						455								1495
460	50	17	941	187	500	1,110				2,710	3.69	195	91	1496
437	59	14	884	242	454	1,020	6.3			2,560	3.48	205	90	1497
443	64	14	914	248	490	1,040	9.0			2,650	3.60	217	90	1498
330						646								1499
361						725								1500
270	46	39	457	156	255	620				1,494	2.02	275	78	1501
216						405								1502
225														1503
201	78	22	335	436	155	350		1.5		1,156	1.57	285	72	1504
284				334		645								1505
295						580								1506
316						665								1507
384						655								1508
233						460								1509
230						385								1510
222						395								1511
260						525								1512
240						480								1513
267														1514

Chemical character of ground waters in the Gila River Basin, Graham County, Ariz., road bridge

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (°F.)
	Driven observation well—Con.					
1515	2-14	NW¼SE¼ sec. 27	Aug. 11, 1943		8	65
1516	2-15	do	July 15, 1943			66
1517	2-16	SW¼NE¼ sec. 27	Aug. 11, 1943		8	72
1518	2-17	do	July 15, 1943			
1519	2-18	NW¼NE¼ sec. 27	do			68
1520	2-19	NE¼NE¼ sec. 27	July 16, 1943			67
1521	2-21	SW¼NE¼ sec. 27	Aug. 11, 1943		8	65
1522	2-23	NW¼NE¼ sec. 27	do		8	70
1523	2-24	do	July 16, 1943			67
1524	2-25	SE¼NW¼ sec. 27	Sept. 27, 1943		8	
1525	2-26	NW¼NE¼ sec. 27	do		2	
1526	2-27	NE¼NW¼ sec. 27	July 16, 1943			65
1527	2-28	do	do			68
1528	2-29	NW¼NW¼ sec. 27	July 19, 1943			69
1529	2-29	do	Aug. 12, 1943		8	66
1530	2-49	SE¼NE¼ sec. 27	Oct. 11, 1943		1.5	64
1531	2-50	NW¼NE¼ sec. 27	Aug. 11, 1943		8	69
1532	2-59	NW¼SE¼ sec. 27	Sept. 27, 1943		2	
1533	2-60	SW¼NW¼ sec. 27	Aug. 6, 1943		8	65
1534	2-67	SE¼SE¼ sec. 27	Aug. 18, 1943		8	68
1535	2-68	SW¼SE¼ sec. 27	July 26, 1943			66
1536	2-68	do	Aug. 6, 1943		8	67
1537	2-69	do	do		5	66
1538	2-70	NW¼SE¼ sec. 27	do		12	65
1539	2-73	SE¼SW¼ sec. 27	do		13	65
1540	USGS 347	SE¼NE¼ sec. 27	Oct. 28, 1943	13		68
1541	USGS 348	do	May 24, 1940	14		
1542	USGS 349	NE¼SE¼ sec. 27	do	14		66
1543	USGS 350	do	do	14		68
1544	USGS 351	SE¼SE¼ sec. 27	Oct. 28, 1943			68
1545	USGS 352	do	May 24, 1940	14		
1546	Ned Daley irrigation well	do	June 20, 1940			65
1547	do	do	Apr. 19, 1943		700	66
1548	W. T. Watson domestic well	SW¼NW¼ sec. 27	Mar. 28, 1940	12		63
1549	do	do	Feb. 25, 1943	12		
1550	Seepage in Gila River channel	NE¼NW¼ sec. 27	Sept. 11, 1941		20	
1551	do	NW¼NE¼ sec. 27	do		100	
1552	Rabb and Watson irrigation well	SW¼SW¼ sec. 27	Feb. 25, 1943			
1553	do	do	Apr. 12, 1943			64
1554	Smithville Canal Co. well, USGS 358.	SE¼SE¼ sec. 28	June 19, 1940	82		65
1555	do	do	Apr. 12, 1943	82		65
1556	do	do	Mar. 17, 1944	82		
1557	Ray Hoopes irrigation well	SW¼SE¼ sec. 28	May 1, 1943			65
1558	do	do	Mar. 31, 1944			
1559	Smithville Canal Co. well, USGS 410.	SE¼SE¼ sec. 28	Mar. 17, 1944			
1560	H. L. Norton well	SW¼NE¼ sec. 28	Feb. 25, 1943			
1561	Driven observation well, 2-61	SE¼NE¼ sec. 28	Aug. 10, 1943		14	67
1562	2-74	SE¼SE¼ sec. 28	Aug. 18, 1943		8	66
1563	3-1	NE¼NE¼ sec. 28	Oct. 16, 1943		8	63
1564	3-3	do	do		8	62
1565	3-5	do	do		8	65
1566	3-6	do	Aug. 12, 1943		8	66
1567	3-7	NW¼NE¼ sec. 28	July 21, 1943		3	64
1568	3-38	NE¼NW¼ sec. 28	do		1.5	65
1569	3-56	NE¼NE¼ sec. 28	Sept. 22, 1943		8	

between the mouth of Bonita Creek near Solomonsville and the Southern Pacific Rail- at Calva—Continued

[Analyses in parts per million]

Specific conductance (K×10⁵ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids		Total hardness as $CaCO_3$	Percent sodium	Analysis No.
										Parts per million	Tons per acre-foot			
248				546		435								1515
260														1516
240				436		480								1517
246	113	32	388	422	223	480		1.0		1,445	1.97	414	67	1518
328						680								1519
325														1520
273						485								1521
210						405								1522
311						625								1523
279						500								1524
265						525								1525
264						495								1526
279						515								1527
286						520								1528
289						510								1529
191						365								1530
221						420								1531
278						500								1532
285						495								1533
234														1534
296						530								1535
316						585								1536
385				704		750								1537
510				476		1,185								1538
359						690								1539
298	150	43	473	523	289	595	2.7	5.0	12	1,820	2.48	552	65	1540
300	203	58	393	568	258	614				1,806	2.46	745	53	1541
169						292								1542
122	30	17	210	222	91	230				688	.94	145	76	1543
198						355								1544
166						292								1545
250				572	180	450						405		1546
245				498		440								1547
280				628	310	510	1.6	27				262		1548
329	88	28	604	624	295	575		23	4.5	1,920	2.61	334	80	1549
265	115	32	458	602	217	490	1.5	.5		1,611	2.19	419	70	1550
176	89	27	257	328	142	332	2.1	.5		1,011	1.37	333	63	1551
394	178	64	615	546	462	775		28	1.6	2,391	3.25	707	65	1552
390				506		800								1553
247				447	240	480						315		1554
275	101	57	431	612	202	485	1.3	31	1.5	1,610	2.19	486	66	1555
269	104	61	422	594	216	485	1.5	35	1.0	1,620	2.20	510	64	1556
263						485								1557
284	98	56	467	598	217	525	1.5	38	1.0	1,700	2.31	475	68	1558
259	128	70	353	552	206	480	1.5	34	.2	1,540	2.09	608	56	1559
393				1,174		580								1560
397						790								1561
423						850								1562
291														1563
355														1564
364														1565
325						580								1566
348														1567
342						660								1568
416						865								1569

879751—50——10

Chemical character of ground waters in the Gila River Basin, Graham County, Ariz., road bridge

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (°F.)
	Driven obervation well—Con.					
1570	3-57	NE¼SE¼ sec. 28	Oct. 11, 1943		2	66
1571	3-58	NW¼SE¼ sec. 28	Aug. 10, 1943		8	66
1572	3-59	SE¼NW¼ sec. 28	do		11	65
1573	3-60	NW¼NE¼ sec. 28	do		10	66
1574	3-61	SE¼NW¼ sec. 28	Sept. 27, 1943		5	
1575	3-62	NW¼NW¼ sec. 28	Aug. 18, 1943		8	68
1576	3-63	SW¼NW¼ sec. 28	Aug. 9, 1943		1	69
1577	3-64	NW¼NW¼ sec. 28	do		5	69
1578	Verne Pace irrigation well	SE¼NW¼ sec. 29	June 22, 1940		500	
1579	do	do	Apr. 15, 1943			66
1580	Spring at hydraulic ram	SW¼SW¼ sec. 29	Oct. 30, 1940			
1581	Verne Pace domestic well	NW¼NW¼ sec. 29	Feb. 26, 1942			
1582	Irrigation well, owner unknown	NW¼SW¼ sec. 29	Feb. 25, 1943			
1583	Charles M. Beals spring	NE¼SE¼ sec. 30	Feb. 26, 1942		2	
1584	Charles M. Beals domestic well	NW¼SE¼ sec. 30	Mar. 28, 1940	22		67
1585	do	do	Feb. 25, 1943	22		
1586	G. Chaves domestic well	NW¼NW¼ sec. 30	Mar. 28, 1940	46		63
1587	do	do	Feb. 26, 1943	46		
1588	Roy Saline irrigation well	SW¼NW¼ sec. 30	do	100		
1589	Wardlaw irrigation well	do	Apr. 20, 1942			
1590	do	do	Apr. 19, 1943			67
1591	C. E. Ferrin irrigation well	NE¼NW¼ sec. 31	Apr. 14, 1944			
1592	Spring at terrace scarp	SW¼NE¼ sec. 32	Dec. 1, 1940		2	
1593	George Layton domestic well	NE¼SE¼ sec. 32	Mar. 28, 1940	36		64
1594	do	do	Feb. 25, 1943	36		
1595	Joe Alder irrigation well	SE¼NE¼ sec. 32	July 15, 1941	70		70
1596	do	do	Apr. 13, 1943	70		69
1597	do	do	June 18, 1943	70		
1598	Jack Norton irrigation well	SE¼SW¼ sec. 33	May 20, 1943		1, 460	66
1599	do	do	Mar. 16, 1944			
1600	Lou Norton and Bill Shurtz irrigation well.	SE¼NW¼ sec. 33	June 19, 1940	51		67
1601	do	do	July 16, 1941	51		66
1602	do	do	Apr. 12, 1943	51	1, 100	66
1603	do	do	Mar. 16, 1944	51		
1604	Mrs. D. Craig well	NE¼SE¼ sec. 33	Feb. 25, 1943	28		
1605	Ben Whitmer irrigation well	NE¼NE¼ sec. 33	Apr. 12, 1943	90		66
1606	J. M. Smith irrigation well, USGS 377.	NW¼SW¼ sec. 34	July 10, 1940		662	
1607	Smithville Canal Co. well, USGS 378.	SW¼NE¼ sec. 34	Apr. 12, 1943	56		65
1608	USGS 379	SE¼NE¼ sec. 34	June 19, 1940	82		65
1609	USGS 379	do	Apr. 12, 1943	82	1, 100	66
1610	USGS 380	do	June 19, 1940		1, 072	66
1611	USGS 380	do	Apr. 12, 1943		940	65
1612	USGS 380	do	July 9, 1943			
1613	USGS 380	do	Mar. 17, 1944			
1614	Ralph Layton well	SE¼NW¼ sec. 34	Feb. 25, 1943			
1615	Driven observation well, 1-89	SE¼NE¼ sec. 34	Aug. 19, 1943		2	69
1616	2-63	NE¼SE¼ sec. 34	Aug. 23, 1943		3	
1617	2-64	NE¼NE¼ sec. 34	Aug. 19, 1943		2	68
1618	2-65	do	Aug. 10, 1943		6	66
1619	2-66	do	Aug 18, 1943		9	65
1620	Pratt Tenny domestic well	SW¼SW¼ sec. 35	Mar. 28, 1940	21		65
1621	Drain ditch entering Gila River	SW¼NE¼ sec. 35	Sept. 11, 1941		30	
1622	Driven observation well, 1-3	SE¼NE¼ sec. 35	Aug. 14, 1943		2	69
1623	1-4	do	Aug. 18, 1943		6	66
1624	1-5	do	do		.5	69

between the mouth of Bonita Creek near Solomonsville and the Southern Pacific Rail-at Calva—Continued

[Analyses in parts per million]

Specific conductance (K×10⁵ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Total hardness as $CaCO_3$	Percent sodium	Analysis No.
387	-----	-----	-----	-----	-----	790	-----	-----	-----	-----	-----	-----	-----	1570
257	-----	-----	-----	-----	-----	475	-----	-----	-----	-----	-----	-----	-----	1571
305	-----	-----	-----	-----	-----	555	-----	-----	-----	-----	-----	-----	-----	1572
315	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	1573
372	-----	-----	-----	-----	-----	725	-----	-----	-----	-----	-----	-----	-----	1574
302	-----	-----	-----	-----	-----	560	-----	-----	-----	-----	-----	-----	-----	1575
314	-----	-----	-----	-----	-----	615	-----	-----	-----	-----	-----	-----	-----	1576
423	119	53	784	688	413	850	-----	35	-----	2,590	3.52	515	77	1577
237	-----	-----	-----	500	140	440	-----	-----	-----	-----	-----	285	-----	1578
250	-----	-----	-----	520	-----	445	-----	-----	-----	-----	-----	-----	-----	1579
342	92	65	595	684	253	680	4.3	-----	.8	2,027	2.76	501	72	1580
319	-----	-----	-----	-----	-----	650	-----	-----	-----	-----	-----	-----	-----	1581
237	30	28	472	616	184	350	3.9	19	2.0	1,390	1.89	190	84	1582
268	-----	-----	-----	-----	-----	470	-----	-----	-----	-----	-----	-----	-----	1583
300	-----	-----	-----	518	180	590	1.9	36	-----	-----	-----	255	-----	1584
324	54	42	579	572	258	580	-----	13	5.0	1,808	2.46	308	80	1585
250	-----	-----	-----	507	110	465	1.2	20	-----	-----	-----	135	-----	1586
258	-----	-----	-----	592	-----	435	-----	-----	-----	-----	-----	-----	-----	1587
286	9.0	16	611	566	218	480	1.7	54	4.5	1,668	2.27	88	94	1588
256	-----	-----	-----	558	158	460	-----	-----	-----	-----	-----	315	-----	1589
238	61	35	428	574	164	400	.8	25	2.5	1,397	1.90	296	76	1590
204	64	26	363	536	142	315	1.1	26	.2	1,200	1.63	266	75	1591
1,870	122	84	4,640	1,810	1,774	5,250	1.1	-----	-----	12,760	17.4	650	94	1592
300	-----	-----	-----	750	60	510	1.0	24	-----	-----	-----	93	-----	1593
309	-----	-----	-----	658	-----	560	-----	-----	-----	-----	-----	-----	-----	1594
366	16	18	798	690	196	760	1.5	4.0	-----	2,133	2.90	114	94	1595
902	94	116	1,890	670	1,072	2,230	.8	10	3.0	5,740	7.81	712	85	1596
505	-----	-----	-----	-----	-----	1,040	-----	-----	-----	-----	-----	-----	-----	1597
263	-----	-----	-----	-----	-----	495	-----	-----	-----	-----	-----	-----	-----	1598
262	57	45	474	568	198	470	1.3	25	.5	1,550	2.11	328	76	1599
250	-----	-----	-----	578	260	445	-----	-----	-----	-----	-----	270	-----	1600
262	74	44	452	556	197	470	.9	28	-----	1,540	2.09	366	73	1601
296	-----	-----	-----	566	-----	550	-----	-----	-----	-----	-----	-----	-----	1602
254	83	48	444	570	201	465	1.1	44	2.0	1,570	2.14	404	70	1603
195	-----	-----	-----	390	-----	364	-----	-----	-----	-----	-----	-----	-----	1604
268	-----	-----	-----	592	-----	465	-----	-----	-----	-----	-----	-----	-----	1605
236	-----	-----	-----	550	179	415	-----	-----	-----	-----	-----	390	-----	1606
293	178	56	387	550	238	560	1.5	30	1.0	1,721	2.34	674	54	1607
260	-----	-----	-----	527	200	475	-----	-----	-----	-----	-----	840	-----	1608
260	-----	-----	-----	536	-----	465	-----	-----	-----	-----	-----	-----	-----	1609
233	-----	-----	-----	561	180	420	-----	-----	-----	-----	-----	420	-----	1610
240	-----	-----	-----	558	-----	405	-----	-----	-----	-----	-----	-----	-----	1611
238	-----	-----	-----	-----	-----	405	-----	-----	-----	-----	-----	-----	-----	1612
229	113	36	357	540	169	400	1.7	25	-----	1,370	1.86	430	64	1613
120	73	29	165	520	66	114	1.2	1.0	.5	705	.96	301	54	1614
246	-----	-----	-----	-----	-----	460	-----	-----	-----	-----	-----	-----	-----	1615
249	-----	-----	-----	-----	-----	720	-----	-----	-----	-----	-----	-----	-----	1616
240	-----	-----	-----	-----	-----	425	-----	-----	-----	-----	-----	-----	-----	1617
252	-----	-----	-----	-----	-----	440	-----	-----	-----	-----	-----	-----	-----	1618
234	-----	-----	-----	484	-----	410	-----	-----	-----	-----	-----	-----	-----	1619
220	-----	-----	-----	220	190	475	1.5	42	-----	-----	-----	405	-----	1620
228	109	33	355	464	182	422	1.2	14	-----	1,345	1.83	408	65	1621
249	-----	-----	-----	-----	-----	465	-----	-----	-----	-----	-----	-----	-----	1622
232	-----	-----	-----	514	-----	405	-----	-----	-----	-----	-----	-----	-----	1623
224	-----	-----	-----	-----	-----	430	-----	-----	-----	-----	-----	-----	-----	1624

Chemical character of ground waters in the Gila River Basin, Graham County, Ariz., road bridge

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (°F.)
	Driven observation well—Con.					
1625	1-6	NE¼NE¼ sec. 35	Aug. 19, 1943		8	66
1626	1-7	SE¼NE¼ sec. 35	Aug. 18, 1943		1	69
1627	1-8	SW¼NE¼ sec. 35	do		12	64
1628	1-9	NE¼NE¼ sec. 35	July 15, 1943			65
1629	1-10	do	July 13, 1943		15	66
1630	1-11	SW¼NE¼ sec. 35	July 15, 1943			64
1631	1-12	NW¼NE¼ sec. 35	do			64
1632	1-13	do	July 13, 1943		1	67
1633	1-14	do	do		10	65
1634	1-15	SW¼NE¼ sec. 35	July 15, 1943			67
1635	1-16	NW¼NE¼ sec. 35	do			64
1636	1-18	do	Aug. 9, 1943		8	69
1637	1-19	NE¼NW¼ sec. 35	do		8	66
1638	1-20	do	July 14, 1943		10	66
1639	1-21	NW¼NE¼ sec. 35	Aug. 9, 1943		2	71
1640	1-22	NE¼NW¼ sec. 35	July 15, 1943			64
1641	1-23	do	July 14, 1943		10	67
1642	1-24	do	do			65
1643	1-25	do	July 15, 1943			65
1644	1-26	do	July 14, 1943		10	68
1645	1-28	NW¼NW¼ sec. 35	do			67
1646	1-29	do	do			67
1647	1-30	do	do			67
1648	1-51	do	July 13, 1943		1	66
1649	1-58	NE¼SE¼ sec. 35	Aug. 9, 1943		12	66
1650	1-59	do	Aug. 23, 1943		8	
1651	1-60	do	Aug. 17, 1943		12	66
1652	1-61	SW¼NW¼ sec. 35	Aug. 10, 1943		8	66
1653	1-62	NE¼NE¼ sec. 35	Aug. 17, 1943		.5	68
1654	1-79	NE¼SE¼ sec. 35	Aug. 23, 1943		8	
1655	1-82	SW¼SE¼ sec. 35	Aug. 6, 1943		2	67
1656	1-83	NW¼SE¼ sec. 35	do		10	65
1657	1-84	SW¼NW¼ sec. 35	Aug. 17, 1943		9	66
1658	1-86	SW¼SW¼ sec. 35	Aug. 10, 1943		9	65
1659	1-87	do	Aug. 6, 1943		12	65
1660	1-88	NW¼SW¼ sec. 35	do		1	66
1661	1-1	SW¼NW¼ sec. 36	Aug. 23, 1943		4	
1662	Drain on right bank of Gila River	NW¼SE¼ sec. 36	Sept. 11, 1941		50	
		T. 7 S., R. 25 E.:				
1663	Chambers irrigation well	SW¼SE¼ sec. 1	June 15, 1944			
1664	Driven observation well, 1-80	NE¼NE¼ sec. 2	Aug. 10, 1943		2	66
1665	1-81	do	Aug. 9, 1943		11	65
1666	Roy Layton irrigation well, USGS 503.	NE¼SE¼ sec. 2	Aug. 8, 1940	92		62
1667	do	do	Mar. 17, 1944	92		
1668	Frank Tyler irrigation well	SE¼NE¼ sec. 2	June 19, 1940			66
1669	do	do	June 18, 1943			66
1670	do	do	Mar. 18, 1944			
1671	Jim Young irrigation well	SE¼NW¼ sec. 2	June 19, 1940			66
1672	do	do	July 15, 1941			66
1673	do	do	Apr. 29, 1943		1,500	66
1674	do	do	Mar. 17, 1944			
1675	Roy Layton unused well, USGS 506.	NW¼SW¼ sec. 2	Feb. 25, 1943			
1676	Roy Layton irrigation well, USGS 550-A.	do	Mar. 31, 1944			
1677	Driven observation well, USGS 508.	NE¼NE¼ sec. 3	Aug. 13, 1940	24		66

between the mouth of Bonita Creek near Solomonsville and the Southern Pacific Rail- at Calva—Continued

[Analyses in parts per million]

Specific conductance (K×10⁵ at 25 °C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Total hardness as $CaCO_3$	Percent sodium	Analysis No.
246						460								1625
239						445								1626
232														1627
216						375								1628
235														1629
259														1630
230						400								1631
227						430								1632
275	168	43	387	480	243	555		10		1,642	2.23	596	58	1633
242														1634
251						450								1635
221						400								1636
240				536		420								1637
217														1638
303						600								1639
270														1640
202	76	18	357	472	149	350		5.3		1,188	1.62	264	75	1641
243						430								1642
232														1643
185						335								1644
240														1645
228	82	23	390	450	178	410		17		1,322	1.80	299	74	1646
236														1647
218						410								1648
235						410								1649
220						400								1650
267						500								1651
256						465								1652
265						530								1653
262						510								1654
222						380								1655
251						455								1656
250						435								1657
245						425								1658
281						525								1659
255						455								1660
221						415								1661
263	187	51	331	429	221	570	1.6	8.9		1,582	2.15	676	52	1662
258	152	48	350	518	214	475	1.1	19	3.0	1,510	2.05	577	57	1663
229						405								1664
224						380								1665
212				508	110	365						375		1666
218	124	39	319	496	167	395	1.1	29	.1	1,320	1.80	470	60	1667
191				285	320	390						285		1668
218	127	40	290	498	162	380				1,244	1.69	482	57	1669
222	132	44	299	508	163	390	1.3	27	.2	1,310	1.78	510	56	1670
214				503	220	375						345		1671
223	105	38	340	506	166	390	.5	22		1,311	1.78	418	64	1672
203						415								1673
243	176	42	308	506	192	450	.7	38	.2	1,460	1.99	612	52	1674
104				282		150								1675
223	178	43	242	378	197	425	.3	40	.1	1,310	1.78	621	46	1676
195						385								1677

Chemical character of ground waters in the Gila River Basin, Graham County, Ariz., road bridge

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (°F.)
1678	Driven observation well, USGS 508	NE¼NE¼ sec. 3	Nov. 19, 1943	24		66
1679	Eldon Palmer irrigation well	SE¼SW¼ sec. 3	June 19, 1940		529	67
1680	Ted Furgerson domestic well, USGS 510.	NW¼NW¼ sec. 3	Mar. 28, 1940	22		64
1681	do	do	Feb. 25, 1943	22		
1682	Roy Layton irrigation well, USGS 516.	SE¼SE¼ sec. 3	May 19, 1943	90		66
1683	Eldon Palmer and S. L. Claridge irrigation well.	SW¼NW¼ sec. 3	Feb. 25, 1943			
1684	J. M. Smith irrigation well, USGS 512.	NW¼NE¼ sec. 4	July 21, 1941			65
1685	do	do	May 1, 1943		530	66
1686	Ted Furgerson irrigation well, USGS 513.	SW¼NE¼ sec. 4	July 23, 1940	80	500	66
1687	Merlyn Layton irrigation well	SE¼NW¼ sec. 4	Mar. 24, 1944	81		
1688	Chris Allred domestic well	SW¼NE¼ sec. 10	Feb. 26, 1942	58		
1689	Jim Carpenter irrigation well	NE¼SE¼ sec. 11	Aug. 9, 1940	85	237	68
1690	Asay irrigation well	SW¼NW¼ sec. 11	Apr. 22, 1943			66
1691	Dr. L. Hoopes irrigation well	NE¼NW¼ sec. 12	June 19, 1940			66
1692	do	do	Apr. 14, 1944			
1693	Ivan Pace irrigation well	SW¼SW¼ sec. 12	May 21, 1940	96		67
1694	do	do	July 8, 1940	96		
1695	Dick Layton irrigation well	SE¼SE¼ sec. 12	Aug. 1, 1940	100		62
1696	do	do	Mar. 30, 1944	100		
1697	Chas. Johns irrigation well	do	July 19, 1940			65
1698	Ive Allred irrigation well, USGS 541.	SE¼NE¼ sec. 12	Mar. 17, 1944			
1699	USGS 547	SW¼NW¼ sec. 12	June 1, 1943			66
1700	Marion Lee irrigation well	SW¼SW¼ sec. 12	Apr. 21, 1944			
1701	Carl Morris irrigation well, USGS 531.	NE¼SE¼ sec. 13	July 17, 1940			
1702	J. M. Wilson flowing well	SW¼SW¼ sec. 25	Aug. 1, 1940		1	
1703	do	do	Nov. 14, 1940		2	
1704	Southeast spring at base of butte	NW¼SW¼ sec. 26	Aug. 12, 1940		10	
1705	Northwest spring at base of butte	SW¼ sec. 26	do		10	
1706	Spring near Frye Creek	SE¼NE¼ sec. 28	Mar. 11, 1941		6	78
		T. 8 S., R. 25 E.:				
1707	Amos Cook flowing well, USGS 725	NE¼NE¼ sec. 12	May 3, 1940	1,050	50	98
1708	USGS 726	SE¼NE¼ sec. 12	do		30	94
1709	Carl Morris irrigation well, USGS 728.	SE¼NW¼ sec. 12	Apr. 6, 1944	200		76
1710	W. A. Watts flowing well	NW¼SE¼ sec. 12	Sept. 15, 1940	700	1	
1711	Crum flowing well	SE¼SE¼ sec. 1	May 3, 1940		120	96
		T. 4 S., R. 24 E.:				
1712	Teague Spring	NW¼NW¼ sec. 27	Dec. 17, 1941		15	74
		T. 5 S., R. 24 E.:				
1713	Seep on right bank of Gila River	SE¼SW¼ sec. 6	Sept. 12, 1941		3	
1714	Driven observation well, 16-2	do	Sept. 9, 1943		2	84
1715	16-3	do	do		5	75
1716	16-4	SW¼SW¼ sec. 6	do		4	69
1717	16-5	NW¼SW¼ sec. 6	do		6	79
1718	16-5	do	Nov. 2, 1943		5	80
1719	16-5	do	Jan. 6, 1944		5	79
1720	16-5	do	May 3, 1944		4	78
1721	16-5	do	July 10, 1944		2	78
1722	16-5	do	Aug. 29, 1944		6	78
1723	16-5	do	Oct. 27, 1944		3	78
1724	16-6	SW¼SW¼ sec. 6	Sept. 11, 1943		2	69
1725	16-7	do	do		4	68
1726	16-8	NW¼SW¼ sec. 6	Mar. 25, 1943	19.4	.5	
1727	16-8	do	Sept. 22, 1943	19.4	8	69

between the mouth of Bonita Creek near Solomonsville and the Southern Pacific Rail- at Calva—Continued

[Analyses in parts per million]

Specific conductance (K×10⁵ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Total hardness as $CaCO_3$	Percent sodium	Analysis No.
209	162	52	228	548	158	345	1.5	13	6.0	1,230	1.67	618	45	1678
225				248	160	470						435		1679
270				552	60	510	1.0	17				398		1680
209				506		338								1681
206						380								1682
254	187	65	260	494	225	455	.3	23	1.6	1,459	1.98	734	44	1683
255	82	60	304	265	194	470	4.3	24		1,269	1.73	451	59	1684
236						450								1685
310				574	320	615						360		1686
250	50	55	450	518	176	500	1.5	16	.2	1,500	2.04	351	74	1687
376						713								1688
270				498	280	500						525		1689
256	116	85	288	150	296	570	.1	36	3.0	1,468	2.00	639	49	1690
224				528	140	415						510		1691
221	140	45	281	472	158	410	.8	18	.2	1,290	1.75	534	53	1692
280				505	500	540						660		1693
237				528	220	395	1.2	22				556		1694
216				484	180	380						480		1695
226	173	43	278	468	192	430	.7	26	.1	1,370	1.86	608	50	1696
231				498	150	400						480		1697
228	166	39	285	490	163	420	.7	37	.1	1,350	1.84	575	52	1698
256						530								1699
257	72	44	412	180	314	540	1.0	23	3.5	1,490	2.03	360	71	1700
350				518	450	700						705		1701
105	14	3.9		156	127	166								1702
107	10	8.7	208	166	122	172	2.6			605	.82	61	88	1703
203	28	5.2	397	195	275	360				1,161	1.58	91	90	1704
157	26	3.1	305	52	271	295				926	1.26	78	90	1705
157	11	.87	339	96	204	330	4.1			937	1.27	31	96	1706
410				36	700	955	7.9					233		1707
250				49	560	525	7.6					68		1708
88.8	7.0	2.8	184	96	111	152	8.0	.2	2.0	512	.70	29	93	1709
120	11	4.8	270	143	156	218	18			749	1.02	47	93	1710
340				45	300	755	9.0					96		1711
47.7	42	17	45	281	19	15	.6			277	.38	175	36	1712
1,271	381	91	2,496	411	1,147	3,690	6.2			8,010	10.9	1,325	80	1713
736	167	33	1,470	131	802	1,980	4.7	2.0	18	4,520	6.15	552	85	1714
1,030						2,700								1715
897						2,350								1716
747				182	736	1,990								1717
615	108	26	1,270	334	621	1,540	5.8	48	30	3,780	5.14	376	86	1718
733						1,930			8.3					1719
794	186	32	1,550	211	821	2,080	4.5	3.5	2	4,780	6.50	596	85	1720
763						2,020								1721
744						1,980								1722
744						1,990								1723
1,010						2,650								1724
851						2,230								1725
831	533	142	1,202	534	987	2,170		1.0		5,300	7.21	1,914	58	1726
814						2,120								1727

Chemical character of ground waters in the Gila River Basin, Graham County, Ariz., road bridge

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (°F.)
	Driven observation well—Con.					
1728	16-10	SW¼SW¼ sec. 6	Mar. 25, 1943	18.2	10	
1729	16-10	do	Sept. 11, 1943	18.2	8	67
1730	Spring, edge of river flood-plain	SE¼NE¼ sec. 7	Dec. 17, 1941			
1731	Driven observation well, 15-1	SW¼SE¼ sec. 7	Aug. 7, 1943		8	61
1732	15-2	do	Sept. 13, 1943		3	68
1733	15-3	NW¼SE¼ sec. 7	do		2	69
1734	15-5	SW¼SE¼ sec. 7	do		3	68
1735	15-6	SE¼SW¼ sec. 7	do		3	66
1736	15-7	do	do		8	64
1737	15-8	do	Sept. 7, 1943		8	68
1738	15-9	NW¼SW¼ sec. 7	Aug. 7, 1943		8	70
1739	15-11	SE¼SW¼ sec. 7	Sept. 30, 1943		8	67
1740	15-12	do	Sept. 14, 1943		8	65
1741	15-13	do	Aug. 7, 1943		5	66
1742	15-14	NE¼SW¼ sec. 7	Sept. 13, 1943		6	68
1743	15-15	NW¼SE¼ sec. 7	do		1	72
1744	15-16	SW¼NE¼ sec. 7	do		1	74
1745	15-17	SW¼SW¼ sec. 7	Sept. 28, 1943		8	61
1746	15-18	SE¼SW¼ sec. 7	Sept. 14, 1943		6	64
1747	15-19	NE¼SW¼ sec. 7	do		4	67
1748	15-20	do	Sept. 13, 1943		1	69
1749	15-21	do	do		8	66
1750	15-23	SW¼NE¼ sec. 7	do		1	77
1751	15-24	SW¼SW¼ sec. 7	Oct. 6, 1943		8	62
1752	15-25	do	Sept. 14, 1943		8	63
1753	15-26	do	Aug. 7, 1943		8	65
1754	15-27	NW¼SW¼ sec. 7	do		8	65
1755	15-28	NE¼SW¼ sec. 7	do		4	66
1756	15-29	SE¼NW¼ sec. 7	Sept. 29, 1943		8	65
1757	15-30	SW¼NW¼ sec. 7	Sept. 11, 1943		2	71
1758	15-31	SW¼NE¼ sec. 7	do		.5	78
1759	15-34	NW¼SW¼ sec. 7	Mar. 24, 1943	23.8	10	
1760	15-34	do	Sept. 13, 1943	23.8	8	71
1761	15-35	do	do		4	68
1762	15-36	do	Mar. 24, 1943	18.4	10	
1763	15-36	do	Sept. 13, 1943	18.4	8	62
1764	15-37	SE¼NW¼ sec. 7	do		4	66
1765	15-38	do	Sept. 11, 1943		4	70
1766	15-39	do	do		8	70
1767	15-40	NE¼NW¼ sec. 7	do		5	77
1768	15-41	NW¼SW¼ sec. 7	Mar. 24, 1943	19	4	
1769	15-41	do	Sept. 14, 1943	19	5	64
1770	15-42	SW¼NW¼ sec. 7	Sept. 13, 1943		.25	73
1771	15-42	do	Sept. 27, 1943		8	66
1772	15-43	do	Sept. 28, 1943		8	66
1773	15-44	NE¼NW¼ sec. 7	Sept. 11, 1943		8	70
1774	15-45	do	do		4	70
1775	15-46	do	do		6	76
1776	15-47	SW¼NW¼ sec. 7	Mar. 24, 1943	18.1	8	
1777	15-47	do	Sept. 13, 1943	18.1	8	61
1778	15-48	do	Mar. 24, 1943	18.6	6	
1779	15-48	do	Sept. 13, 1943	18.6	8	67
1780	15.49	NW¼NW¼ sec. 7	Sept. 28, 1943		8	64
1781	15-50	do	Sept. 11, 1943		8	68
1782	15-50	do	Oct. 30, 1943		5	67
1783	15-50	do	Jan. 6, 1944		5	65
1784	15-50	do	Mar. 1, 1944		6	63
1785	15-50	do	May 3, 1944		4	61
1786	15-50	do	July 10, 1944		2	63
1787	15-50	do	Aug. 29, 1944		5	64

between the mouth of Bonita Creek near Solomonsville and the Southern Pacific Rail- at Calva—Continued

[Analyses in parts per million]

Specific conductance (K×10⁵ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Total hardness as $CaCO_3$	Percent sodium	Analysis No.
733	--	--	--	574	--	1,890	--	--	--	--	--	--	--	1728
625	--	--	--	--	--	1,550	--	--	--	--	--	--	--	1729
2,640	949	548	4,800	114	2,810	8,540	--	--	--	17,700	24.1	4,620	69	1730
734	322	116	1,212	508	840	1,850	--	20	--	4,610	6.27	1,280	67	1731
786	--	--	--	--	--	1,970	--	--	--	--	--	--	--	1732
859	--	--	--	--	--	2,130	--	--	--	--	--	--	--	1733
726	--	--	--	--	--	1,860	--	--	--	--	--	--	--	1734
552	--	--	--	548	--	1,290	--	--	--	--	--	--	--	1735
740	--	--	--	--	--	1,820	--	--	--	--	--	--	--	1736
773	--	--	--	--	--	1,980	--	--	--	--	--	--	--	1737
891	--	--	--	--	--	2,190	--	--	--	--	--	--	--	1738
281	--	--	--	--	--	575	--	--	--	--	--	--	--	1739
576	--	--	--	--	--	1,330	--	--	--	--	--	--	--	1740
701	--	--	--	--	--	1,725	--	--	--	--	--	--	--	1741
808	--	--	--	--	--	2,000	--	--	--	--	--	--	--	1742
970	451	194	1,613	430	1,644	2,375	--	14	10	6,500	8.84	1,923	65	1743
1,060	--	--	--	--	--	2,750	--	--	--	--	--	--	--	1744
222	--	--	--	--	--	440	--	--	--	--	--	--	--	1745
248	--	--	--	--	--	485	--	--	--	--	--	--	--	1746
595	--	--	--	--	--	1,410	--	--	--	--	--	--	--	1747
725	--	--	--	--	--	1,840	--	--	--	--	--	--	--	1748
815	--	--	--	--	--	2,040	--	--	--	--	--	--	--	1749
1,080	616	236	1,704	332	2,016	2,720	--	8.6	--	7,460	10.1	2,510	60	1750
215	--	--	--	--	--	420	--	--	--	--	--	--	--	1751
204	--	--	--	--	--	390	--	--	--	--	--	--	--	1752
269	--	--	--	410	--	535	--	--	--	--	--	--	--	1753
578	--	--	--	--	--	1,375	--	--	--	--	--	--	--	1754
693	--	--	--	--	--	1,730	--	--	--	--	--	--	--	1755
851	--	--	--	--	--	2,150	--	--	--	--	--	--	--	1756
991	518	206	1,578	332	1,723	2,475	2.1	11	20	6,680	9.08	2,140	62	1757
1,080	--	--	--	--	--	2,780	--	--	--	--	--	--	--	1758
96.7	--	--	--	219	--	146	--	--	--	--	--	--	--	1759
226	--	--	--	--	--	440	--	--	--	--	--	--	--	1760
300	--	--	--	--	--	635	--	--	--	--	--	--	--	1761
494	190	80	819	540	499	1,150	--	1.0	--	3,000	4.08	803	69	1762
545	--	--	--	--	--	1,300	--	--	--	--	--	--	--	1763
509	--	--	--	--	--	1,190	--	--	--	--	--	--	--	1764
1,020	--	--	--	--	--	2,600	--	--	--	--	--	--	--	1765
1,150	--	--	--	--	--	2,920	--	--	--	--	--	--	--	1766
1,220	746	259	1,880	377	2,114	3,190	2.2	--	--	8,380	11.4	2,930	59	1767
208	--	--	--	340	--	400	--	--	--	--	--	--	--	1768
236	--	--	--	--	--	490	--	--	--	--	--	--	--	1769
263	--	--	--	--	--	555	--	--	--	--	--	--	--	1770
283	--	--	--	--	--	585	--	--	--	--	--	--	--	1771
521	--	--	--	--	--	1,240	--	--	--	--	--	--	--	1772
1,190	--	--	--	--	--	3,040	--	--	--	--	--	--	--	1773
1,330	--	--	--	--	--	3,510	--	--	--	--	--	--	--	1774
938	--	--	--	--	--	2,400	--	--	--	--	--	--	--	1775
242	100	29	388	376	221	475	--	5.0	--	1,403	1.91	368	70	1776
265	--	--	--	--	--	525	--	--	--	--	--	--	--	1777
271	--	--	--	394	--	535	--	--	--	--	--	--	--	1778
250	--	--	--	--	--	500	--	--	--	--	--	--	--	1779
1,190	--	--	--	--	--	3,040	--	--	--	--	--	--	--	1780
1,290	--	--	--	--	--	3,390	--	--	--	--	--	--	--	1781
1,370	768	312	2,290	583	2,410	3,680	2.6	2.5	25	9,750	13.3	3,200	61	1782
1,410	--	--	--	--	--	3,730	--	--	--	--	--	--	--	1783
1,350	--	--	--	--	--	3,530	--	--	--	--	--	--	--	1784
1,270	--	--	--	--	--	3,260	--	--	--	--	--	--	--	1785
1,310	--	--	--	--	--	3,360	--	--	--	--	--	--	--	1786
1,380	--	--	--	--	--	3,610	--	--	--	--	--	--	--	1787

Chemical character of ground waters in the Gila River Basin, Graham County, Ariz., road bridge

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (°F.)
	Driven observation well—Con.					
1788	15-50	NW¼NW¼ sec. 7	Oct. 27, 1944	------	6	66
1789	15-51	NE¼NW¼ sec. 7	Sept. 22, 1943	------	8	67
1790	15-52	SW¼NW¼ sec. 7	Mar. 24, 1943	24	.5	------
1791	15-52	do	Sept. 22, 1943	24	8	64
1792	15-53	NW¼NW¼ sec. 7	Mar. 24, 1943	18.4	18	------
1793	15-53	do	Sept. 13, 1943	18.4	8	65
1794	15-54	do	Mar. 24, 1943	18.2	15	------
1795	15-54	do	Sept. 27, 1943	18.2	8	75
1796	15-54	do	Oct. 30, 1943	18.2	3	74
1797	15-54	do	Jan. 5, 1944	18.2	6	68
1798	15-54	do	Mar. 2, 1944	18.2	8	66
1799	15-54	do	May 3, 1944	18.2	3	66
1800	15-54	do	July 11, 1944	18.2	4	67
1801	15-54	do	Aug. 29, 1944	18.2	5	74
1802	15-54	do	Oct. 30, 1944	18.2	2	71
1803	15-55	do	Sept. 11, 1943	------	.5	70
1804	15-57	do	Sept. 13, 1943	------	8	67
1805	15-58	do	Sept. 9, 1943	------	8	66
1806	Sampled by bailing	do	Mar. 15, 1944	------	------	64
1807	Sampled by bailing	do	do	------	------	64
1808	Sampled by pumping	do	do	------	.5	64
1809	Spring at Indian Hot Springs, USGS 183.	SE¼SE¼ sec. 8	Apr. 20, 1942	------	4.5	77
1810	USGS 184	SW¼SW¼ sec. 8	do	------	1	------
1811	USGS 184-A	NW¼SW¼ sec. 16	do	------	------	81
1812	USGS 185	NE¼NE¼ sec. 17	do	------	1	71
1813	"Beauty Spring" at Indian Hot Springs.	SE¼NE¼ sec. 17	Oct. 30, 1940	------	------	119
1814	do	do	Apr. 20, 1942	------	------	------
1815	do	do	June 15, 1943	------	------	119
1816	do	do	Jan. 5, 1944	------	------	------
1817	do	do	June 14, 1944	------	------	118
1818	Mud Spring at Indian Hot Springs	do	Oct. 30, 1940	------	5	104
1819	do	do	Apr. 20, 1942	------	------	106
1820	do	do	Jan. 5, 1944	------	------	------
1821	do	do	June 14, 1944	------	------	109
1822	Main Spring at Indian Hot Springs	do	Oct. 30, 1940	------	200	118
1823	Youth Spring at Indian Hot Springs.	do	do		------	118
1824	do	do	Apr. 20, 1942	------	150	118
1825	do	do	June 15, 1943	------	150	116
1826	do	do	Jan. 4, 1944	------	------	------
1827	do	do	June 14, 1944	------	------	112
1828	Magnesia Spring at Indian Hot Springs.	do	Oct. 30, 1940		------	72
1829	Drain flowing into Gila River	NE¼SE¼ sec. 18	Sept. 12, 1941	------	10	------
1830	V. McEuen stock well	SE¼NE¼ sec. 18	Mar. 27, 1940	22	------	68
1831	do	do	Feb. 27, 1943	22	------	------
1832	Driven observation well, 14-1	SE¼SE¼ sec. 18	Sept. 15, 1943	------	8	68
1833	14-2	do	Aug. 30, 1943	------	8	64
1834	14-2	do	Sept. 15, 1943	------	8	63
1835	14-3	do	do	------	8	67
1836	14-4	do	do	------	6	67
1837	14-6	do	Mar. 18, 1943	18.8	9	------
1838	14-7	NE¼SE¼ sec. 18	Sept. 15, 1943	------	3	69
1839	14-7	do	Nov. 2, 1943	------	2	68
1840	14-7	do	Jan. 4, 1944	------	2	67
1841	14-7	do	Feb. 10, 1944	------	------	------
1842	14-7	do	Mar. 1, 1944	------	------	59

between the mouth of Bonita Creek near Solomonsville and the Southern Pacific Rail- at Calva—Continued

[Analyses in parts per million]

Specific conductance (K×10⁵ at 25 °C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Total hardness as $CaCO_3$	Percent sodium	Analysis No.
1,550	----	----	----	----	----	4,270	----	----	----	----	----	----	----	1788
1,140	----	----	----	----	----	2,920	----	----	----	----	----	----	----	1789
304	----	----	----	438	----	630	----	----	----	----	----	----	----	1790
245	----	----	----	----	----	460	----	----	----	----	----	----	----	1791
276	----	----	----	432	----	550	----	----	----	----	----	----	----	1792
272	----	----	----	----	----	555	----	----	----	----	----	----	----	1793
364	174	57	546	392	388	800	----	1.0	----	2,159	2.94	668	64	1794
204	----	----	----	----	----	370	----	----	----	----	----	----	----	1795
292	80	28	554	416	285	620	2.3	.5	8.0	1,770	2.41	314	79	1796
422	173	57	711	454	454	965	1.8	2.0	10	2,590	3.52	666	70	1797
395	----	----	----	----	----	890	----	----	----	----	----	----	----	1798
375	----	----	----	----	----	805	----	----	----	----	----	----	----	1799
479	----	----	----	----	----	1,120	----	----	----	----	----	----	----	1800
362	127	41	628	472	371	760	1.8	1.0	4.0	1,480	2.01	486	74	1801
218	54	19	403	424	157	410	----	.5	----	1,250	1.70	213	80	1802
1,140	----	----	----	----	----	3,140	----	----	----	----	----	----	----	1803
300	----	----	----	----	----	580	----	----	----	----	----	----	----	1804
742	----	----	----	----	----	1,850	----	----	----	----	----	----	----	1805
637	260	93	1,090	123	798	1,750	----	2.0	----	4,050	5.51	1,030	70	1806
628	232	91	1,110	122	785	1,740	----	1.0	----	4,020	5.47	953	72	1807
609	319	102	997	484	793	1,530	----	3.0	----	3,980	5.41	1,220	64	1808
573	----	----	----	113	435	1,560	----	----	----	----	----	315	----	1809
646	----	----	----	119	490	1,820	----	----	----	----	----	315	----	1810
524	----	----	----	108	396	1,430	----	----	----	----	----	240	----	1811
567	----	----	----	109	426	1,550	----	----	----	----	----	248	----	1812
445	80	14	875	103	360	1,200	3.2	----	----	2,580	3.51	257	88	1813
451	----	----	----	104	354	1,210	----	----	----	----	----	195	----	1814
441	----	----	----	----	----	1,190	----	----	----	----	----	----	----	1815
440	77	12	879	104	351	1,200	3.5	2.0	8.0	2,580	3.51	242	89	1816
440	78	9.6	879	105	348	1,195	3.9	.5	2.0	2,570	3.50	234	89	1817
521	83	11	1,027	106	395	1,400	4.8	----	.8	2,970	4.04	252	90	1818
521	----	----	----	107	396	1,400	----	----	----	----	----	225	----	1819
552	----	----	----	----	----	1,510	----	----	----	----	----	----	----	1820
519	----	----	----	----	----	1,440	----	----	----	----	----	----	----	1821
508	81	14	1,023	101	402	1,400	3.4	----	----	2,970	4.04	260	90	1822
515	80	12	1,026	100	393	1,400	4.6	----	.8	2,960	4.03	249	90	1823
513	----	----	----	103	387	1,400	----	----	----	----	----	225	----	1824
504	----	----	----	----	----	1,385	----	----	----	----	----	----	----	1825
512	78	12	1,050	106	404	1,420	3.8	2.0	9.0	3,020	4.11	244	90	1826
506	----	----	----	----	----	1,400	----	----	----	----	----	----	----	1827
538	88	14	1,103	116	437	1,500	3.4	----	----	3,200	4.35	277	90	1828
312	84	45	526	226	316	720	2.2	2.5	----	1,807	2.46	395	74	1829
610	262	132	1,014	474	866	1,475	1.7	32	----	3,480	4.73	1,196	65	1830
864	361	184	1,392	414	1,241	2,150	----	25	3.5	5,560	7.56	1,658	65	1831
483	----	----	----	----	----	1,090	----	----	----	----	----	----	----	1832
508	155	65	917	676	536	1,080	----	16	----	3,100	4.22	654	75	1833
546	----	----	----	----	----	1,220	----	----	----	----	----	----	----	1834
603	----	----	----	----	----	1,370	----	----	----	----	----	----	----	1835
308	----	----	----	----	----	655	----	----	----	----	----	----	----	1836
166	78	22	242	308	142	290	----	2.0	----	928	1.26	285	65	1837
596	----	----	----	----	----	1,360	----	----	----	----	----	----	----	1838
582	238	118	968	550	760	1,340	1.6	58	----	3,750	5.10	1,080	66	1839
586	----	----	----	----	----	1,350	----	----	----	----	----	----	----	1840
599	----	----	----	572	----	1,340	----	----	5.3	----	----	----	----	1841
587	----	----	----	----	----	1,350	----	----	----	----	----	----	----	1842

Chemical character of ground waters in the Gila River Basin, Graham County, Ariz., road bridge

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (°F.)
	Driven observation well—Con.					
1843	14-8	SW¼SE¼ sec. 18	Mar. 18, 1943	18.7	9	
1844	14-8	do	Sept. 15, 1943	18.7	8	64
1845	14-9	do	Mar. 22, 1943	23.8	9	
1846	14-9	do	Sept. 15, 1943	23.8	8	65
1847	14-10	NW¼SE¼ sec. 18	Mar. 22, 1943	18.6	15	
1848	14-10	do	Sept. 15, 1943	18.6	8	64
1849	14-11	do	Sept. 14, 1943			69
1850	14-12	SW¼SE¼ sec. 18	Mar. 18, 1943	18.1	18	
1851	14-12	do	Sept. 15, 1943	18.1	8	65
1852	14-13	do	Mar. 18, 1943	23.8	6	
1853	14-13	do	Sept. 15, 1943	23.8	8	64
1854	14-14	NW¼SE¼ sec. 18	Mar. 22, 1943	18.4		
1855	14-14	do	Sept. 14, 1943	18.4	8	63
1856	14-15	SE¼SW¼ sec. 18	Aug. 31, 1943		8	63
1857	14-16	do	Mar. 18, 1943	18.3	12	
1858	14-16	do	Sept. 15, 1943	18.3	8	66
1859	14-17	NW¼SE¼ sec. 18	Mar. 22, 1943	18.7	12	
1860	14-17	do	Sept. 15, 1943	18.7	8	64
1861	14-18	do	Mar. 22, 1943	23.8	3	
1862	14-18	do	Sept. 14, 1943	23.8	3	62
1863	14-19	do	do		3	73
1864	14-20	SE¼SW¼ sec. 18	Aug. 31, 1943		8	62
1865	14-21	NE¼SW¼ sec. 18	Sept. 15, 1943		1	67
1866	14-22	do	Mar. 22, 1943	18.6	15	
1867	14-22	do	Sept. 14, 1943	18.6	8	62
1868	14-23	NW¼SE¼ sec. 18	Oct. 1, 1943		8	75
1869	14-24	NE¼SW¼ sec. 18	Mar. 17, 1943	18.5	10	
1870	14-24	do	Sept. 15, 1943	18.5	8	64
1871	14-25	do	Mar. 22, 1943	18.4	18	
1872	14-25	do	Sept. 14, 1943	18.4	8	60
1873	14-26	do	Mar. 23, 1943	23.9	15	
1874	14-26	do	Sept. 14, 1943	23.9	8	61
1875	14-27	SW¼NE¼ sec. 18	Aug. 31, 1943		8	67
1876	14-28	do	Sept. 30, 1943		8	66
1877	14-29	do	do		8	66
1878	14-30	do	Sept. 14, 1943		5	67
1879	14-31	NW¼NE¼ sec. 18	do		8	66
1880	14-32	do	do		8	68
1881	14-33	do	Sept. 30, 1943		8	66
1882	14-34	NW¼SW¼ sec. 18	Mar. 22, 1943	18.8	6	
1883	14-34	do	Sept. 14, 1943	18.8	4	64
1884	14-35	NE¼SW¼ sec. 18	Mar. 22, 1943	18.7	12	
1885	14-35	do	Sept. 14, 1943	18.7	8	60
1886	14-36	SE¼NW¼ sec. 18	Mar. 23, 1943	17.4	5	
1887	14-36	do	Sept. 14, 1943	17.4	6	75
1888	14-37	do	do		1	68
1889	14-38	NE¼NW¼ sec. 18	do		8	67
1890	14-39	NW¼NE¼ sec. 18	do		8	67
1891	14-41	SW¼SW¼ sec. 18	Mar. 23, 1943	23.8	5	
1892	14-41	do	Sept. 14, 1943	23.8	8	64
1893	14-42	do	Mar. 22, 1943	18.8	12	
1894	14-42	do	Sept. 14, 1943	18.8	4	66
1895	14-43	SW¼NW¼ sec. 18	Mar. 22, 1943	18.6	7	
1896	14-43	do	Sept. 14, 1943	18.6	4	62
1897	14-44	SE¼NW¼ sec. 18	Mar. 23, 1943	18.7	18	
1898	14-44	do	Sept. 14, 1943	18.7	8	61
1899	14-45	NE¼NW¼ sec. 18	Aug. 31, 1943		1	72
1900	14-46	do	Sept. 13, 1943		3	67
1901	14-47	do	do		6	66
1902	14-48	SW¼NW¼ sec. 18	Mar. 23, 1943	18.7	.2	

between the mouth of Bonita Creek near Solomonsville and the Southern Pacific Rail- at Calva—Continued

[Analyses in parts per million]

Specific conductance (K×10⁵ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Total hardness as $CaCO_3$	Percent sodium	Analysis No.
364	216	59	512	460	360	810		2.0		2,186	2.97	782	59	1843
364						810								1844
179				304		334								1845
324						680								1846
318				404		690								1847
496						1,175								1848
447				245		1,055								1849
569	362	99	809	638	626	1,340	1.4	2.0	2.5	3,550	4.83	1,310	57	1850
610						1,500								1851
395	246	67	531	480	371	895		2.0		2,348	3.19	890	56	1852
394						900								1853
213				346		415								1854
272	131	49	391	370	267	565		1.0		1,586	2.16	528	62	1855
544						1,250								1856
612				632		1,470								1857
524				538		1,510								1858
384				484		875								1859
364						830								1860
268	110	42	411	382	246	545		3.0		1,545	2.10	447	67	1861
315						685								1862
229						440								1863
542						1,240								1864
656						1,640								1865
332				452		725								1866
335						740								1867
248						500								1868
506				618		1,135								1869
518						1,200								1870
708	268	118	1,153	330	787	1,820	1.0	1.0		4,310	5.86	1,154	68	1871
757	446	132	1,148	777	826	1,880	1.2	2.0	7.5	4,820	6.56	1,656	60	1872
361				484		795								1873
181						330								1874
328				380		720								1875
358						795								1876
295						640								1877
456						1,015								1878
568						1,300								1879
749						1,840								1880
742						1,830								1881
498	266	74	767	628	523	1,115		5.0		3,060	4.16	968	63	1882
511				586		1,140								1883
678				774		1,600								1884
787						1,960								1885
93.7				219		132								1886
145						230								1887
259	134	40	331	100	240	625	1.9	1.0	7.5	1,422	1.93	499	59	1888
286						585								1889
524				545		1,200								1890
897	471	135	1,423	584	885	2,420		13		5,630	7.66	1,730	64	1891
890						2,390								1892
457				612		990								1893
502						1,120								1894
538				586		1,295								1895
597						1,500								1896
185	76	26	286	346	149	340		1.0		1,048	1.43	296	68	1897
213				410										1898
223	66	29	378	320	213	440		.5		1,284	1.75	284	74	1899
314						670								1900
485				444		1,120								1901
772				598		2,020								1902

Chemical character of ground waters in the Gila River Basin, Graham County, Ariz., road bridge

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (°F.)
	Driven observation well—Con.					
1903	14-48	SW¼NW¼ sec. 18	Aug. 31, 1943	18.7	4	62
1904	14-49	do	Mar. 23, 1943	13.9	7	
1905	14-49	do	Sept. 14, 1943	13.9	8	64
1906	14-50	NE¼NW¼ sec. 18	Sept. 13, 1943		8	68
1907	14-51	do	do		1	66
1908	14-52	SW¼NW¼ sec. 18	Mar. 23, 1943	18.7	4	
1909	14-52	do	Sept. 14, 1943	18.7	4	64
1910	14-54	NW¼NW¼ sec. 18	Sept. 30, 1943		8	64
1911	14-55	do	Sept. 14, 1943		8	66
1912	14-56	do	Mar. 23, 1943	24	2	
1913	14-56	do	Sept. 14, 1943	24	4	64
1914	14-57	do	Sept. 30, 1943		8	65
1915	14-58	do	Sept. 14, 1943		8	66
1916	14-60	do	do		4	71
1917	14-61	do	Aug. 31, 1943		8	65
1918	14-62	SE¼NW¼ sec. 18	Mar. 23, 1943	13.5	15	
1919	14-62	do	Sept. 14, 1943	13.5	8	69
1920	USGS 195	SW¼NE¼ sec. 19	Aug. 14, 1940	34		70
1921	USGS 195	do	Nov. 19, 1943	34		64
1922	13-15	SE¼NE¼ sec. 19	Sept. 15, 1943		2	68
1923	13-16	NE¼NE¼ sec. 19	Oct. 1, 1943		8	66
1924	13-17	do	do		8	67
1925	13-18	SE¼SE¼ sec. 19	Mar. 16, 1943	19	18	
1926	13-18	do	Sept. 16, 1943	19	8	66
1927	13-19	do	Mar. 17, 1943	19	11	
1928	13-19	do	Sept. 16, 1943	19	8	62
1929	13-20	do	Mar. 17, 1943	18	1	
1930	13-20	do	Sept. 16, 1943	18	3	66
1931	13-21	NE¼SE¼ sec. 19	Oct. 5, 1943		8	69
1932	13-22	do	Sept. 15, 1943		8	67
1933	13-23	SE¼NE¼ sec. 19	do		8	67
1934	13-24	do	do		8	68
1935	13-25	do	do		5	67
1936	13-26	NE¼NE sec. 19	do		6	64
1937	13-27	do	Oct. 1, 1943		8	63
1938	13-28	do	Sept. 15, 1943		8	65
1939	13-29	SE¼SE¼ sec. 19	Mar. 16, 1943	24	1	
1940	13-29	do	Sept. 16, 1943	24	4	63
1941	13-30	NE¼SE¼ sec. 19	Mar. 17, 1943	18	9	
1942	13-30	do	Sept. 16, 1943	18	5	64
1943	13-31	do	Sept. 15, 1943		6	65
1944	13-32	do	Mar. 17, 1943	19	6	
1945	13-32	do	Sept. 15, 1943	19	8	67
1946	13-33	SE¼NE¼ sec. 19	do		8	68
1947	13-34	SW¼NE¼ sec. 19	Mar. 17, 1943	24	7	
1948	13-34	do	Sept. 15, 1943	24	6	65
1949	13-34	do	Oct. 30, 1943	24	3	65
1950	13-34	do	Jan. 5, 1944	24	5	64
1951	13-34	do	Mar. 2, 1944	24	8	64
1952	13-34	do	May 3, 1944	24	5	63
1953	13-34	do	July 11, 1944	24	5	64
1954	13-34	do	Aug. 30, 1944	24	5	64
1955	13-34	do	Oct. 30, 1944	24	4	66
1956	13-35	SE¼NE¼ sec. 19	Sept. 15, 1943		8	65
1957	13-36	SW¼NE¼ sec. 19	Mar. 17, 1943	24	2	
1958	13-36	do	Oct. 12, 1943	24	6	67
1959	13-37	NE¼NE¼ sec. 19	Mar. 18, 1943	19	15	
1960	13-37	do	Sept. 15, 1943	19	8	70
1961	13-38	NW¼NE¼ sec. 19	Mar. 18, 1943	19	18	
1962	13-38	do	Sept. 15, 1943	19	8	65

between the mouth of Bonita Creek near Solomonsville and the Southern Pacific Rail- at Calva—Continued

[Analyses in parts per million]

Specific conductance ($K \times 10^5$ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids		Total hardness as $CaCO_3$	Percent sodium	Analysis No.
										Parts per million	Tons per acre-foot			
576	--	--	--	--	--	1,350	--	--	--	--	--	--	--	1903
261	95	33	428	406	228	515	1.9	1.0	3.0	1,501	2.04	372	71	1904
315	--	--	--	--	--	675	--	--	--	--	--	--	--	1905
196	--	--	--	322	--	390	--	--	--	--	--	--	--	1906
262	87	31	435	301	256	550	--	2.0	--	1,509	2.05	344	73	1907
1,051	--	--	--	562	--	2,990	--	--	--	--	--	--	--	1908
892	--	--	--	--	--	2,460	--	--	--	--	--	--	--	1909
190	--	--	--	--	--	370	--	--	--	--	--	--	--	1910
219	--	--	--	--	--	425	--	--	--	--	--	--	--	1911
1,340	914	252	1,854	538	1,175	4,030	--	--	--	8,490	11.5	3,320	55	1912
656	--	--	--	--	--	1,650	--	--	--	--	--	--	--	1913
281	--	--	--	--	--	615	--	--	--	--	--	--	--	1914
244	--	--	--	--	--	510	--	--	--	--	--	--	--	1915
178	--	--	--	--	--	335	--	--	--	--	--	--	--	1916
228	--	--	--	--	--	460	--	--	--	--	--	--	--	1917
169	70	27	248	318	139	296	--	1.0	--	938	1.28	286	65	1918
252	--	--	--	--	--	510	--	--	--	--	--	--	--	1919
1,140	928	241	1,354	83	980	3,660	--	--	--	7,200	9.79	3,310	47	1920
1,340	1,050	258	1,720	254	1,160	4,260	.4	.0	10	8,570	11.7	3,680	50	1921
359	--	--	--	--	--	735	--	--	--	--	--	--	--	1922
413	--	--	--	--	--	890	--	--	--	--	--	--	--	1923
544	--	--	--	--	--	1,230	--	--	--	--	--	--	--	1924
776	536	142	1,085	660	947	1,950	1.0	2.0	3.0	4,990	6.79	1,922	55	1925
738	--	--	--	--	--	1,850	--	--	--	--	--	--	--	1926
729	--	--	--	822	--	1,750	--	--	--	--	--	--	--	1927
671	--	--	--	--	--	1,620	--	--	--	--	--	--	--	1928
637	462	122	822	574	767	1,540	--	2.0	--	4,000	5.44	1,654	52	1929
639	--	--	--	--	--	1,560	--	--	--	--	--	--	--	1930
689	--	--	--	--	--	1,700	--	--	--	--	--	--	--	1931
415	--	--	--	556	--	905	--	--	--	--	--	--	--	1932
383	202	67	565	537	390	820	1.8	.5	13	2,311	3.14	780	61	1933
343	--	--	--	--	--	730	--	--	--	--	--	--	--	1934
367	--	--	--	--	--	805	--	--	--	--	--	--	--	1935
341	--	--	--	--	--	715	--	--	--	--	--	--	--	1936
636	--	--	--	--	--	1,300	--	--	--	--	--	--	--	1937
369	--	--	--	--	--	770	--	--	--	--	--	--	--	1938
531	334	84	763	644	574	1,210	--	7.0	--	3,290	4.47	1,179	58	1939
536	--	--	--	--	--	1,240	--	--	--	--	--	--	--	1940
650	--	--	--	682	--	1,560	--	--	--	--	--	--	--	1941
623	--	--	--	--	--	1,500	--	--	--	--	--	--	--	1942
656	--	--	--	--	--	1,580	--	--	--	--	--	--	--	1943
691	491	128	932	696	829	1,660	1.0	2.0	2.0	4,390	5.97	1,752	54	1944
705	486	126	989	688	840	1,730	1.2	.5	7.5	4,510	6.13	1,731	55	1945
603	--	--	--	--	--	1,460	--	--	--	--	--	--	--	1946
624	--	--	--	690	--	1,460	--	--	--	--	--	--	--	1947
534	--	--	--	534	--	1,250	--	--	--	--	--	--	--	1948
607	415	112	875	628	733	1,500	1.7	1.0	12	3,950	5.37	1,500	56	1949
695	--	--	--	--	--	1,710	--	--	--	--	--	--	--	1950
587	--	--	--	--	--	1,410	--	--	--	--	--	--	--	1951
505	277	82	773	610	547	1,160	1.4	.5	3.0	3,140	4.27	1,030	62	1952
491	--	--	--	--	--	1,110	--	--	--	--	--	--	--	1953
504	--	--	--	--	--	1,160	--	--	--	--	--	--	--	1954
456	--	--	--	--	--	1,100	--	--	--	--	--	--	--	1955
448	--	--	--	--	--	1,000	--	--	--	--	--	--	--	1956
579	--	--	--	572	--	1,390	--	--	--	--	--	--	--	1957
549	--	--	--	--	--	--	--	--	--	--	--	--	--	1958
407	276	70	521	504	388	915	--	2.0	--	2,420	3.29	977	54	1959
356	--	--	--	--	--	780	--	--	--	--	--	--	--	1960
575	--	--	--	576	--	1,370	--	--	--	--	--	--	--	1961
567	--	--	--	--	--	1,360	--	--	--	--	--	--	--	1962

Chemical character of ground waters in the Gila River Basin, Graham County, Ariz., road bridge

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (°F.)
	Driven observation well—Con.					
1963	13-39	NE¼SE¼ sec. 19	Mar. 17, 1943	18	12	
1964	13-39	do	Sept. 15, 1943	19	8	65
1965	13-40	NW¼NE¼ sec. 19	Mar. 18, 1943	19	.5	
1966	13-40	do	Sept. 15, 1943	19	8	66
1967	13-41	do	do		1	69
1968	13-42	NE¼NW¼ sec. 19	Mar. 18, 1943	19	9	
1969	13-42	do	Sept. 15, 1943	19	8	65
1970	13-43	NW¼NE¼ sec. 19	Mar. 18, 1943	19	12	
1971	13-43	do	Sept. 15, 1943	19	8	64
1972	13-44	do	Mar. 18, 1943	18	8	
1973	13-44	do	Sept. 15, 1943	18	8	64
1974	13-45	NE¼NW¼ sec. 19	do		2	64
1975	13-53	NE¼SW¼ sec. 19	Sept. 16, 1943		4	65
1976	13-54	NW¼SE¼ sec. 19	Sept. 15, 1943		8	64
1977	13-55	NE¼NW¼ sec. 19	Oct. 12, 1943		8	65
1978	13-55	do	Oct. 30, 1943		8	66
1979	13-55	do	Jan. 5, 1944		5	66
1980	13-55	do	Mar. 2, 1944		8	65
1981	13-55	do	May 3, 1944		4	65
1982	13-55	do	July 11, 1944		4	66
1983	13-55	do	Aug. 30, 1944		6	67
1984	13-55	do	Oct. 30, 1944		6	67
1985	13-56	do	Sept. 15, 1943		6	65
1986	J. H. Morgan irrigation well	NE¼NW¼ sec. 20	July 16, 1940	66		69
1987	do	do	June 17, 1943	66		69
1988	do	do	Apr. 19, 1944	66		
1989	Paul Thatcher domestic well	SE¼SW¼ sec. 20	Mar. 27, 1940	21		63
1990	do	do	Feb. 27, 1943	21		
1991	Henry Haggard irrigation well, USGS 201.	SE¼SE¼ sec. 20	July 18, 1940			69
1992	do	do	Apr. 15, 1943			69
1993	Toad Haggard irrigation well, USGS 201-A.	do	do	71		66
1994	A. D. Nelson domestic well	SW¼SW¼ sec. 20	Feb. 27, 1943	39		
1995	Driven observation well, 13-2	do	Sept. 16, 1943		1	65
1996	13-6	SW¼NW¼ sec. 20	Oct. 1, 1943		2	64
1997	13-7	do	do		2	66
1998	13-9	NW¼NW¼ sec. 20	Aug. 30, 1943		8	66
1999	13-9	do	Nov. 2, 1943		5	67
2000	13-9	do	Jan. 6, 1944		3	63
2001	13-9	do	Mar. 1, 1944		5	66
2002	13-9	do	May 3, 1944		8	67
2003	13-9	do	July 10, 1944		6	67
2004	13-9	do	Aug. 29, 1944		8	67
2005	13-9	do	Oct. 27, 1944		6	67
2006	13-10	SW¼SW¼ sec. 20	Mar. 16, 1943	18	15	
2007	13-10	do	Sept. 16, 1943	18	8	68
2008	13-11	do	Mar. 17, 1943	19	12	
2009	13-11	do	Sept. 16, 1943	19	8	65
2010	13-12	do	do		8	62
2011	13-13	NW¼SW¼ sec. 20	Sept. 15, 1943		8	65
2012	13-14	SW¼NW¼ sec. 20	do		6	68
2013	Well drilled by U. S. Grazing Service.	NE¼ sec. 26	May 3, 1944			
2014	Eden Spring	NE¼NW¼ sec. 27	Feb. 13, 1941		10	
2015	W. B. Marshall domestic well	NW¼NW¼ sec. 28	Feb. 27, 1943	29		
2016	J. D. Colvin irrigation well	SE¼NE¼ sec. 29	Mar. 27, 1940	32		66
2017	do	do	Mar. 2, 1943	32		

between the mouth of Bonita Creek near Solomonsville and the Southern Pacific Rail- at Calva—Continued

[Analyses in parts per million]

Specific conductance (K×10⁵ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Total hardness as $CaCO_3$	Percent sodium	Analysis No.
543	284	97	830	700	596	1,210		14		3,380	4.60	1,108	62	1963
506				533	586	1,160								1964
365	236	64	474	460	360	800		2.0		2,163	2.94	852	55	1965
313						670								1966
559						1,350								1967
531				662		1,205								1968
521	281	100	759	540	609	1,190	1.0	6.6	17	3,210	4.37	1,112	60	1969
368				458		805								1970
363						805								1971
565	368	101	784	614	626	1,335		2.0		3,520	4.79	1,334	56	1972
590				627		1,400								1973
538						1,220								1974
730						1,930								1975
614						1,530								1976
1,400														1977
1,380	1,000	256	2,060	550	1,620	4,180	.6	1.2	15	9,390	12.8	3,550	56	1978
1,390						4,050								1979
1,360						3,980								1980
1,380						3,990								1981
1,390						4,080								1982
1,390						4,100								1983
1,380						4,080								1984
1,310	827	231	1,907	252	1,269	3,990	.3	5.0	7.5	8,350	11.4	3,014	58	1985
410				522	350	888						690		1986
485						840								1987
452	186	79	714	410	523	1,000	1.4	58	1.0	2,760	3.75	789	66	1988
420				546	500	960	.4	19				630		1989
387				534		800								1990
700				416	800	1,712						1,770		1991
579				480		1,295								1992
430	195	64	665	526	436	895	1.4	56	2.5	2,570	3.50	750	66	1993
585				836		1,270								1994
363						795								1995
371						760								1996
432						960								1997
486	181	77	795	538	511	1,055		44		2,930	3.98	768	69	1998
480						1,070								1999
499						1,100								2000
428						865								2001
415	134	53	730	550	465	840	1.8	20	2	2,510	3.41	552	74	2002
435						920								2003
445						945								2004
458						1,020								2005
265				478		485								2006
278						530								2007
273	120	36	438	458	264	530		2.0		1,616	2.20	448	68	2008
379						830								2009
354						720								2010
333	142	50	543	597	323	645	1.9	1.0		2,000	2.72	560	68	2011
278						575								2012
135	3.3	3.8	344	862	33	15	3.2	.5	6.0	827	1.12	24	97	2013
36.9	33	16	27	161	40	14	.9	13		223	.30	148	28	2014
469	228	85	670	514	505	975	1.4	61	1.6	2,780	3.78	918	61	2015
450				223	600	1,005	.6					412		2016
307				350		600								2017

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Chemical character of ground waters in the Gila River Basin, Graham County, Ariz., road bridge

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (°F.)
2018	Lamar Kempton irrigation well	SE¼SW¼ sec. 29	May 2, 1940	15		63
2019	do	do	Feb. 27, 1943	15		
2020	Drain on right bank of Gila River	NW¼NW¼ sec. 29	Sept. 12, 1941		25	
2021	Driven observation well, 11-60	SE¼SE¼ sec. 29	Sept. 16, 1943		1	69
2022	12-1	SW¼SW¼ sec. 29	do		8	67
2023	12-1	do	Oct. 28, 1943		2	68
2024	12-1	do	Jan. 4, 1944		2	66
2025	12-1	do	Feb. 29, 1944		2	62
2026	12-1	do	May 2, 1944		.5	61
2027	12-1	do	July 10, 1944		.5	65
2028	12-1	do	Aug. 29, 1944		.25	70
2029	12-1	do	Oct. 27, 1944		.25	68
2030	12-2	do	Sept. 16, 1943		8	67
2031	12-3	do	do		8	75
2032	12-4	NW¼SW¼ sec. 29	Oct. 2, 1943		8	66
2033	12-5	do	Sept. 16, 1943		5	66
2034	12-6	SE¼NW¼ sec. 29	do		2	71
2035	12-6	do	Nov. 2, 1943		.2	66
2036	12-6	do	Jan. 4, 1944		.2	59
2037	12-6	do	Feb. 29, 1944		.5	59
2038	12-6	do	May 3, 1944		.5	62
2039	12-7	SW¼NW¼ sec. 29	Sept. 16, 1943		6	68
2040	Stock well with hand pump	NE¼SW¼ sec. 29	July 10, 1944			67
2041	do	do	Aug. 29, 1944			
2042	do	do	Oct. 27, 1944			68
2043	Driven observation well, 12-9	SW¼NW¼ sec. 29	Sept. 16, 1943		1	68
2044	12-12	NW¼NW¼ sec. 29	do		.5	70
2045	12-14	do	do		8	67
2046	12-15	SW¼SW¼ sec. 29	do		2	68
2047	12-16	do	do		2	67
2048	12-17	NW¼SW¼ sec. 29	do		.5	72
2049	12-18	do	do		8	65
2050	12-19	SW¼NW¼ sec. 29	do		8	65
2051	12-20	do	do		8	65
2052	12-21	NW¼NW¼ sec. 29	do		2	65
2053	12-23	SW¼SW¼ sec. 29	do		8	65
2054	12-24	do	Oct. 2, 1943		8	65
2055	12-25	NW¼SW¼ sec. 29	Sept. 16, 1943		.5	70
2056	12-26	do	do		8	65
2057	12-27	SW¼NW¼ sec. 29	Mar. 16, 1943	18.5	10	
2058	12-27	do	Sept. 16, 1943	18.5	8	68
2059	12-28	do	Oct. 5, 1943		6	64
2060	12-29	NW¼NW¼ sec. 29	Mar. 16, 1943	19	9	
2061	12-29	do	Sept. 16, 1943	19	8	64
2062	12-39	NW¼SE¼ sec. 29	do		8	65
2063	12-53	NE¼SW¼ sec. 29	do		8	68
2064	L. W. Farrington unused well	SW¼SE¼ sec. 30	Feb. 27, 1942	34		
2065	do	do	Mar. 2, 1943	34		
2066	Unused well, owner unknown	NW¼NE¼ sec. 30	do			
2067	J. S. Brown domestic well	NE¼SE¼ sec. 30	Mar. 11, 1943	40		
2068	Driven observation well, 12-30	do	Mar. 16, 1943	18.3	9	
2069	do	do	Sept. 16, 1943	18.3	8	65
2070	12-31	SE¼NE¼ sec. 30	Aug. 28, 1943		8	64
2071	12-32	do	Mar. 16, 1943	23.9	9	
2072	12-32	do	Sept. 16, 1943	23.9	8	64
2073	12-33	NE¼NE¼ sec. 30	Mar. 16, 1943	18.7	3	
2074	12-33	do	Sept. 16, 1943	18.7	8	62
2075	12-34	do	Mar. 16, 1943	23.7	12	
2076	12-34	do	Sept. 16, 1943	23.7	8	64
2077	12-35	do	Mar. 16, 1943	18.6	12	

between the mouth of Bonita Creek near Solomonsville and the Southern Pacific Rail- at Calva—Continued

[Analyses in parts per million]

Specific conductance (K×10⁵ at 25 °C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Total hardness as $CaCO_3$	Percent sodium	Analysis No.
470				553	1,000	1,050						885		2018
239	97	33	386	444	212	445		5.0	2.5	1,397	1.90	378	69	2019
206	79	29	336	378	164	398	1.5	1.5		1,195		316	69	2020
340				195		755								2021
312						640								2022
319	167	48	501	519	356	640	1.8	.5	7.5	1,970	2.68	614	64	2023
306						610								2024
301						590								2025
286						545								2026
303						590								2027
310						620								2028
191	88	24	287	192	201	405		5.0		1,100	1.50	318	66	2029
376						740								2030
192						310								2031
477						1,015								2032
517						1,110								2033
396	153	57	664	581	467	775		7.2		2,409	3.28	616	70	2034
379	157	60	654	621	459	750	3.0	10	18	2,400	3.26	638	69	2035
364						740								2036
365						735								2037
371						760								2038
509	230	80	797	304	685	1,180	2.9	3.5	22	3,130	4.26	903	66	2039
422						895								2040
356						710								2041
347						685								2042
464						995								2043
400				67		1,010								2044
377						770								2045
346						715								2046
360						730								2047
349														2048
506						1,100								2049
512														2050
499						1,065								2061
563				36		1,480								2052
360						735								2053
366						785								2054
425						965								2055
567	281	91	928	610	766	1,270	1.6	1.0	10	3,640	4.95	1,076	65	2056
682	366	109	1,086	708	913	1,550	1.4	2.0	5.0	4,380	5.96	1,362	63	2057
374						770								2058
305						625								2059
523				598		1,125								2060
446						935								2061
403						825								2062
467						960								2063
999						2,820								2064
1,120	450	157	1,932	512	1,320	2,960			1.8	7,070	9.62	1,768	70	2065
1,070	181	98	2,193	62	1,228	2,960		2.5	6.0	6,640	9.03	854	84	2066
328				527		675								2067
472	319	78	638	564	528	1,055	1.6	1.0	4.0	2,900	3.94	1,116	55	2068
435														2069
492	306	81	697	536	622	1,080		3.0		3,050	4.15	1,096	58	2070
531	333	84	772	580	654	1,200	1.5	3.0	4.5	3,330	4.53	1,176	59	2071
500				397		1,150								2072
633	358	97	969	650	796	1,440	1.3	4.0	4.0	3,990	5.43	1,292	62	2073
576						1,310								2074
697				610		1,660								2075
643														2076
682				696		1,640								2077

Chemical character of ground waters in the Gila River Basin, Graham County, Ariz., road bridge

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (°F.)
	Driven observation well—Con.					
2078	12-35	NE¼NE¼ sec. 30	Sept. 16, 1943	18.6	8	63
2079	12-36	SE¼SE¼ sec. 30	do		1	67
2080	12-37	do	Mar. 16, 1943	30	1.2	
2081	12-37	do	Sept. 16, 1943	30	3	66
2082	12-38	NE¼SE¼ sec. 30	Mar. 16, 1943	23.9	8	
2083	12-38	do	Sept. 16, 1943	23.9	8	65
2084	12-48	SE¼NE¼ sec. 30	do		8	64
2085	12-49	NE¼NE¼ sec. 30	do		8	64
2086	12-50	NW¼NE¼ sec. 30	do		6	64
2087	12-50	do	Oct. 28, 1943		10	66
2088	12-50	do	Jan. 5, 1944		10	66
2089	12-50	do	Mar. 2, 1944		10	66
2090	12-50	do	May 3, 1944		8	65
2091	12-50	do	Jnly 11, 1944		8	65
2092	12-50	do	Aug. 30, 1944		8	66
2093	12-50	do	Oct. 30, 1944		6	66
2094	12-51	do	Sept. 16, 1943		4	64
2095	12-55	NW¼SE¼ sec. 30	do		5	65
2096	12-56	NW¼NE¼ sec. 30	Sept. 15, 1943		3	67
2097	12-56	do	Oct. 28, 1943		2	68
2098	12-56	do	Jan. 5, 1944		3	66
2099	12-56	do	Mar. 2, 1944		4	64
2100	12-56	do	May 3, 1944		5	67
2101	12-56	do	July 11, 1944		3	68
2102	12-56	do	Aug. 30, 1944		5	68
2103	12-56	do	Oct. 30, 1944		5	68
2104	Eldon Palmer irrigation well, USGS 209.	SE¼SE¼ sec. 31	Aug. 7, 1941	76		70
2105	do	do	May 1, 1943	76		70
2106	do	do	Mar. 17, 1944	76		70
2107	Driven observation well, USGS 212.	NW¼NE¼ sec. 31	May 28, 1940	31		
2108	USGS 213	NE¼NE¼ sec. 31	do	27		
2109	USGS 214	do	May 27, 1940	22		
2110	USGS 214	do	Nov. 5, 1943	22		65
2111	11-45	do	Aug. 28, 1943		8	66
2112	11-46	do	Aug. 26, 1943		8	66
2113	11-46	do	Oct. 28, 1943		5	66
2114	11-46	do	Jan. 5, 1944		8	66
2115	11-46	do	Mar. 2, 1944		5	64
2116	11-46	do	May 2, 1944		5	64
2117	11-46	do	July 11, 1944		5	66
2118	11-46	do	Aug. 30, 1944		8	66
2119	11-46	do	Oct. 30, 1944		6	66
2120	USGS 216	NW¼NW¼ sec. 32	May 28, 1940	18		62
2121	USGS 216	do	Nov. 5, 1943	18		64
2122	USGS 217	do	May 29, 1940	13		64
2123	USGS 217	do	Nov. 5, 1943	13		67
2124	USGS 218	do	May 29, 1940	14		64
2125	USGS 218	do	Nov. 5, 1943	14		65
2126	H. C. Kempton domestic well	NE¼NE¼ sec. 32	Mar. 27, 1940	13.6		63
2127	Drain to Gila River from left	NW¼SE¼ sec. 32	Sept. 12, 1941		15	
2128	Seepage in Gila River channel	SE¼SE¼ sec. 32	do		10	
2129	Bored observation well, T-14	NW¼SE¼ sec. 32	Feb. 2, 1944			
2130	do	do	Feb. 7, 1944		6	
2131	Driven observation well, 11-6	SE¼SE¼ sec. 32	Mar. 12, 1943	24.9	2	
2132	do	do	Aug. 3, 1943	24.9	5	66

between the mouth of Bonita Creek near Solomonsville and the Southern Pacific Rail- at Calva—Continued

[Analyses in parts per million]

Specific conductance (K×10⁵ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO₃)	Sulfate (SO₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO₃)	Borate (BO₃)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Total hardness as CaCO₃	Percent sodium	Analysis No.
632						1,550								2078
334														2079
342				500		705								2080
334						730								3081
369				530		785								2082
374						800								2083
507	298	81	738	544	498	1,210	1.4	8.5	7.5	3,100	4.22	1,076	60	2084
578				467		1,390								2085
575														2086
586	344	99	875	558	587	1,480	1.4	9.8	6.0	3,670	4.99	1,270	60	2087
587						1,500								2088
592						1,490								2089
647	392	110	932	568	654	1,630	1.3	11		4,010	5.45	1,430	59	2090
718						1,860								2091
758	474	137	1,090	528	762	2,030	1.1	21	9.0	4,780	6.50	1,750	57	2092
822						2,220								2093
570				493		1,440								2094
397				394		925								2095
730	344	83	1,213	472	833	1,830	.8	1.0	17	4,540	6.17	1,200	69	2096
718						1,850								2097
707						1,810								2098
691						1,770								2099
693						1,730								2100
689						1,730								2101
688						1,730								2102
678						1,710								2103
564	224	73	1,144	609	652	1,520	2.1	23		3,940	5.36	859	74	2104
608	177	61	1,105	546	613	1,425				3,650	4.96	692	78	2105
619	196	64	1,150	620	618	1,470	1.4	22		3,830	5.21	752	77	2106
530	216	60	854	540	534	1,166				3,100	4.22	786	70	2107
350	55	42	664	168	335	898				2,077	2.82	310	82	2108
310						662								2109
294	136	50	448	396	309	615	1.5	3.0	14	1,760	2.39	545	64	2110
491	208	68	811	586	478	1,120		5.0		2,980	4.05	798	69	2111
405				518		900								2112
363	176	50	585	524	359	785	1.8	3.0	7.5	2,220	3.02	641	66	2113
355						770								2114
355						770								2115
339						720								2116
331						685								2217
309	148	40	481	498	284	615	1.9	3.5	5.0	1,820	2.48	534	66	2118
286						565								2219
370						748								2120
401						850								2121
300						658								2122
318						630								2123
360	204	53	507	518	374	720				2,113	2.87	727	60	2124
311	154	48	481	454	349	625	1.4	7.5	18	1,890	2.57	582	64	2125
290				390	360	555	1.7	54				330		2126
263	86	38	530	448	254	630	.8	2.0		1,762	2.40	371	76	2127
176	91	26	262	362	158	312	.4	.5		1,028	1.40	334	63	2128
351	172	49	572	523	342	770	1.5	.0	4.0	2,160	2.94	630	66	2129
360				526		780								2130
309				554		605								2131
298						565								2132

Chemical character of ground waters in the Gila River Basin, Graham County, Ariz., road bridge

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (°F.)
	Driven observation well—Con.					
2133	11-7	SE¼SE¼ sec. 32	Sept. 17, 1943	------	.5	72
2134	11-8	do	Mar. 13, 1943	17.8	3	------
2135	11-8	do	Aug. 30, 1943	17.8	3	68
2136	11-9	do	Mar. 12, 1943	17.8	3	------
2137	11-9	do	Aug. 31, 1943	17.8	7	69
2138	11-10	NE¼SE¼ sec. 32	Oct. 2, 1943	------	8	70
2139	11-11	SE¼SE¼ sec. 32	Mar. 13, 1943	23.1	5	------
2140	11-11	do	Aug. 30, 1943	23.1	1	69
2141	11-12	NE¼SE¼ sec. 32	Mar. 13, 1943	15.8	2	------
2142	11-12	do	Aug. 31, 1943	15.8	10	67
2143	11-14	NW¼SE¼ sec. 32	Aug. 27, 1943	------	8	------
2144	Sampled by bailing	do	Mar. 15, 1944	------	------	64
2145	do	do	do	------	------	64
2146	Pumped	do	do	------	5	64
2147	11-15	do	Mar. 13, 1943	16.5	3	------
2148	11-15	do	Aug. 31, 1943	16.5	6	67
2149	11-16	do	Aug. 26, 1943	------	8	------
2150	11-17	SW¼SE¼ sec. 32	Mar. 14, 1943	14.7	12	------
2151	11-17	do	Aug. 30, 1943	14.7	12	69
2152	11-18	NW¼SE¼ sec. 32	Mar. 13, 1943	17	10	------
2153	11-18	do	Aug. 30, 1943	17	10	66
2154	11-19	do	Mar. 13, 1943	19	2	------
2155	11-19	do	Aug. 31, 1943	19	6	66
2156	11-20	do	Sept. 17, 1943	------	8	68
2157	11-21	SE¼SW¼ sec. 32	Mar. 13, 1943	16.9	5	------
2158	11-21	do	Aug. 30, 1943	16.9	12	65
2159	11-22	NW¼SE¼ sec. 32	Aug. 31, 1943	------	12	65
2160	11-23	do	do	------	8	67
2161	11-24	SE¼NW¼ sec. 32	Sept. 17, 1943	------	6	72
2162	11-25	SE¼SW¼ sec. 32	Mar. 14, 1943	17	7	------
2163	11-25	do	Aug. 31, 1943	17	8	65
2164	11-26	NE¼SW¼ sec. 32	Mar. 14, 1943	19	5	------
2165	11-26	do	Aug. 30, 1943	19	10	64
2166	11-27	do	Mar. 13, 1943	20.85	8	------
2167	11-27	do	Aug. 31, 1943	20.85	13	65
2168	11-28	do	Sept. 17, 1943	------	1	70
2169	11-29	SE¼SW¼ sec. 32	Mar. 15, 1943	24.3	6	------
2170	11-29	do	Sept. 17, 1943	24.3	3	63
2171	11-29	do	Oct. 30, 1943	24.3	2	64
2172	11-29	do	Jan. 5, 1944	24.3	2	63
2173	11-29	do	Mar. 2, 1944	23.4	1	62
2174	11-29	do	May 2, 1944	24.3	.5	62
2175	11-29	do	July 11, 1944	24.3	1.	64
2176	11-29	do	Aug. 30, 1944	24.3	.75	66
2177	11-29	do	Oct. 30, 1944	24.3	.5	66
2178	11-30	NE¼SW¼ sec. 32	Mar. 14, 1943	13	4	------
2179	11-30	do	Aug. 31, 1943	13	12	65
2180	11-31	do	Mar. 14, 1943	15	2	------
2181	11-31	do	Aug. 30, 1943	15	12	63
2182	11-32	do	Sept. 17, 1943	------	2	75
2183	11-33	SW¼NW¼ sec. 32	do	------	1	68
2184	11-34	NW¼SW¼ sec. 32	do	------	1	70
2185	11-35	SW¼NW¼ sec. 32	do	------	2	65
2186	11-36	NW¼NW¼ sec. 32	do	------	1	69
2187	11-37	do	do	------	.5	70
2188	11-38	do	Aug. 26, 1943	------	8	------
2189	11-39	do	Sept. 17, 1943	------	1	70
2190	11-40	NW¼SW¼ sec. 32	do	------	8	64
2191	11-41	SW¼SW¼ sec. 32	Mar. 15, 1943	24.3	.75	------
2192	11-41	do	Sept. 17, 1943	24.3	2	66

between the mouth of Bonita Creek near Solomonsville and the Southern Pacific Rail- at Calva—Continued

[Analyses in parts per million]

Specific conductance (K×10⁵ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO₃)	Sulfate (SO₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO₃)	Borate (BO₃)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Total hardness as CaCO₃	Percent sodium	Analysis No.
331	--	--	--	--	--	735	--	--	--	--	--	--	--	2133
287	--	--	--	504	--	565	--	--	--	--	--	--	--	2134
334	--	--	--	--	--	690	--	--	--	--	--	--	--	2135
319	--	--	--	566	--	630	--	--	--	--	--	--	--	2136
333	--	--	--	--	--	645	--	--	--	--	--	--	--	2137
368	--	--	--	--	--	770	--	--	--	--	--	--	--	2138
264	--	--	--	518	--	485	--	--	--	--	--	--	--	2139
276	--	--	--	--	--	525	--	--	--	--	--	--	--	2140
291	--	--	--	526	--	570	--	--	--	--	--	--	--	2141
371	--	--	--	--	--	735	--	--	--	--	--	--	--	2142
289	--	--	--	--	--	555	--	--	--	--	--	--	--	2143
334	167	47	543	498	326	740	--	1.0	--	2,070	2.82	610	66	2144
334	169	49	540	499	324	745	--	.5	--	2,070	2.82	624	65	2145
326	168	47	518	489	315	715	--	.5	--	2,000	2.72	613	65	2146
284	--	--	--	540	--	535	--	--	--	--	--	--	--	2147
370	--	--	--	--	--	755	--	--	--	--	--	--	--	2148
345	--	--	--	--	--	695	--	--	--	--	--	--	--	2149
278	--	--	--	490	--	545	--	--	--	--	--	--	--	2150
326	--	--	--	424	--	705	--	--	--	--	--	--	--	2151
351	116	37	629	584	336	690	2.7	1.0	8.0	2,099	2.85	442	76	2152
321	--	--	--	--	--	--	--	--	--	--	--	--	--	2153
370	--	--	--	632	--	715	--	--	--	--	--	--	--	2154
330	--	--	--	--	--	650	--	--	--	--	--	--	--	2155
336	--	--	--	--	--	695	--	--	--	--	--	--	--	2156
249	103	31	398	460	228	450	--	1.0	5.0	1,438	1.96	384	69	2157
330	174	45	492	496	300	685	--	4.0	--	1,944	2.64	619	63	2158
347	--	--	--	--	--	670	--	--	--	--	--	--	--	2159
399	--	--	--	--	--	800	--	--	--	--	--	--	--	2160
230	--	--	--	--	--	455	--	--	--	--	--	--	--	2161
282	--	--	--	470	--	555	--	--	--	--	--	--	--	2162
276	--	--	--	--	--	530	--	--	--	--	--	--	--	2163
276	--	--	--	510	--	520	--	--	--	--	--	--	--	2164
277	--	--	--	--	--	515	--	--	--	--	--	--	--	2165
388	140	40	701	688	392	755	--	1.6	10	2,368	3.22	514	75	2165
342	--	--	--	--	--	655	--	--	--	--	--	--	--	2167
304	--	--	--	--	--	--	--	--	--	--	--	--	--	2168
277	--	--	--	474	--	535	--	--	--	--	--	--	--	2169
304	--	--	--	--	--	615	--	--	--	--	--	--	--	2170
290	126	41	491	512	256	605	1.5	10	14	1,780	2.42	483	69	2171
287	--	--	--	--	--	595	--	--	--	--	--	--	--	2172
304	--	--	--	--	--	645	--	--	--	--	--	--	--	2173
329	--	--	--	--	--	685	--	--	--	--	--	--	--	2174
386	183	53	609	492	345	870	.6	9.4	17	2,310	3.14	674	66	2175
438	226	66	668	568	398	990	1.4	10	5.0	2,640	3.59	836	63	2176
390	--	--	--	--	--	870	--	--	--	--	--	--	--	2177
465	164	52	849	712	477	980	2.4	2.0	5.0	2,880	3.92	624	75	2178
355	--	--	--	--	--	695	--	--	--	--	--	--	--	2179
346	126	38	597	576	322	680	--	4.0	7.0	2,051	2.84	471	73	2180
342	128	37	593	550	309	695	1.9	4.0	7.0	2,039	2.77	472	73	2181
327	--	--	--	--	--	690	--	--	--	--	--	--	--	2182
266	--	--	--	233	--	605	--	--	--	--	--	--	--	2183
319	--	--	--	--	--	--	--	--	--	--	--	--	--	2184
312	--	--	--	--	--	640	--	--	--	--	--	--	--	2185
247	--	--	--	--	--	460	--	--	--	--	--	--	--	2186
243	--	--	--	--	--	--	--	--	--	--	--	--	--	2187
363	--	--	--	--	--	790	--	--	--	--	--	--	--	2188
293	--	--	--	--	--	--	--	--	--	--	--	--	--	2189
296	--	--	--	--	--	585	--	--	--	--	--	--	--	2190
321	--	--	--	512	--	645	--	--	--	--	--	--	--	2191
317	--	--	--	--	--	645	--	--	--	--	--	--	--	2192

Chemical character of ground waters in the Gila River Basin, Graham County, Ariz., road bridge

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (°F.)
	Driven observation well—Con.					
2193	11-42	NW¼SW¼ sec. 32	Mar. 15, 1943	29	4	
2194	11-42	do	Sept. 17, 1943	29	5	64
2195	11-44	SW¼NW¼ sec. 32	do		3	65
2196	11-48	NW¼NE¼ sec. 32	do		8	62
2197	11-49	do	do		8	60
2198	11-50	NE¼NW¼ sec. 32	do		8	66
2199	11-51	do	do		8	67
2200	11-52	NW¼NE¼ sec. 32	do		8	60
2201	11-61	SE¼NE¼ sec. 32	do		8	64
2202	11-61	do	Oct. 28, 1943		6	65
2203	11-61	do	Jan. 4, 1944		2	64
2204	11-61	do	Feb. 29, 1944		5	64
2205	11-61	do	May 2, 1944		4	63
2206	11-61	do	July 10, 1944		8	64
2207	11-61	do	Aug. 29, 1944		5	65
2208	11-61	do	Oct. 27, 1944		5	65
2209	11-62	NW¼NE¼ sec. 32	Sept. 16, 1943		8	67
2210	11-62	do	Oct. 28, 1943		10	68
2211	11-62	do	Jan. 4, 1944		8	68
2212	11-62	do	Feb. 10, 1944			65
2213	11-62	do	Feb. 29, 1944		10	64
2214	11-62	do	May 2, 1944		6	60
2215	11-62	do	July 10, 1944		6	61
2216	11-62	do	Aug. 29, 1944		5	64
2217	11-62	do	Oct. 27, 1944		7	68
2218	11-63	NE¼NW¼ sec. 32	Sept. 16, 1943		8	65
2219	11-64	SE¼SW¼ sec. 32	Sept. 17, 1943		8	64
2220	L. E. Hancock domestic well	SW¼NW¼ sec. 33	Mar. 27, 1940	17.5		64
2221	do	do	Mar. 2, 1943	17.5		
2222	A. C. Compton domestic well	do	Mar. 27, 1940	18		63
2223	Dave Hawkins domestic well	NE¼NW¼ sec. 33	do	27		66
2224	do	do	Mar. 2, 1943	27		
2225	E. E. Hancock unused well	NE¼SW¼ sec. 33	Mar. 27, 1940	27.3		64
2226	do	do	Mar. 2, 1943	27.3		
2227	Driven observation well, 11-2	SW¼SW¼ sec. 33	Aug. 31, 1943		9	66
2228	do	do	Sept. 17, 1943		8	68
2229	11-4	do	Mar. 12, 1943	23.8	5	
2230	11-4	do	Aug. 31, 1943	23.8	3	70
2231	11-55	NE¼SW¼ sec. 33	Sept. 17, 1943		1	68
2232	11-55	do	Oct. 28, 1943		1	67
2233	11-55	do	Jan. 4, 1944		1	65
2234	11-55	do	Feb. 10, 1944			63
2235	11-55	do	May 2, 1944		.5	64
2236	11-57	SE¼NW¼ sec. 33	Sept. 17, 1943		8	64
2237	11-58	NW¼NW¼ sec. 33	do		4	65
		T. 6 S., R. 24 E.:				
2238	J. Udall irrigation well	SW¼NE¼ sec. 1	May 19, 1943	60		68
2239	Driven observation well, 6-61	SW¼SW¼ sec. 1	Aug. 24, 1943		2	66
2240	L. E. Hancock irrigation well	SE¼NE¼ sec. 2	July 22, 1941			67
2241	Driven observation well, USGS 262.	NE¼SW¼ sec. 2	Aug. 13, 1940	27		67
2242	7-22	SW¼SE¼ sec. 2	Aug. 16, 1943		15	65
2243	7-28	SE¼SW¼ sec. 2	Aug. 25, 1943		12	62
2244	7-29	do	Aug. 16, 1943		12	65
2245	7-30	do	do		9	65
2246	7-33	SW¼SW¼ sec. 2	Oct. 11, 1943		8	61
2247	7-34	do	Aug. 25, 1943		8	62

between the mouth of Bonita Creek near Solomonsville and the Southern Pacific Rail- at Calva—Continued

[Analyses in parts per million]

Specific conductance (K×10⁵ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Total hardness as $CaCO_3$	Percent sodium	Analysis No.
305				504		615								2193
275						535								2194
349						755								2195
294						575								2196
232						445								2197
260														2198
259						480								2199
335						715								2200
400						860								2201
393	214	64	612	486	496	840	1.8	30	10	2,500	3.40	797	63	2202
393						840								2203
400						850								2204
420						890								2205
436						930								2206
427						905								2207
406						860								2208
385				532		765								2209
428	217	65	698	554	552	905	2.1	21		2,730	3.71	809	65	2210
384						770								2211
403				576		802			6.2					2212
401						830								2213
332	147	40	551	554	360	630	2.2	6.0		2,010	2.73	532	69	2214
398						810								2215
376						760								2216
431	216	60	704	526	534	915	2.1	42		2,730	3.71	786	66	2217
292	132	38	470	532	289	540		11		1,742	2.37	486	68	2217
300						610								2219
208				335	180	410	3.8	18				195		2220
228				376		400								2221
350				374	450	750	.2	147				488		2222
490				466	800	1,060	1.6	16				720		2223
404	147	58	688	503	491	820	1.8	22	1.8	2,476	3.37	606	71	2224
490				285	1,000	1,155	2.8	10				652		2225
449				183		955								2226
325						660								2227
338						680								2228
266				544		495								2229
252						485								2230
560						1,270								2231
610	286	90	1,060	466	886	1,450	1.6	36		4,040	5.49	1,080	68	2232
588						1,340								2233
607				616		1,360			5.9					2234
605						1,340								2235
486						1,005								2236
370						750								2237
1,010						2,070								2238
244				672		370								2239
938	192	92	1,929	740	1,881	1,800	4.6	9.7		6,200	8.43	857	83	2240
1,090	162	113	2,451	642	2,179	2,414				7,640	10.4	868	86	2241
622						1,265								2242
289						575								2243
700						1,455								2244
685	145	45	1,457	934	989	1,355	2.4	1.0		4,450	6.05	547	85	2245
297						610								2246
349				568		740								2247

Chemical character of ground waters in the Gila River Basin, Graham County, Ariz., road bridge

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (°F.)
	Driven observation well—Con.					
2248	7-35	SW¼SW¼ sec. 2	Aug. 16, 1943		1	69
2249	7-39	do	Aug. 25, 1943		3	62
2250	7-40	do	do		10	63
2251	7-41	NW¼SW¼ sec. 2	Aug. 16, 1943		10	65
2252	7-41	do	Feb. 9, 1944			62
2253	7-42	do	Aug. 24, 1943		8	
2254	7-42	do	Oct. 27, 1943		2	67
2255	7-42	do	Jan. 4, 1944		3	66
2256	7-42	do	Feb. 9, 1944			65
2257	7-42	do	Feb. 29, 1944		6	
2258	7-42	do	May 2, 1944		2	64
2259	7-42	do	July 10, 1944		6	65
2260	7-42	do	Aug. 29, 1944		4	67
2261	7-42	do	Oct. 27, 1944		2	67
2262	7-43	SW¼SW¼ sec. 2	Aug. 25, 1943		8	63
2263	7-44	do	do		10	62
2264	7-45	NW¼SW¼ sec. 2	Feb. 9, 1944			61
2265	7-50	SW¼SE¼ sec. 2	Oct. 11, 1943		4	64
2266	7-51	do	do		5	66
2267	7-52	SW¼SW¼ sec. 2	do		1	66
2268	7-55	NW¼SW¼ sec. 2	Sept. 28, 1943		4	
2269	7-55	do	Feb. 9, 1944			
2270	7-56	SW¼NW¼ sec. 2	Sept. 17, 1943		8	66
2271	J. A. Hancock unused well	NE¼NE¼ sec. 3	Mar. 2, 1943	18		
2272	Driven observation well, 8-1	SE¼SE¼ sec. 3	Oct. 4, 1943		8	65
2273	8-2	do	Aug. 26, 1943		1	66
2274	8-3	do	Aug. 25, 1943		8	63
2275	8-3	do	Oct. 29, 1943		5	64
2276	8-3	do	Jan. 5, 1944		5	61
2277	8-3	do	Feb. 28, 1944		8	58
2278	8-3	do	May 2, 1944		3	59
2279	8-3	do	July 11, 1944		2	61
2280	8-3	do	Aug. 30, 1944		5	63
2281	8-3	do	Oct. 30, 1944		5	64
2282	8-4	NE¼SE¼ sec. 3	Aug. 16, 1943		10	68
2283	8-4	do	Feb. 9, 1944			66
2284	8-5	SE¼SE¼ sec. 3	Aug. 25, 1943		12	65
2285	8-6	do	Aug. 26, 1943		4	62
2286	8-8	SW¼SE¼ sec. 3	Aug. 25, 1943		1	66
2287	8-9	NE¼SE¼ sec. 3	Aug. 16, 1943		11	65
2288	8-10	do	Sept. 28, 1943		1.5	
2289	8-11	NW¼SE¼ sec. 3	Aug. 26, 1943		12	62
2290	8-12	do	Aug. 16, 1943		7	65
2291	8-13	do	Aug. 25, 1943		8	
2292	8-14	do	Aug. 16, 1943		15	65
2293	8-15	do	do		14	64
2294	8-16	NE¼SW¼ sec. 3	Aug. 26, 1943		3	66
2295	8-17	do	Aug. 16, 1943		10	63
2296	8-18	SW¼NE¼ sec. 3	Aug. 26, 1943		8	
2297	8-19	NE¼SW¼ sec. 3	Aug. 16, 1943		12	67
2298	8-20	SE¼NW¼ sec. 3	Aug. 26, 1943		5	64
2299	8-21	SW¼NE¼ sec. 3	do		1	69
2300	8-22	NE¼SW¼ sec. 3	Oct. 12, 1943		2	73
2301	8-23	SE¼NW¼ sec. 3	Aug. 26, 1943		9	63
2302	8-23	do	Oct. 27, 1943		2	64
2303	8-23	do	Jan. 4, 1944		3	62
2304	8-23	do	Feb. 9, 1944			58
2305	8-23	do	Feb. 29, 1944		2	59
2306	8-23	do	May 2, 1944		1	59
2307	8-23	do	July 10, 1944		1	61

between the mouth of Bonita Creek near Solomonsville and the Southern Pacific Rail- at Calva—Continued

[Analyses in parts per million]

Specific conductance (K×10⁶ at 25 °C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Total hardness as $CaCO_3$	Percent sodium	Analysis No.
716						1,520								2248
360				600		765								2249
417						915								2250
851				866		1,700								2251
816				854		1,610			20					2252
845				772	1,533	1,680								2253
863	190	93	1,850	778	1,580	1,820	4.8	31	25	5,950	8.09	856	82	2254
964						2,140								2255
971				828		2,080			23					2256
956						2,080			30					2257
945						1,960								2258
924						1,910								2259
896						1,880								2260
889						1,860								2261
350						720								2262
409				676		900								2263
834				834		1,630			20					2264
687														2265
655						1,240								2266
689				758		1,415								2267
858						1,710								2268
915				792		1,880			20					2269
742	126	60	1,604	750	1,363	1,410	6.4	11	33	4,950	6.73	561	86	2270
625				944		1,100								2271
341						725								2272
279						625								2273
292						560								2274
291	168	64	420	624	245	585	1.5	.5	5.0	1,790	2.43	682	57	2275
294						595								2276
318						660								2277
319						630								2278
297						580								2279
293						575								2280
290						580								2281
823	193	76	1,708	802	1,462	1,630	2.2	27	25	5,490	7.47	794	82	2282
812				804		1,580			18					2283
404						860								2284
304						560								2285
391						840								2286
554						1,065								2287
959				728		1,980								2288
402						835								2289
457						895								2290
1,130						2,493								2291
462				610		935								2292
1,047	261	104	2,241	832	1,962	2,270	1.8	25	40	7,270	9.89	1,079	82	2293
374						850								2294
1,100						2,320								2295
1,190						2,590								2296
321						600								2297
1,300						3,010								2298
1,400						3,450								2299
228														2300
1,390	419	176	2,910	876	2,710	3,230				9,880	13.4	1,769	78	2301
1,320						3,060								2302
1,250						2,910								2303
1,310				892		2,920			29					2304
1,330						3,060								2305
1,480	462	196	3,330	886	2,770	3,960	2.4	2.5	30	11,200	15.2	1,960	79	2306
1,390						3,230								2307

Chemical character of ground waters in the Gila River Basin, Graham County, Ariz., road bridge

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (°F.)
	Driven observation well—Con.					
2308	8-23	SE¼NW¼ sec. 3	Aug. 29, 1944		1	64
2309	8-23	do	Oct. 31, 1944		1	62
2310	8-24	SW¼NW¼ sec. 3	Aug. 26, 1943		8	
2311	8-25	SE¼NW¼ sec. 3	do		4	
2312	8-28	SW¼NW¼ sec. 3	Aug. 30, 1943		4	65
2313	8-28	do	Oct. 27, 1943		3	67
2314	8-28	do	Jan. 4, 1944		4	66
2315	8-28	do	Feb 29, 1944		5	66
2316	8-28	do	May 2, 1944		4	66
2317	8-28	do	July 10, 1944		4	66
2318	8-28	do	Aug. 29, 1944		2	66
2319	8-28	do	Oct. 27, 1944		3	66
2320	8-31	SW¼SW¼ sec. 3	Aug. 26, 1943		3	66
2321	8-31	do	Apr. 13, 1944		4	64
2322	8-34	SW¼NW¼ sec. 3	Oct. 12, 1943		6	67
2323	8-35	NW¼SW¼ sec. 3	Aug. 26, 1943		12	65
2324	8-35	do	Apr. 13, 1944		8	63
2325	8-36	do	Oct. 12, 1943		1	67
2326	8-37	do	Apr. 13, 1944		1	63
2327	8-38	SE¼NE¼ sec. 3	Sept. 17, 1943		2	68
2328	8-39	do	do		6	66
2329	8-40	NE¼NE¼ sec. 3	do		4	66
2330	8-41	NW¼NE¼ sec. 3	do		8	66
2331	8-42	do	do		8	65
2332	8-46	SW¼SE¼ sec. 3	Sept. 29, 1943		8	
2333	8-47	do	do		9	
2334	8-49	SE¼SW¼ sec. 3	Aug. 16, 1943		4	66
2335	8-51	SW¼SW¼ sec. 3	Aug. 25, 1943		12	65
2336	8-52	SE¼SW¼ sec. 3	Aug. 26, 1943		11	66
2337	Wm. Carpenter irrigation well	NE¼NE¼ sec. 4	July 19, 1940	53	225	66
2338	do	do	May 5, 1943	53		66
2339	Curtis Canal Co. well	SE¼NE¼ sec. 4	May 28, 1940	52	557	
2340	do	do	Apr. 15, 1943	52		64
2341	Wm. Carpenter unused well	NE¼NE¼ sec. 4	Feb. 27, 1943			
2342	Toad Haggard irrigation well, USGS 268.	do	July 18, 1940	58	459	
2343	do	do	June 2, 1944	58		
2344	do	do	June 12, 1944	58		
2345	Frank Mathews irrigation well	SW¼SE¼ sec. 4	Feb. 26, 1942	48		
2346	do	do	Feb. 27, 1943	48		
2347	Fred Sanchez unused well	do	Mar. 1, 1943	30		
2348	Seepage in Gila River channel	SE¼NW¼ sec. 4	Sept. 12, 1941		40	
2349	M. J. Ferguson well	SW¼SW¼ sec. 4	Mar. 15, 1943	58.8		
2350	Driven observation well, 8-30	SE¼SE¼ sec. 4	Aug. 27, 1943		4	68
2351	8-32	NE¼SE¼ sec. 4	Aug. 26, 1943		3	67
2352	8-32	do	Apr. 13, 1944		1	63
2353	8-33	do	Aug. 27, 1943		8	
2354	8-33	do	do			69
2355	8-33	do	Apr. 14, 1944		6	63
2356	9-1	SE¼SE¼ sec. 4	Aug. 27, 1943		1	69
2357	9-2	do	do		.1	69
2358	9-3	NE¼SE¼ sec. 4	do		8	
2359	9-3	do	Aug. 30, 1943		12	71
2360	9-4	do	do		4	75
2361	9-7	SE¼SE¼ sec. 4	Aug. 27, 1943		1	71
2362	9-8	do	do		8	68

between the mouth of Bonita Creek near Solomonsville and the Southern Pacific Rail- at Calva—Continued

[Analyses in parts per million]

Specific conductance (K×10⁶ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Total hardness as $CaCO_3$	Percent sodium	Analysis No.
1,300	------	------	------	------	------	2,960	------	------	------	------	------	------	------	2308
1,270	------	------	------	------	------	2,860	------	------	------	------	------	------	------	2309
1,210	------	------	------	------	------	2,640	------	------	------	------	------	------	------	2310
1,040	------	------	------	1,010	2,151	2,025	------	------	------	------	------	------	------	2311
410	------	------	------	------	------	790	------	------	------	------	------	------	------	2312
450	123	46	882	664	542	920	2.2	2.0	10	2,840	3.86	496	79	2313
493	------	------	------	------	------	1,030	------	------	------	------	------	------	------	2314
463	------	------	------	------	------	940	------	------	------	------	------	------	------	2315
422	------	------	------	------	------	840	------	------	------	------	------	------	------	2316
336	60	20	684	560	321	650	3.1	.5	6.0	2,010	2.73	232	87	2317
368	------	------	------	------	------	720	------	------	------	------	------	------	------	2318
407	------	------	------	------	------	820	------	------	------	------	------	------	------	2319
424	------	------	------	------	------	870	------	------	------	------	------	------	------	2320
404	------	------	------	------	------	810	------	------	------	------	------	------	------	2321
379	------	------	------	------	------	------	------	------	------	------	------	------	------	2322
347	120	37	621	582	296	705	------	29	------	2,095	2.85	452	75	2323
371	------	------	------	------	------	765	------	------	------	------	------	------	------	2324
342	------	------	------	------	------	------	------	------	------	------	------	------	------	2325
381	------	------	------	------	------	795	------	------	------	------	------	------	------	2326
1,050	------	------	------	114	2,068	2,450	------	------	------	------	------	------	------	2327
1,130	------	------	------	------	------	2,440	------	------	------	------	------	------	------	2328
1,190	------	------	------	------	------	2,340	------	------	------	------	------	------	------	2329
1,130	------	------	------	------	------	------	------	------	------	------	------	------	------	2330
1,130	180	107	2,530	685	2,540	2,242	4.5	14	33	7,950	10.8	889	86	2331
370	------	------	------	------	------	745	------	------	------	------	------	------	------	2332
426	------	------	------	------	------	875	------	------	------	------	------	------	------	2333
829	------	------	------	806	------	1,650	------	------	------	------	------	------	------	2334
418	------	------	------	------	------	865	------	------	------	------	------	------	------	2335
340	------	------	------	------	------	660	------	------	------	------	------	------	------	2336
510	------	------	------	532	850	1,088	------	------	------		------	488	------	2337
912	------	------	------	------	------	2,140	------	------	------	------	------	------	------	2338
540	------	------	------	460	950	1,090	------	------	------	------	------	450	------	2339
883	350	128	1,618	732	1,486	1,960	1.4	4.0	5.0	5,910	8.04	1,400	72	2340
433	------	------	------	170	------	1,150	------	------	------	------	------	------	------	2341
480	------	------	------	450	1,050	1,012	------	------	------	------	------	585	------	2342
1,040	------	------	------	------	------	2,450	------	------	------	------	------	------	------	2343
1,050	584	196	1,800	768	2,040	2,420	.7	5.0	20	7,420	10.1	2,260	63	2344
317	------	------	------	------	------	640	------	------	------	------	------	------	------	2345
316	26	16	660	502	242	630	3.5	5.0	2.0	1,830	2.49	131	92	2346
973	------	------	------	1,208	------	------	------	------	------	------	------	------	------	2347
239	86	43	430	472	197	520	.4	.5	------	1,509	2.05	391	70	2348
600	111	57	1,181	661	518	1,380	1.6	58	4.0	3,630	4.94	512	83	2349
588	------	------	------	------	------	1,290	------	------	------	------	------	------	------	2350
402	------	------	------	------	------	855	------	------	------	------	------	------	------	2351
421	139	50	760	686	363	880	1.4	26	1.5	2,560	3.48	552	75	2352
346	------	------	------	------	------	700	------	------	------	------	------	------	------	2353
333	------	------	------	------	------	740	------	------	------	------	------	------	------	2354
371	141	51	634	608	340	765	1.4	5.0	.8	2,240	3.05	562	71	2355
499	------	------	------	------	------	1,085	------	------	------	------	------	------	------	2356
359	------	------	------	------	------	800	------	------	------	------	------	------	------	2357
355	------	------	------	612	------	720	------	------	------	------	------	------	------	2358
353	144	40	617	618	317	725	------	8.5	------	2,156	2.93	524	72	2359
290	------	------	------	------	------	545	------	------	------	------	------	------	------	2360
534	------	------	------	223	------	1,460	------	------	------	------	------	------	------	2361
372	------	------	------	------	------	855	------	------	------	------	------	------	------	2362

Chemical character of ground waters in the Gila River Basin, Graham County, Ariz., road bridge

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (°F.)
	Driven observation well—Con.					
2363	9-9	NE¼SE¼ sec. 4	Aug. 30, 1943		3	66
2364	9-9	do	Aug. 24, 1943		8	
2365	9-10	NW¼SE¼ sec. 4	Aug. 30, 1943		.25	71
2366	9-10	do	Oct. 2, 1943		8	69
2367	9-11	SW¼SE¼ sec. 4	Aug. 27, 1943		3	71
2368	9-11	do	Oct. 30, 1943		4	72
2369	9-11	do	Jan. 5, 1944		2	64
2370	9-11	do	Feb. 28, 1944		1	60
2371	9-11	do	May 2, 1944		.75	64
2372	9-11	do	July 11, 1944		1	68
2373	9-11	do	Aug. 30, 1944		.5	71
2374	9-11	do	Oct. 30, 1944		.7	70
2375	9-12	NW¼SE¼ sec. 4	Aug. 27, 1943		4	67
2376	9-13	do	Aug. 30, 1943		4	66
2377	9-14	do	do		1	69
2378	9-14	do	Oct. 2, 1943		8	68
2379	9-15	SW¼SE¼ sec. 4	Aug. 27, 1943		5	67
2380	9-15	do	Apr. 13, 1944		1	67
2381	9-16	NW¼SE¼ sec. 4	Aug. 27, 1943		8	
2382	9-17	do	Oct. 5, 1943		8	62
2383	9-18	do	Aug. 30, 1943		.5	70
2384	9-18	do	do		1	69
2385	9-19	SW¼NE¼ sec. 4	do		1	69
2386	9-21	NW¼NE¼ sec. 4	Aug. 31, 1943		.5	69
2387	9-21	do	Sept. 17, 1943		1	68
2388	9-22	SW¼SE¼ sec. 4	Aug. 27, 1943		1	68
2389	9-22	do	Apr. 13, 1944		1	66
2390	9-23	NE¼SW¼ sec. 4	Aug. 27, 1943		10	73
2391	9-24	do	Aug. 30, 1943		6	61
2392	9-25	do	do		5	65
2393	9-26	SE¼NW¼ sec. 4	do		1	66
2394	9-27	do	Aug. 31, 1943		4	65
2395	9-28	NE¼NW¼ sec. 4	Mar. 12, 1943	18.8	2	
2396	9-28	do	Aug. 31, 1943	18.8	10	
2397	9-28	do	Apr. 13, 1944	18.8	1.5	63
2398	9-30	NE¼SW¼ sec. 4	Aug. 27, 1943		4	64
2399	9-31	do	do		2	
2400	9-32	SE¼NW¼ sec. 4	Oct. 12, 1943		2	69
2401	9-34	NE¼NW¼ sec. 4	Mar. 12, 1943	22	5	
2402	9-34	do	Aug. 27, 1943	22	6	66
2403	9-34	do	Apr. 13, 1944	22	2	66
2404	9-35	NE¼SW¼ sec. 4	do			67
2405	9-36	NE¼SW¼ sec. 4	Aug. 27, 1943		2	69
2406	9-36	do	Oct. 30, 1943		3	70
2407	9-36	do	Jan. 5, 1944		1.5	69
2408	9-36	do	Feb. 28, 1944		1	61
2409	9-36	do	May 2, 1944		1	57
2410	9-36	do	July 11, ,944		2	62
2411	9-36	do	Aug. 30, 1944		1	67
2412	9-36	do	Oct. 30, 1944		1.5	70
2413	9-37	do	Aug. 28, 1943		8	67
2414	9-37	do	Apr. 13, 1944		3	63
2415	9-38	SE¼NW¼ sec. 4	Aug. 27, 1943		12	66
2416	9-38	do	Apr. 13, 1944		5	61
2417	9-39	do	Aug. 27, 1943		4	68
2418	Sampled by bailing	do	Mar. 15, 1944			63
2419	do	do	do			62
2420	Sampled by pumping	do	do		5	63
2421	do	do	Apr. 13, 1944		6	63
2422	9-40	NE¼NW¼ sec. 4	Aug. 27, 1943		2	67

between the mouth of Bonita Creek near Solomonsville and the Southern Pacific Rail-at Calva—Continued

[Analyses in parts per million]

Specific conductance (K×10⁵ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Total hardness as $CaCO_3$	Percent sodium	Analysis No.
354						710								2363
359				568		735								2364
316						675								2365
305						605								2366
388						775								2367
279	39	19	585	454	273	555	1.9	3.5	10	1,700	2.31	176	88	2368
237						465								2369
432	120	46	840	702	406	920	1.4	20	1.0	2,700	3.67	488	79	2370
369	44	29	764	650	319	715	1.4	16	3.2	2,210	3.01	229	88	2371
363						690								2372
359						715								2373
367						730								2374
370	107	35	687	594	330	760		2.0		2,214	3.01	411	78	2375
363						715								2376
297						695								2377
325						665								2378
431						885								2379
381	66	28	779	620	337	775	2.2	19	2.5	2,310	3.14	280	86	2380
165						260								2381
351						710								2382
331						670								2383
329						670								2384
303				384		660								2385
302						600								2386
343						710								2387
580						1,390								2388
533	140	53	1,010	630	430	1,260	1.8	29	2.5	3,230	4.39	568	80	2389
377	144	43	649	620	313	785	2.1	1.0	8.0	2,242	3.05	536	72	2390
347				510		720								2391
306						615								2392
268				440		525								2393
284						515								2394
269	129	36	424	476	252	520	1.5	2.0	3.5	1,599	2.17	470	66	2395
268						515								2396
302						600								2397
356						765								2398
279				464		565								2399
303														2400
267				540		500								2401
261						485								2402
275						530								2403
619						1,920								2404
329						675								2405
252	74	25	477	440	258	490	1.8	1.0	13	1,540	2.09	288	78	2406
234						460								2407
211						415								2408
339	157	48	536	484	344	705	1.0	5.0	2	2,030	2.76	590	66	2409
367						775								2410
346						715								2411
180	36	14	351	328	177	315	3.9	4.0		1,060	1.44	148	84	2412
335						695								2413
255						520								2414
272	104	35	452	460	236	540		2.0		1,596	2.17	404	71	2415
359						760								2416
279														2417
237	24	16	491	306	200	520		.5		1,400	1.90	126	89	2418
271	85	27	495	359	242	605		.5		1,630	2.22	323	77	2419
292	110	34	525	504	256	620		2.0		1,800	2.45	414	73	2420
312						650								2421
303						645								2422

Chemical character of ground waters in the Gila River Basin, Graham County, Ariz., road bridge

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (°F.)
	Driven observation well—Con.					
2423	9-40	NE¼NW¼ sec. 4	Apr. 13, 1944		1	62
2424	9-41	do	Aug. 27, 1943		13	66
2425	9-41	do	Apr. 13, 1944		5	63
2426	9-44	NE¼SE¼ sec. 4	Sept. 17, 1943		2	70
2427	9-58	NW¼SW¼ sec. 4	Sept. 29, 1943		6	
2428	9-58	do	Apr. 13, 1944		2	62
2429	9-59	SW¼NW¼ sec. 4	Sept. 29, 1943		4	
2430	11-1	NE¼NW¼ sec. 4	Aug. 31, 1943		3	
2431	11-1	do	Sept. 17, 1943		5	68
2432	11-5	do	Mar. 12, 1943	22.4	6	
2433	11-5	do	Aug. 30, 1943	22.4	10	66
2434	M. N. Ferguson irrigation well, USGS 271.	NE¼NE¼ sec. 5	Apr. 14, 1943	63		66
2435	J. F. Ferguson unused well	SE¼NE¼ sec. 5	Mar. 25, 1940	58		
2436	do	do	Feb. 26, 1942	58		
2437	Eldon Palmer irrigation well, USGS 273.	SW¼NE¼ sec. 5	May 1, 1943	64		69
2438	Driven observation well, 10-1	SE¼NE¼ sec. 5	Oct. 5, 1943		8	64
2439	10-2	NW¼NE¼ sec. 5	Aug. 30, 1943		8	64
2440	M. J. Ferguson unused well, USGS 270-A.	NW¼NW¼ sec. 9	May 19, 1943			69
2441	Spring in Mathews Wash	SW¼SE¼ sec. 9	Oct. 14, 1940		5	
2442	do	do	June 25, 1941		5	72
2443	Spring in Mathews Wash	do	Oct. 14, 1940		10	73
2444	do	do	May 26, 1941		10	73
2445	Driven observation well, 9-6	NE¼NE¼ sec. 9	Aug. 27, 1943		8	
2446	do	do	Oct. 29, 1943		5	70
2447	do	do	Jan. 5, 1944		2	66
2448	do	do	Feb. 28, 1944		1	63
2449	do	do	May 2, 1944		.5	63
2450	do	do	July 11, 1944		.25	69
2451	do	do	Aug. 30, 1944		.2	74
2452	9-47	SE¼SE¼ sec. 9	Apr. 13, 1944			66
2453	Dean unused well	SE¼SW¼ sec. 10	Mar. 29, 1940	60		64
2454	Lamar Bellman irrigation well	SE¼NE¼ sec. 10	July 18, 1940	53	849	67
2455	do	do	May 1, 1943	53		67
2456	Driven observation well, 7-69	NE¼NE¼ sec. 10	Aug. 23, 1943		12	64
2457	8-45	do	Sept. 29, 1943		10	
2458	8-48	SE¼NW¼ sec. 10	Aug. 27, 1943		5	69
2459	8-50	NW¼NW¼ sec. 10	Aug. 25, 1943		6	67
2460	Guy Anderson irrigation well, USGS 277.	SE¼SW¼ sec. 11	July 16, 1940			68
2461	do	do	Sept. 16, 1943			
2462	Drain to Gila River from left	NE¼SE¼ sec. 11	Sept. 12, 1941		10	
2463	Seepage in Gila River channel	NE¼NE¼ sec. 11	do		5	
2464	Driven observation well, 6-50	NE¼SE¼ sec. 11	Oct. 4, 1943		8	62
2465	6-54	NE¼NE¼ sec. 11	Aug. 4, 1943		7	64
2466	7-1	NE¼SE¼ sec. 11	Aug. 23, 1943		10	66
2467	7-2	SE¼NE¼ sec. 11	do		11	68
2468	7-3	do	Aug. 4, 1943		12	61
2469	7-3	do	Oct. 27, 1943		12	63
2470	7-3	do	Jan. 4, 1944		10	62
2471	7-3	do	Feb. 29, 1944		10	60
2472	7-3	do	May 2, 1944		8	60
2473	7-3	do	July 10, 1944		8	61
2474	7-3	do	Aug. 29, 1944		8	62
2475	7-3	do	Oct. 27, 1944		5	63
2476	7-4	do	Aug. 23, 1943		5	67
2477	7-4	do	Oct. 29, 1943		5	66

between the mouth of Bonita Creek near Solomonsville and the Southern Pacific Rail- at Calva—Continued

[Analyses in parts per million]

Specific conductance (K×10⁵ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Total hardness as $CaCO_3$	Percent sodium	Analysis No.
302						615								2423
313						615								2424
288						585								2425
427				70		1,065								2426
407	104	40	756	542	360	875	1.4	15	6.5	2,418	3.29	424	80	2427
332	92	37	621	548	297	680	1.5	13	2.0	2,010	2.73	382	78	2428
399														2429
390						810								2430
389						845								2431
312	148	41	504	584	284	605	1.9	1.0	5.0	1,873	2.55	538	67	2432
305	145	39	483	574	278	575		2.0		1,805	2.45	522	67	2433
456	125	43	825	498	402	1,025		18	3.5	2,680	3.64	489	79	2434
187				285	200	335						78		2435
466						1,100								2436
614						1,495								2437
395						830								2438
281	104	29	487	490	229	560		9.6		1,660	2.26	378	74	2439
1,860						5,560								2440
290				724	200	460	2.4					126		2441
344	44	29	707	662	378	580	1.8	8.7		2,074	2.82	229	87	2442
290	28	22		686	339	445						90		2443
339	36	25	710	640	379	570	2.5	8.6		2,046	2.78	193	89	2444
490						1,075								2445
566	243	71	1,020	870	533	1,310	.6	7.4	18	3,610	4.91	898	71	2446
484						1,080								2447
394	128	40	760	752	359	800	2.2	16	5.0	2,480	3.37	484	77	2448
392						740								2449
356						715								2450
374						855								2451
332						680								2452
320				654	250	645	1.5	5.0				315		2453
290				622	140	525						248		2454
340	56	44	647	522	329	680				2,013	2.20	321	81	2455
430	176	65	724	654	414	895	1.4	58	5.0	2,660	3.62	706	69	2456
307						560								2457
339						630								2458
350						635								2459
246				522	160	475						465		2460
243	90	43	405	529	173	450	1.1	39		1,462	1.99	401	69	2641
299	100	52	485	340	205	720	1.1	8.9		1,740	2.37	463	69	2462
410	194	59	830	776	514	960	1.7	1.0		2,940	4.00	727	71	2463
283						575								2464
424						800								2465
328				538		705								2466
403	144	35	696	522	239	940	2.5	9.6	16	2,323	3.16	504	75	2467
488						920								2468
504	145	51	1,010	882	603	980	5.8	21	20	3,250	4.42	572	79	2469
506						990								2470
477						905								2471
445	116	40	906	825	553	815	4.9	11	5.0	2,850	3.88	454	81	2472
467						860								2473
475						890								2474
489						945								2475
294						605								2476
245	149	45	335	470	185	500	.7	2.0	5.0	1,450	1.97	557	57	2477

Chemical character of ground waters in the Gila River Basin, Graham County, Ariz., road bridge

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (°F.)
	Driven observation well—Con.					
2478	7-5	SE¼NE¼ sec. 11	Aug. 23, 1943	-------	12	67
2479	7-6	NE¼NE¼ sec. 11	Aug. 4, 1943	-------	2	70
2480	7-7	SW¼NE¼ sec. 11	Oct. 21, 1943	-------	8	65
2481	7-8	do	Aug. 23, 1943	-------	6	66
2482	7-9	NE¼NE¼ sec. 11	Aug. 26, 1943	-------	5	64
2483	7-10	NW¼NE¼ sec. 11	do	-------	7	66
2484	7-11	NE¼NE¼ sec. 11	do	-------	8	67
2485	7-12	NW¼NE¼ sec. 11	do	-------	8	66
2486	7-13	SW¼NE¼ sec. 11	Oct. 11, 1943	-------	1	70
2487	7-14	do	do	-------	1.5	66
2488	7-15	NW¼NE¼ sec. 11	Aug. 23, 1943	-------	2	66
2489	7-16	do	Aug. 26, 1943	-------	8	65
2490	7-17	do	Aug. 25, 1943	-------	8	-------
2491	7-19	do	Aug. 23, 1943	-------	.1	73
2492	7-20	NE¼NW¼ sec. 11	Aug. 25, 1943	-------	-------	64
2493	7-21	NW¼NE¼ sec. 11	Aug. 26, 1943	-------	2	67
2494	7-23	SE¼NW¼ sec. 11	Aug. 25, 1943	-------	6	66
2495	7-24	NE¼NW¼ sec. 11	Oct. 9, 1943	-------	8	64
2496	7-25	do	Oct. 5, 1943	-------	8	62
2497	7-26	SE¼NW¼ sec. 11	Aug. 25, 1943	-------	10	66
2498	7-27	NE¼NW¼ sec. 11	Aug. 26, 1943	-------	6	67
2499	7-27	do	Oct. 11, 1943	-------	8	63
2500	7-32	NW¼NW¼ sec. 11	Aug. 25, 1943	-------	2	66
2501	7-37	do	do	-------	12	63
2502	7-38	do	do	-------	4	64
2503	7-46	SW¼NE¼ sec. 11	Aug. 23, 1943	-------	12	65
2504	7-46	do	Jan. 5, 1944	-------	10	64
2505	7-46	do	Feb. 28, 1944	-------	15	64
2506	7-46	do	May 2, 1944	-------	8	63
2507	7-46	do	July 11, 1944	-------	8	64
2508	7-46	do	Aug. 30, 1944	-------	10	65
2509	7-46	do	Oct. 30, 1944	-------	8	65
2510	7-47	NE¼NE¼ sec. 11	Aug. 11, 1943	-------	3	67
2511	7-48	do	do	-------	2	67
2512	7-49	NW¼NE¼ sec. 11	do	-------	10	64
2513	7-62	NE¼SE¼ sec. 11	Aug. 24, 1943	-------	9	67
2514	7-63	SE¼SW¼ sec. 11	Aug. 23, 1943	-------	10	66
2515	7-64	NW¼SE¼ sec. 11	Oct. 11, 1943	-------	1	67
2516	7-65	SE¼NW¼ sec. 11	Aug. 23, 1943	-------	12	64
2517	7-66	NW¼SW¼ sec. 11	do	-------	12	67
2518	7-67	SW¼NW¼ sec. 11	do	-------	6	64
2519	USGS 279	SW¼SW¼ sec. 12	Nov. 19, 1943	17	-------	-------
2520	USGS 280	NE¼NE¼ sec. 12	Aug. 13, 1940	21	-------	66
2521	6-2	SE¼SE¼ sec. 12	Aug. 5, 1943	-------	6	64
2522	6-3	do	Aug. 25, 1943	-------	8	-------
2523	6-4	do	Aug. 4, 1943	-------	10	64
2524	6-5	NE¼SE¼ sec. 12	Aug. 21, 1943	-------	8	-------
2525	6-6	do	Aug. 4, 1943	-------	-------	-------
2526	6-8	SE¼SE¼ sec. 12	Oct. 4, 1943	-------	8	64
2527	6-9	do	Aug. 4, 1943	-------	3	69
2528	6-10	NE¼SE¼ sec. 12	Aug. 21, 1943	-------	8	-------
2529	6-11	do	Aug. 2, 1943	-------	2	65
2530	6-12	do	do	-------	1	68
2531	6-12	do	Oct. 27, 1943	-------	1	64
2532	6-12	do	Jan. 4, 1944	-------	.5	60
2533	6-12	do	Feb. 29, 1944	-------	.2	58
2534	6-13	SW¼SE¼ sec. 12	Aug. 5, 1943	-------	8	67
2535	6-14	do	Aug. 25, 1943	-------	8	-------
2536	6-15	NW¼SE¼ sec. 12	Aug. 21, 1943	-------	-------	-------
2537	6-16	do	Aug. 3, 1943	-------	1	-------

between the mouth of Bonita Creek near Solomonsville and the Southern Pacific Rail- at Calva—Continued

[Analyses in parts per million]

Specific conductance (K×10⁵ at 25 °C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Total hardness as $CaCO_3$	Percent sodium	Analysis No.
360				542		810								2478
363	134	39	653	678	392	670	2.2	1.0	8.0	2,225	3.03	495	74	2479
268						545								2480
296						610								2481
457						915								2482
413						800								2483
456						905								2484
460														2485
275														2486
276						560								2487
276						555								2488
523						1,080								2489
414				734		760								2490
289														2491
303						615								2492
498						1,100								2493
286						580								2494
274						565								2495
284						570								2496
292						575								2497
359				440		770								2498
373						815								2499
318						660								2500
309						610								2501
362						755								2502
268						520								2503
249						490								2504
216	135	36	305	472	173	400	.7	20	.5	1,300	1.77	485	58	2505
235						450								2506
263						520								2507
275	173	45	361	454	219	550	.9	29	7.0	1,600	2.18	616	56	2508
263						520								2509
795	190	57	1,569	688	1,024	1,750		26		4,950	6.73	708	83	2510
737				882		1,560								2511
674						1,400								2512
253						460								2513
217						370								2514
264						520								2515
276						530								2516
241				562		390								2517
316						615								2518
223	132	34	322	474	193	400	.7	17	7.0	1,330	1.81	470	60	2519
550	121	52	1,093	760	654	1,126				3,420	4.65	516	82	2520
209	102	28	326	486	160	345		32		1,232	1.68	370	66	2521
431						865								2522
329				742		560								2523
462						870								2524
455				850		885								2525
214						365								2526
382				784		710								2527
264						425								2528
331	146	38	567	708	326	585	2.6	2.0	3.5	2,015	2.74	520	70	2529
400						795								2530
401	167	52	730	802	457	750	4.2	21	18	2,580	3.51	631	72	2531
395						740								2532
369				478		770								2533
211						350								2534
355				828		620								2535
354						650								2536
461				642		960								2537

Chemical character of ground waters in the Gila River Basin, Graham County, Ariz., road bridge

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (°F.)
	Driven observation well—Con.					
2538	6-17	SW¼SE¼ sec. 12	Aug. 5, 1943		1	73
2539	6-18	do	do		6	67
2540	6-18	do	Oct. 12, 1943		8	69
2541	6-19	NW¼SE¼ sec. 12	Aug. 4, 1943		4	64
2542	6-20	do	Aug. 3, 1943		.5	67
2543	6-21	do	do		8	64
2544	6-22	SW¼SE¼ sec. 12	Oct. 4, 1943		8	66
2545	6-24	do	Aug. 11, 1943		12	67
2546	6-25	do	do		14	65
2547	6-26	NW¼SE¼ sec. 12	Aug. 3, 1943		12	65
2548	6-27	do	do		6	63
2549	6-28	SE¼SW¼ sec. 12	Aug. 11, 1943		15	67
2550	6-29	NE¼SW¼ sec. 12	Oct. 4, 1943			
2551	6-30	do	Aug. 3, 1943		3	66
2552	6-31	SE¼NW¼ sec. 12	Aug. 21, 1943		6	
2553	6-32	do	Aug. 4, 1943		9	66
2554	6-33	SE¼SW¼ sec. 12	Aug. 11, 1943		3	69
2555	6-34	do	do		2	68
2556	6-35	NE¼SW¼ sec. 12	do		11	64
2557	6-36	do	Aug. 3, 1943		12	65
2558	6-37	SE¼NW¼ sec. 12	Aug. 21, 1943		8	
2559	6-38	do	do		2	
2560	6-39	do	Aug. 4, 1943		6	65
2561	6-40	NW¼SW¼ sec. 12	Aug. 11, 1943		12	68
2562	6-41	do	do		1	69
2563	6-42	do	Aug. 3, 1943		10	64
2564	6-43	SW¼NW¼ sec. 12	Aug. 21, 1943		8	
2565	6-44	SE¼NW¼ sec. 12	Aug. 4, 1943		9	66
2566	6-45	NW¼SW¼ sec. 12	Aug. 11, 1943		.5	70
2567	6-46	do	do		10	67
2568	6-47	SW¼NW¼ sec. 12	Aug. 21, 1943		8	
2569	6-48	do	Aug. 4, 1943		3	67
2570	6-49	NW¼NW¼ sec. 12	do		8	65
2571	6-51	SW¼NW¼ sec. 12	Aug. 11, 1943		1.5	71
2572	6-52	do	Aug. 4, 1943		2	65
2573	6-53	NW¼NW¼ sec. 12	do		4	67
2574	6-55	SW¼NE¼ sec. 12	Aug. 24, 1943		12	65
2575	6-55	do	Feb. 9, 1944			
2576	6-57	NE¼NW¼ sec. 12	Aug. 24, 1943		9	64
2577	6-57	do	Oct. 27, 1943		10	65
2578	6-57	do	Jan. 4, 1944		10	65
2579	6-57	do	Feb. 9, 1944			64
2580	6-57	do	Feb. 29, 1944		6	64
2581	6-57	do	May 2, 1944		6	64
2582	6-57	do	July 10, 1944		5	65
2583	6-57	do	Oct. 27, 1944		4	65
2584	6-58	SE¼NW¼ sec. 12	Aug. 24, 1943		8	64
2585	6-59	NW¼NW¼ sec. 12	do		2	66
2586	6-62	do	do		5	66
2587	6-63	do	do		10	64
2588	6-63	do	Feb. 9, 1944			64
2589	6-63	do	Aug. 29, 1944		8	63
2590	6-71	SW¼SW¼ sec. 12	Sept. 29, 1943		6	
2591	Guy Anderson domestic well, USGS 282.	SW¼NE¼ sec. 13	Mar. 28, 1940	25.4		63
2592	do	do	Feb. 26, 1943	25.4		

between the mouth of Bonita Creek near Solomonsville and the Southern Pacific Rail- at Calva—Continued

[Analyses in parts per million]

Specific conductance (K×10⁵ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Total hardness as $CaCO_3$	Percent sodium	Analysis No.
195						380								2538
217						380								2539
226						410								2540
498						1,060								2541
305						585								2542
433				816		840								2543
218						380								2544
209														2545
214				484		365								2546
259	102	26	440	472	222	495		1.0		1,519	2.06	362	73	2547
458				914		890								2548
266						525								2549
265						520								2550
296						580								2551
458						915								2552
482						920								2553
206						365								2554
209														2555
272						545								2556
383						780								2557
510						1,055								2558
480						970								2559
461						855								2560
208						355								2561
249						525								2562
430				690		895								2563
489						970								2564
468						875								2565
208						390								2566
282						570								2567
530				774		1,160								2568
439						845								2569
532	175	53	1,005	716	669	1,070	4.7	42	10	3,370	4.58	654	77	2570
287				450		620								2571
488						980								2572
441						845								2573
506				818		940								2574
470				810		842			10					2575
859						1,910								2576
813	180	78	1,720	842	1,160	1,810	6.5	38	16	5,410	7.36	770	83	2577
840						1,900								2578
898				894		1,980			16					2579
859						1,920								2580
863						1,950								2581
731						1,500								2582
775						1,740								2583
476						885								2584
768	192	59	1,552	722	1,054	1,690	2.4	21	25	4,930	6.70	722	82	2585
637						1,350								2586
645						1,360								2587
588				850		1,160			10					2588
478	118	39	954	738	580	905	5.7	36	10	3,000	4.08	455	82	2589
209						385								2590
171				248	75	335	.2	27				158		2591
158	64	18	270	464	110	220	1.1	14	1.4	926	1.26	234	72	2592

Chemical character of ground waters in the Gila River Basin, Graham County, Ariz., road bridge

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (°F.)
2593	Guy Anderson irrigation well, USGS 284.	SE¼SE¼ sec. 13	June 20, 1940		765	
2594	do	do	Apr. 29, 1943			65
2595	USGS 285	do	do	59	790	65
2596	Evans irrigation well	SW¼SE¼ sec. 13	May 19, 1943			65
2597	Seep from terrace gravel	SW¼SW¼ sec. 13	Nov. 29, 1940		1	
2598	W. J. Preston domestic well	NW¼SW¼ sec. 13	Mar. 28, 1940	48.25		65
2599	do	do	Feb. 26, 1943	48.25		
2600	Mary Mack flowing well	NW¼NE¼ sec. 13	Oct. 30, 1940	3,767	1,550	138
2601	do	do	Oct. 27, 1943	3,767		
2602	do	do	Jan. 5, 1944	3,767		
2603	do	do	June 21, 1944	3,767		
2604	Driven observation well, 6-1	NE¼NE¼ sec. 13	Aug. 5, 1943		1.5	64
2605	6-7	do	Aug. 4, 1943		10	65
2606	6-23	NW¼NE¼ sec. 13	Aug. 11, 1943		13	67
2607	6-66	SE¼NE¼ sec. 13	Aug. 2, 1943		2	66
2608	6-67	SW¼NE¼ sec. 13	Aug. 24, 1943		10	66
2609	6-68	NW¼NE¼ sec. 13	Aug. 5, 1943		10	65
2610	6-69	SW¼NE¼ sec. 13	Aug. 24, 1943		10	67
2611	6-70	NE¼NW¼ sec. 13	do		12	68
2612	6-72	do	do		4	65
2613	B. Carter unused well	NE¼NE¼ sec. 14	Mar. 1, 1943	25		
2614	H. L. Smith domestic well	NW¼NE¼ sec. 14	Mar. 11, 1943	36		
2615	Driven observation well, 6-73	NE¼NE¼ sec. 14	Aug. 23, 1943		10	65
2616	do	do	Oct. 29, 1943		5	66
2617	do	do	Jan. 5, 1944		1.5	64
2618	do	do	Feb. 28, 1944		1	63
2619	do	do	May 3, 1944		1	63
2620	do	do	July 11, 1944		1.5	65
2621	do	do	Aug. 30, 1944		1	66
2622	do	do	Oct. 30, 1944		1	66
2623	Spring in Matthews Wash	NW¼NE¼ sec. 16	May 26, 1941		10	71
2624	Driven observation well, 7-18	SW¼NE¼ sec. 11	Aug. 23, 1943		9	66
2625	Union test well	NE¼NE¼ sec. 23	Feb. 26, 1943			
2626	Mattice brothers irrigation well	SE¼NE¼ sec. 23	Aug. 29, 1941	64		64
2627	do	do	May 15, 1943	64		69
2628	Joe Rogers stock well	NE¼NW¼ sec. 25	Mar. 28, 1940	22		67
2629	Joe Rogers irrigation well	NW¼NE¼ sec. 35	do			61
2630	do	do	Aug. 12, 1941			64
		T. 7 S., R. 24 E.:				
2631	Ernest Long flowing well	SW¼NW¼ sec. 8	Dec. 21, 1940	150	3	72
2632	Flowing well at Durham Ranch	NE¼SW¼ sec. 8	Dec. 10, 1940	177	7	71
2633	Anton Frederickson flowing well, USGS 495.	NE¼NE¼ sec. 8	Feb. 28, 1941	436	1	
2634	USGS 496	do	do		1	
2635	Jim Smith flowing well	SW¼SW¼ sec. 10	Dec. 14, 1940	190	3	
2636	Spring flowing into Ash Creek	SW¼SE¼ sec. 13	Feb. 13, 1940		27	
2637	do	do	Oct. 31, 1940		20	85
2638	do	do	May 20, 1944			
2639	Unused well flowing	do	Feb. 13, 1940		1.5	
2640	Domestic well	SW¼NE¼ sec. 26	Mar. 7, 1941	16		61
		T 4 S., R. 23 E.:				
2641	Spring in fault zone, USGS 67	NW¼NW¼ sec. 7	Feb. 27, 1942		7	70
2642	USGS 68	do	do		.3	
2643	Driven observation well, USGS 71	SE¼SW¼ sec. 7	June 8, 1940	21		64
2644	do	do	Nov. 11, 1943	21		68
2645	USGS 72	do	June 7, 1940	11		

between the mouth of Bonita Creek near Solomonsville and the Southern Pacific Rail- at Calva—Continued

[Analyses in parts per million]

Specific conductance (K×10[5] at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Total hardness as $CaCO_3$	Percent sodium	Analysis No.
190				444	140	350						270		2593
164						270								2594
151						320								2595
90.4						110								2596
2,300	446	304	5,050	835	4,210	5,870				16,290	22.1	2,361	82	2597
214				454	120	395	.4	26				345		2598
216				532		340								2599
592	74	8.7	1,220	101	416	1,660	6.0		7.0	3,530	4.80	220	92	2600
582	72	9.2	1,210	98	416	1,640	5.8	.0	7.5	3,400	4.62	218	92	2601
583						1,650								2602
548						1,630								2603
216						385								2604
207						340								2605
201						330								2606
197						305								2607
199						320								2608
215						360								2609
174						280								2610
205						360								2611
151						220								2612
168				378		265								2613
213	29	15	440	518	162	330	1.5	33	5.0	1,266	1.72	134	88	2614
187						300								2615
158	102	36	203	378	144	255	.3	30	5.0	956	1.30	402	52	2616
165						285								2617
144						220								2618
165						260								2619
157						245								2620
173						275								2621
163						285								2622
346	32	25	731	688	360	580	2.9	8.6		2,087	2.82	183	90	2623
288						585								2624
254				574		455								2625
203	100	32	309	488	128	360	1.2	12		1,183	1.61	381	64	2626
179						320								2627
280				424	200	642	1.9	20				810		2628
43				237	24	9.0						172		2629
33.6	42	8.3	18	181	19	7.0	.2	.2		184	.25	139	22	2630
37.4	6.0	2.2	75	(3)	45	36	4.6			214	.29	24	87	2631
38.6	3.0	1.3	71	107	36	24	2.9			191	.26	13	92	2632
51.0	2.5	1.3	119	207	29	44	3.4			301	.41	12	96	2633
42.0	4.0	1.7	96	177	26	33	3.0			251	.34	17	93	2634
37.1	6.5	4.4	81	188	12	26	2.8			226	.30	34	84	2635
500				156	500	1,200	6.9	2.5				60		2636
490	24	6.6	1,047	79	588	1,180	8.4			2,890	3.93	87	96	2637
495	40	5.9	1,050	66	569	1,230	7.8	.5	12	2,940	4.00	124	95	2638
440				125	850	1,035						60		2639
11.3	12	1.7	14	44	21	5	.6			76	.10	37	44	2640
539	185	29	969	144	503	1,450				3,210	.73	580	78	2641
912	376	55	1,622	188	835	2,600				5,580	7.59	1,164	75	2642
260	105	29	411	324	233	540	2.0			1,480	2.01	381	70	2643
311	152	44	470	263	327	725	1.5	.0	15	1,850	2.52	560	65	2644
98						164								2645

[3] Contained 45 parts per million of carbonate (CO_3) and 1.1 parts per million of hydroxide (OH).

Chemical character of ground waters in the Gila River Basin, Graham County, Ariz., road bridge

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (°F.)
	Driven observation well—Con.					
2646	USGS 72	SE¼SW¼ sec. 7	Nov. 5, 1943	11		70
2647	USGS 73	do	June 7, 1940	20		
2648	Seepage in Gila River channel	SW¼SW¼ sec. 7	Sept. 22, 1941		2	
2649	Driven observation well, 21-8	SW¼SE¼ sec. 7	July 27, 1943		5	
2650	do	do	Sept. 4, 1943		8	72
2651	do	do	Apr. 25, 1944		3	65
2652	21-11	do	Apr. 5, 1943	18.4	10	
2653	21-11	do	Sept. 2, 1943	18.4	8	72
2654	21-11	do	Oct. 28, 1943	18.4	15	72
2655	21-11	do	Jan. 6, 1944	18.4	10	66
2656	21-11	do	Mar. 1, 1944	18.4	8	62
2657	21-11	do	Apr. 25, 1944	18.4	8	62
2658	21-11	do	July 14, 1944	18.4	10	66
2659	21-11	do	Sept. 1, 1944	18.4	8	70
2660	21-11	do	Oct. 31, 1944	18.4	8	70
2661	21-12	do	July 27, 1943			
2662	21-12	do	Sept. 4, 1943		8	73
2663	21-12	do	Apr. 25, 1944		3	68
2664	21-13	SE¼SW¼ sec. 7	Mar. 31, 1943	18.3	.2	
2665	21-13	do	Aug. 5, 1943	18.3	2	71
2666	21-13	do	Apr. 24, 1944	18.3	1	68
2667	21-14	do	July 27, 1943		10	
2668	21-14	do	Sept. 4, 1943		8	73
2669	21-14	do	Apr. 25, 1944		4	62
2670	21-15	SW¼SE¼ sec. 7	Apr. 5, 1943	18.4	1	
2671	21-15	do	Sept. 2, 1943	18.4	5	76
2672	21-17	SE¼SW¼ sec. 7	July 28, 1943		4	67
2673	21-17	do	Apr. 25, 1944		3	59
2674	21-18	SW¼SW¼ sec. 7	July 30, 1943		8	67
2675	21-18	do	Apr. 24, 1944		3	65
2676	21-22	do	Apr. 1, 1943	13.7	2	
2677	21-24	do	do	18.7	10	
2678	21-24	do	Sept. 2, 1943	18.7	8	68
2679	21-24	do	Apr. 27, 1944	18.7	6	65
2680	21-29	do	July 28, 1943		8	67
2681	21-29	do	Apr. 25, 1944		6	67
2682	Ed. McEuen stock well	SE¼NW¼ sec. 17	Feb. 26, 1942	35.5		
2683	do	do	Jan. 6, 1944	35.5		86
2684	do	do	Apr. 25, 1944	35.5		87
2685	Fay Rabb irrigation well, USGS 80	NW¼SW¼ sec. 17	July 18, 1940	82	883	68
2686	do	do	May 3, 1943	82		
2687	Seepage in Gila River channel	NW¼NW¼ sec. 17	Sept. 22, 1941		5	
2688	do	NE¼SW¼ sec. 17	do		5	
2689	Fay Rabb unused well, USGS 79	NW¼SW¼ sec. 17	Mar. 18, 1943	21		
2690	Driven observation well, 20-21	SW¼SE¼ sec. 17	Apr. 6, 1943	18.6	1	
2691	do	do	Sept. 3, 1943	18.6	5	75
2692	do	do	Oct. 28, 1943	18.6	.25	74
2693	do	do	Apr. 17, 1944	18.6	.5	70
2694	20-22	do	Apr. 6, 1943	18.7	10	
2695	20-22	do	Sept. 2, 1943	18.7	5	75
2696	20-22	do	Apr. 17, 1944	18.7	3	72
2697	20-24	SE¼SW¼ sec. 17	Aug. 6, 1943		8	65
2698	20-24	do	Apr. 17, 1944		6	62
2699	20-25	do	Sept. 4, 1943		8	76
2700	20-25	do	Apr. 17, 1944		5	70

between the mouth of Bonita Creek near Solomonsville and the Southern Pacific Rail- at Calva—Continued

[Analyses in parts per million]

Specific conductance (K×10⁵ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Total hardness as $CaCO_3$	Percent sodium	Analysis No.
118						192								2646
84						127								2647
242	146	15	368	261	235	540	2.0	.5		1,435	1.95	426	65	2648
258	111	19	415	186	220	620		2.0		1,478	2.01	355	72	2649
252						595								2650
224						505								2651
174				236		345								2652
344				266		810								2653
257	149	32	374	264	265	580	1.5	1.5	5.0	1,530	2.08	504	62	2654
236						515								2655
202	102	20	310	261	198	415	1.5	1.0	.4	1,180	1.60	336	67	2656
191						380								2657
275	154	27	402	275	261	615	1.5	.5	3.5	1,600	2.18	496	64	2658
257						570								2659
216						450								2660
208						455								2661
221						490								2662
259						585								2663
146	102	19	182	212	120	300	2.2	.5	.5	830	1.13	332	54	2664
104						170								2665
114						182								2666
437						1,100								2667
393				268		945								2668
258	128	27	403	291	258	565	1.5	0	.2	1,530	2.08	430	67	2669
259				256		565								2670
354	188	37	530	279	343	840	1.4	.5	3.8	2,077	2.82	621	65	2671
446						1,135								2672
147						254								2673
127				245		260								2674
115						178								2675
114				229		174								2676
136				280		232								2677
146						260								2678
136	76	20	195	293	139	218	1.1	0	0	793	1.08	272	61	2679
395						965								2680
366	196	49	545	347	367	855	1.4	.5	.2	2,180	2.96	690	63	2681
467	232	34	760	116	437	1,290	1.2			2,810	3.82	719	70	2682
467	226	33	739	116	426	1,250	1.4	3.0	8.0	2,740	3.73	700	70	2683
466														2684
106				176	100	202						195		2685
111						185								2686
138	55	39	184	278	111	248	1.2	.5		776	1.06	298	57	2687
285	105	29	480	327	282	610	1.4	.5		1,669	2.27	381	73	2688
461				568		985								2689
590	190	34	1,053	177	522	1,570		1.0		3,460	4.71	614	79	2690
570						1,530								2691
556						1,540								2692
548						1,620								2693
685				235		1,820								2694
669						1,820								2695
683						1,900								2696
805	381	93	1,412	613	1,049	1,990		2.0		5,230	7.11	1,334	70	2697
997						2,720								2698
609						1,620								2699
631	210	37	1,140	211	576	1,690	3.4	.5	1.5	3,760	5.11	676	79	2700

Chemical character of ground waters in the Gila River Basin, Graham County, Ariz., road bridge

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (°F.)
	Driven observation well—Con.					
2701	20-26	NW¼SW¼ sec. 17	Apr. 6, 1943	18.5	1	-------
2702	20-26	do	Sept. 2, 1943	18.5	2	75
2703	20-26	do	Apr. 17, 1944	18.5	4	72
2704	20-27	SE¼SW¼ sec. 17	Sept. 4, 1943	-------	5	65
2705	20-27	do	Apr. 19, 1944	-------	2	63
2706	20-28	do	Apr. 5, 1943	18.8	10	-------
2707	20-28	do	Sept. 3, 1943	18.8	8	64
2708	20-28	do	Apr. 17, 1944	18.8	6	60
2709	20-29	NE¼SW¼ sec. 17	Apr. 6, 1943	18.8	.25	-------
2710	20-29	do	Sept. 4, 1943	18.8	5	75
2711	20-29	do	Apr. 17, 1944	18.8	5	68
2712	20-30	do	Apr. 5, 1943	18.5	10	-------
2713	20-30	do	Sept. 2, 1943	18.5	8	73
2714	20-30	do	Apr. 17, 1944	18.5	5	70
2715	20-31	NW¼SE¼ sec. 17	Apr. 25, 1944	-------	1	72
2716	20-32	SE¼SW¼ sec. 17	Sept. 4, 1943	-------	8	66
2717	20-32	do	Apr. 19, 1944	-------	4	64
2718	20-33	NE¼SW¼ sec. 17	Sept. 4, 1943	-------	8	67
2719	20-33	do	Apr. 17, 1944	-------	4	62
2720	20-33	do	Apr. 25, 1944	-------	4	62
2721	20-34	do	Sept. 4, 1943	-------	8	74
2722	20-34	do	Apr. 25, 1944	-------	4	68
2723	20-35	SW¼NE¼ sec. 17	Apr. 5, 1943	18.2	10	-------
2724	20-35	do	Sept. 2, 1943	18.2	8	78
2725	20-35	do	Apr. 25, 1944	18.2	6	68
2726	20-36	SW¼SW¼ sec. 17	Mar. 31, 1943	18.5	8	-------
2727	20-36	do	Sept. 3, 1943	18.5	8	62
2728	20-36	do	Apr. 19, 1944	18.5	6	50
2729	20-37	NW¼SW¼ sec. 17	Mar. 31, 1943	18.9	8	-------
2730	20-37	do	Sept. 3, 1943	18.9	8	65
2731	20-37	do	Apr. 24, 1944	18.9	5	64
2732	20-38	do	do	-------	1	64
2733	20-39	NE¼SW¼ sec. 17	Sept. 2, 1943	-------	4	66
2734	20-39	do	Apr. 24, 1944	-------	3	64
2735	20-40	SE¼NW¼ sec. 17	Sept. 4, 1943	-------	8	76
2736	20-40	do	Apr. 25, 1944	-------	8	70
2737	20-41	NW¼SW¼ sec. 17	Apr. 24, 1944	-------	4	65
2738	20-42	do	Mar. 31, 1943	18.5	1	-------
2739	20-42	do	Sept. 2, 1943	18.5	8	68
2740	20-42	do	Apr. 24, 1944	18.5	3	66
2741	20-43	do	do	-------	6	-------
2742	20-44	SE¼NW¼ sec. 17	Mar. 31, 1943	19	1	-------
2743	20-44	do	Sept. 2, 1943	19	8	65
2744	20-44	do	Apr. 24, 1944	19	5	63
2745	20-45	do	Apr. 5, 1943	13.1	12	-------
2746	20-45	do	Sept. 2, 1943	13.1	8	79
2747	20-45	do	Oct. 28, 1943	13.1	10	79
2748	20-45	do	Jan. 6, 1944	13.1	10	76
2749	20-45	do	Mar. 1, 1944	13.1	10	75
2750	20-45	do	Apr. 25, 1944	13.1	10	75
2751	20-45	do	July 14, 1944	13.1	10	79
2752	20-45	do	Sept. 1, 1944	13.1	12	79
2753	20-45	do	Oct. 31, 1944	13.1	12	78
2754	20-46	NW¼SW¼ sec. 17	Mar. 31, 1943	13.1	1	-------
2755	20-46	do	Sept. 2, 1943	13.1	3	69
2756	20-46	do	Apr. 24, 1944	13.1	.5	65
2757	20-47	SW¼NW¼ sec. 17	do	-------	4	62
2758	20-48	do	Mar. 31, 1943	18.4	5	-------
2759	20-48	do	Sept. 2, 1943	18.4	8	66
2760	20-48	do	Nov. 2, 1943	18.4	12	68

between the mouth of Bonita Creek near Solomonsville and the Southern Pacific Rail- at Calva—Continued

[Analyses in parts per million]

Specific conductance (K×10⁵ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Total hardness as $CaCO_3$	Percent sodium	Analysis No.
654				234		1,790								2701
741						2,060								2702
815						2,290								2703
507						1,080								2704
424	142	34	794	646	448	860	1.4	9.3	3.5	2,610	3.55	494	78	2705
935	470	117	1,568	658	1,202	2,320		1.0		6,000	8.16	1,654	67	2706
866						2,150								2707
997						2,720								2708
682				234		1,810								2709
660						1,760								2710
672						1,820								2711
746				190		2,030								2712
711						1,930								2713
678						1,850								2714
611	308	82	914	191	446	1,750	1.4	.5	.1	3,600	4.90	1,110	64	2715
232						440								2716
187	67	19	319	308	170	355	1.5	4.5	.5	1,090	1.48	245	74	2717
683						1,660								2718
941	529	143	1,470	452	1,190	2,480	.7	0	3.0	6,040	8.21	1,910	63	2719
944						2,500								2720
697						1,870								2721
685						1,840								2722
740				239		2,000								2723
753	263	46	1,390	245	667	2,100	3.8	.5	2.5	4,590	6.24	846	78	2724
726						1,970								2725
103	42	9.4	159	248	85	138		3.8		559	.76	144	71	2726
189						310								2727
207						375								2728
178				350		315								2729
157						275								2730
166						300								2731
144	69	17	219	249	127	266	1.9	2.5	.2	825	1.12	242	66	2732
152						275								2733
151						280								2734
750						2,060								2735
694	244	47	1,250	217	632	1,900	3.7	.5	2.0	4,180	5.68	802	77	2736
138						252								2737
207	136	28	271	272	202	425	1.7	8.3	1.0	1,206	1.64	454	56	2738
191						380								2739
151						270								2740
128	76	14	178	226	115	230	1.1	3.0	.1	728	.99	247	61	2741
194				274		385								2742
189						370								2743
169	108	21	225	277	157	320	1.1	1.0	.1	970	1.32	356	58	2744
753	292	55	1,328	250	678	2,070	3.4	2.0	1.5	4,550	6.19	954	75	2745
818						2,260								2746
733						2,050								2747
731						2,020								2748
720						1,980								2749
700	270	49	1,230	235	632	1,910	3.0	0	1.5	4,210	5.73	876	75	2750
702						1,910								2751
748						2,070								2752
765						2,130								2753
131				214		238								2754
125	82	24	141	205	122	222		3.0	2.0	695	.95	303	50	2755
112						194								2756
129						228								2757
148	92	16	193	233	127	275		4.6		822	1.12	296	59	2758
141						256								2759
134						242								2760

Chemical character of ground waters in the Gila River Basin, Graham County, Ariz., road bridge

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (°F.)
	Driven observation well—Con.					
2761	20-48	SW¼NW¼ sec. 17	Jan. 7, 1944	18.4	10	66
2762	20-48	do	Mar. 3, 1944	18.4	10	64
2763	20-48	do	Apr. 24, 1944	18.4	6	64
2764	20-48	do	July 11, 1944	18.4	6	65
2765	20-48	do	Aug. 30, 1944	18.4	8	67
2766	20-48	do	Oct. 30, 1944	18.4	8	67
2767	20-49	NW¼NW¼ sec. 17	Sept. 4, 1943		1	76
2768	20-49	do	Apr. 25, 1944		3	68
2769	20-50	SW¼NW¼ sec. 17	Mar. 31, 1943	24	12	
2770	20-50	do	Sept. 2, 1943	24	8	67
2771	20-50	do	Apr. 24, 1944	24	6	67
2772	20-51	do	do		10	64
2773	20-52	NW¼NW¼ sec. 17	Mar. 31, 1943	18.4	1	
2774	20-52	do	Sept. 2, 1943	18.4	8	67
2775	20-52	do	Apr. 24, 1944	18.4	8	64
2776	20-53	do	Aug. 5, 1943		8	69
2777	20-53	do	Apr. 24, 1944		6	65
2778	20-56	NW¼SW¼ sec. 17	Sept. 2, 1943		8	67
2779	20-56	do	Apr. 24, 1944		6	67
2780	20-68	SW¼SW¼ sec. 17	Sept. 3, 1943		8	67
2781	20-68	do	Apr. 19, 1944		8	65
2782	USGS 75	NE¼NW¼ sec. 18	June 7, 1940	14		
2783	E. W. Black unused well	SW¼NW¼ sec. 18	Mar. 19, 1943	29		
2784	E. M. Claridge domestic well	NW¼SW¼ sec. 18	Feb. 25, 1942	47		
2785	do	do	Mar. 19, 1943	47		
2786	E. W. Black irrigation well	SE¼SW¼ sec. 18	July 23, 1940	72		
2787	do	do	May 8, 1943	72		
2788	Fay Rabb unused well	NE¼SE¼ sec. 18	Mar. 22, 1943	28		
2789	Fay Rabb well	SE¼SE¼ sec. 18	do	30		
2790	Fay Rabb and Elliot Montierth unused well.	do	Mar. 17, 1943	67.7		
2791	Fay Rabb and Elliot Montierth irrigation well.	do	May 3, 1943			
2792	Elliot Montierth well	SE¼NE¼ sec. 18	Mar. 19, 1943	19.5		
2793	Joy Curtis domestic well	SW¼SE¼ sec. 18	Mar. 18, 1943	30		
2794	W. H. Holyoak irrigation well	SW¼SW¼ sec. 18	Mar. 22, 1943	63		
2795	Driven observation well, 21-1	SE¼NE¼ sec. 18	Mar. 31, 1943	18.7	12	
2796	do	do	Sept. 2, 1943	18.7	8	68
2797	do	do	Apr. 24, 1944	18.7	2	66
2798	21-2	NE¼NE¼ sec. 18	Aug. 5, 1943		8	69
2799	21-2	do	Apr. 24, 1944		5	68
2800	21-3	do	Mar. 31, 1943	18.7	18	
2801	21-3	do	Sept. 2, 1943	18.7	8	68
2802	21-3	do	Apr. 24, 1944	18.7	6	67
2803	21-5	do	Mar. 31, 1943	19.7	12	
2804	21-5	do	Sept. 2, 1943	19.7	8	66
2805	21-5	do	Apr. 24, 1944	19.7	10	66
2806	21-6	do	Apr. 5, 1943	18.4	1	
2807	21-6	do	Sept. 2, 1943	18.4	6	76
2808	21-6	do	Oct. 28, 1943	18.4	4	75
2809	21-6	do	Jan. 6, 1944	18.4	4	71
2810	21-6	do	Mar. 1, 1944	18.4	6	68
2811	21-6	do	Apr. 25, 1944	18.4	5	67
2812	21-6	do	July 14, 1944	18.4	3	70
2813	21-6	do	Sept. 1, 1944	18.4	2	74
2814	21-6	do	Oct. 31, 1944	18.4	3	73
2815	21-7	NW¼NE¼ sec. 18	Aug. 5, 1943		5	70

between the mouth of Bonita Creek near Solomonsville and the Southern Pacific Rail- at Calva—Continued

[Analyses in parts per million]

Specific conductance (K×10⁵ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Total hardness as $CaCO_3$	Percent sodium	Analysis No.
141						266								2761
128						234								2762
129						234								2763
139						236								2764
134						240								2765
209	160	29	247	265	188	455		2.0		1,210	1.65	518	51	2766
940						2,680								2767
881						2,540								2768
96.8				200		144								2769
117						188								2770
116						196								2771
115						184								2772
192				228		375								2773
153						275								2774
169						320								2775
112	54	9.6	160	209	95	175		5.8		602	.82	174	67	2776
105						168								2777
150						275								2778
127						222								2779
248						445								2780
194						330								2781
71	44	11	94	200	66	89	.7			404	.55	155	57	2782
142				290		230								2783
67.8						96								2784
71.7				182		81								2785
65				144	34	73						90		2786
73.3						96								2787
95.9				196		278								2788
90.0	50	9.4	130	179	79	154		1.5		512	.70	164	63	2789
74.1				174		105								2790
68.4	41	9.2	96	172	64	100				395	.54	140	60	2791
95.0				200		144								2792
130	66	14	189	226	117	230		2.0		729	.99	222	65	2793
65.6	44	9.2	83	198	56	74		3.4		367	.50	148	55	2794
117				241		184								2795
139						235								2796
96.1						149								2797
97.5						154								2798
90.2	41	13	134	195	84	137	1.6	2.5	.1	509	.69	156	65	2799
97.9	46	8.7	149	213	91	144		2.5	.5	546	.74	151	68	2800
88.2						128								2801
88.2						129								2802
127				271		204								2803
104						158								2804
125	64	14	193	265	116	206	1.5	3.0	0	728	.99	217	66	2805
189				210		405								2806
235				220		520								2807
182	76	14	306	215	171	390	2.3	2.5	6.0	1,070	1.46	247	73	2808
172						355								2809
188						400								2810
184						385								2811
179						365								2812
187						390								2813
299	199	33	404	272	255	720	1.5	3.0		1,750	2.38	632	58	2814
109						175								2815

Chemical character of ground waters in the Gila River Basin, Graham County, Ariz., road bridge

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (°F.)
	Driven observation well—Con.					
2816	21-7	NW¼NE¼ sec. 18	Apr. 24, 1944		2	62
2817	21-9	SW¼SE¼ sec. 18	Oct. 8, 1943		8	69
2818	21-9	do	Apr. 25, 1944		5	68
2819	21-10	NW¼NE¼ sec. 18	Mar. 31, 1943	18.6	20	
2820	21-10	do	Sept. 2, 1943	18.6	8	65
2821	21-10	do	Apr. 24, 1944	18.6	10	67
2822	21-16	SW¼NW¼ sec. 18	Aug. 5, 1943		8	70
2823	21-16	do	Nov. 2, 1943		10	70
2824	21-16	do	Jan. 6, 1944		8	66
2825	21-16	do	Mar. 3, 1944		10	64
2826	21-16	do	Apr. 24, 1944		6	64
2827	21-16	do	July 11, 1944		6	68
2828	21-16	do	Aug. 30, 1944		10	71
2829	21-16	do	Oct. 30, 1944		6	71
2830	21-21	NW¼NW¼ sec. 18	Aug. 4, 1943		8	67
2831	21-21	do	May 26, 1944			
2832	21-26	SW¼NW¼ sec. 18	Aug. 4, 1943		3	71
2833	21-27	do	Sept. 1, 1943		8	69
2834	21-27	do	May 26, 1944		5	66
2835	21-30	NE¼SE¼ sec. 18	Sept. 2, 1943		1	70
2836	21-31	SW¼NE¼ sec. 18	do		8	65
2837	21-31	do	Apr. 24, 1944		8	64
2838	21-32	do	Sept. 2, 1943		1	71
2839	21-32	do	Nov. 2, 1943		.5	70
2840	21-32	do	Jan. 7, 1944		.5	66
2841	21-32	do	Mar. 3, 1944		1	64
2842	21-32	do	Apr. 24, 1944		.5	66
2843	21-32	do	July 11, 1944		1	69
2844	21-32	do	Aug. 30, 1944		1	71
2845	21-32	do	Oct. 30, 1944		1	70
2846	21-33	NW¼NE¼ sec. 18	Sept. 2, 1943		2	67
2847	21-33	do	Apr. 24, 1944		2	60
2848	21-34	NE¼SE¼ sec. 18	Sept. 2, 1943		3	68
2849	21-36	NE¼NW¼ sec. 18	do		6	68
2850	21-36	do	Apr. 24, 1944		6	63
2851	21-37	do	Oct. 7, 1943		8	79
2852	21-38	NW¼NE¼ sec. 18	Sept. 2, 1943		8	69
2853	21-38	do	Apr. 24, 1944		6	66
2854	21-39	do	do		6	63
2855	21-40	do	Sept. 2, 1943		6	66
2856	21-40	do	Apr. 24, 1944		3	63
2857	22-4	NW¼NW¼ sec. 18	Aug. 4, 1943		8	68
2858	22-4	do	Apr. 27, 1944		3	66
2859	Mrs. J. B. Blessing domestic well	NW¼NE¼ sec. 19	Feb. 25, 1942	34		
2860	do	do	Mar. 18, 1943	34		
2861	Otto Holyoak unused well	NE¼NE¼ sec. 19	Mar. 19, 1943	60		
2862	Rex Black well	NE¼SE¼ sec. 19	Mar. 23, 1943	50		
2863	Domestic well, owner unknown	NW¼SE¼ sec. 19	do			
2864	C. J. Grover domestic well	SW¼SE¼ sec. 20	Feb. 18, 1944			
2865	Earl Black well	NW¼NW¼ sec. 20	Mar. 19, 1943	60		
2866	Ed. Chesley domestic well	NE¼SW¼ sec. 20	Mar. 29, 1940	29		72
2867	Domestic well, owner unknown	SW¼SE¼ sec. 20	Feb. 25, 1942			67
2868	do	do	Nov. 2, 1943			
2869	do	do	Jan. 5, 1944			
2870	do	do	Mar. 2, 1944			
2871	do	do	May 3, 1944			
2872	do	do	July 11, 1944			
2873	do	do	Aug. 30, 1944			
2874	do	do	Oct. 30, 1944			
2875	Seepage at mouth of Wash	SE¼NW¼ sec. 20	Mar. 31, 1944		2	68

between the mouth of Bonita Creek near Solomonsville and the Southern Pacific Rail- at Calva—Continued

[Analyses in parts per million]

Specific conductance (K×10^5 at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Total hardness as $CaCO_3$	Percent sodium	Analysis No.
121	78	19	160	306	76	202	1.9	0	0	688	.94	272	56	2816
338						845								2817
445	228	51	681	290	408	1,130	1.8	0	.4	2,640	3.59	778	65	2818
144				258		262								2819
120						196								2820
119						200								2821
128						205								2822
103	64	13	147	242	101	160	1.4	.5	3.0	606	.82	213	60	2823
107						162								2824
110						170								2825
121	80	16	159	259	128	186	1.1	1.5	.0	699	.95	266	57	2826
142						232								2827
120						184								2828
169	134	23	195	256	174	325		3.0		980	1.33	429	45	2829
92.5						128								2830
101						138								2831
123	37	8.5	219	218	145	194		2.0		713	.97	128	79	2832
299				280		685								2833
170	77	20	270	249	256	270	2.2	6.1	2.0	1,020	1.39	274	68	2834
111						202								2835
146						258								2836
130						218								2837
82.0						112								2838
83.0	46	14	117	185	104	115	.8	2.2	4.0	490	.67	172	60	2839
96.7						144								2840
155	118	21	194	225	208	280	1.1	5.0	.5	938	1.28	381	53	2841
128						204								2842
80.2	41	7.0	122	194	88	100	1.2	3.0	5.0	458	.62	132	67	2843
72.0						85								2844
71.6						85								2845
90.0						130								2846
201	91	21	326	331	191	385	1.9	3.5	.4	1,180	1.60	314	69	2847
95.6						144								2848
81.2						108								2849
193						375								2850
77.5						106								2851
80.8						104								2852
88.0						122								2853
494	132	52	981	708	702	935	3.2	47	1.5	3,200	4.35	544	80	2854
110	54	17	160	225	121	168	1.1	2.0	2.5	634	.86	205	63	2855
166						285								2856
103						148								2857
130						210								2858
81.0						136								2859
112				189		194								2860
358				518		745								2681
415	66	35	842	648	393	835	2.0	20	5.0	2,510	3.41	308	86	2862
56.1	36	6.8	72	162	54	59		2.5		310	.42	118	57	2863
174	94	31	244	270	181	335	.7	11	1.0	1,030	1.40	362	60	2864
185	106	20	259	285	158	358	.9	5.0	1.4	1,047	1.42	346	62	2865
98				233	100	133	.2	5.0				63		2866
126						182								2867
244	155	34	325	242	272	525	.7	13	8.0	1,440	1.96	527	57	2868
273						595								2869
292	209	43	373	256	342	660	.6	15	.2	1,770	2.41	698	54	2870
345	277	57	409	268	406	825	.6	8.5	.2	2,120	2.88	926	49	2871
426	363	74	472	269	540	1,020	.0	19	2.0	2,620	3.56	1,210	46	2872
443						1,060								2873
452						1,080								2874
238	88	25	416	426	240	440	1.5	5.0	2.0	1,430	1.94	322	74	2875

Chemical character of ground waters in the Gila River Basin, Graham County, Ariz.; road bridge

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (°F.)
2876	Seepage in Gila River channel on right bank.	SW¼NE¼ sec. 20	Mar. 31, 1944		20	77
2877	Driven observation well, 19-71	SE¼SE¼ sec. 20	Sept. 3, 1943		8	65
2878	20-2	SE¼NE¼ sec. 20	Sept. 4, 1943		8	68
2879	20-2	do.	Apr. 19, 1944		5	63
2880	20-4	NE¼SE¼ sec. 20	Sept. 4, 1943		8	62
2881	20-4	do.	Apr. 19, 1944		2	56
2882	20-5	SE¼NE¼ sec. 20	Sept. 4, 1943		8	63
2883	20-5	do.	Jan. 5, 1944		3	63
2884	20-5	do.	Apr. 19, 1944		8	61
2885	20-6	do.	Sept. 4, 1943		8	63
2886	20-6	do.	Apr. 19, 1944		6	60
2887	20-8	do.	Sept. 4, 1943		8	63
2888	20-8	do.	Apr. 19, 1944		6	63
2889	20-9	do.	Sept. 4, 1943		6	75
2890	20-9	do.	Feb. 10, 1944			
2891	20-9	do.	do.			69
2892	20-9	do.	Apr. 17, 1944		4	69
2893	20-10	NE¼NE¼ sec. 20	Apr. 6, 1943	23.7	8	
2894	20-10	do.	Sept. 3, 1943	23.7	4	82
2895	20-10	do.	Apr. 17, 1944	23.7	2	80
2896	20-11	SW¼NE¼ sec. 20	Apr. 6, 1943	18.5	2	
2897	20-11	do.	Sept. 3, 1943	18.5	6	68
2898	20-11	do.	Apr. 17, 1944	18.5	5	64
2899	20-12	NW¼NE¼ sec. 20	Sept. 4, 1943		6	77
2900	20-12	do.	Feb. 10, 1944			76
2901	20-12	do.	Apr. 17, 1944		6	76
2902	20-13	NE¼NE¼ sec. 20	Sept. 4, 1943		4	79
2903	20-13	do.	Apr. 17, 1944		2	78
2904	20-14	NW¼NE¼ sec. 20	Sept. 4, 1943		8	68
2905	20-14	do.	Apr. 17, 1944		4	60
2906	20-15	do.	Aug. 6, 1943		8	77
2907	20-15	do.	Jan. 6, 1944		8	76
2908	20-15	do.	Mar. 1, 1944		8	74
2909	20-15	do.	Apr. 17, 1944		6	75
2910	20-15	do.	July 14, 1944		4	76
2911	20-15	do.	Sept. 1, 1944		6	77
2912	20-15	do.	Oct. 31, 1944		6	77
2913	20-17	do.	Sept. 4, 1943		8	65
2914	20-17	do.	Oct. 28, 1943		5	64
2915	20-17	do.	Jan. 6, 1944		10	63
2916	20-17	do.	Mar. 1, 1944		10	61
2917	20-17	do.	Apr. 17, 1944		8	60
2918	20-17	do.	July 14, 1944		6	62
2919	20-17	do.	Sept. 1, 1944		6	63
2920	20-17	do.	Oct. 31, 1944		8	64
2921	20-20	do.	Apr. 5, 1943	18.4	10	
2922	20-20	do.	Sept. 2, 1943	18.4	8	65
2923	20-20	do.	Apr. 17, 1944	18.4	6	61
2924	20-23	NE¼NW¼ sec. 20	Sept. 4, 1943		8	65
2925	20-23	do.	Apr. 19, 1944		4	61
2926	20-54	do.	Sept. 4, 1943		8	67
2927	20-54	do.	Apr. 17, 1944		6	61
2928	20-55	do.	Apr. 6, 1943	18.2	10	
2929	20-55	do.	Sept. 3, 1943	18.2	8	68
2930	20-55	do.	Oct. 28, 1943	18.2	10	68
2931	20-55	do.	Jan. 6, 1944	18.2	10	68
2932	20-55	do.	Mar. 1, 1944	18.2	10	66
2933	20-55	do.	Apr. 17, 1944	18.2	8	65
2934	20-55	do.	July 14, 1944	18.2	5	65
2935	20-55	do.	Sept. 1, 1944	18.2	6	67

between the mouth of Bonita Creek near Solomonsville and the Southern Pacific Rail- at Calva—Continued

[Analyses in parts per million]

Specific conductance (K×10⁵ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Total hardness as $CaCO_3$	Percent sodium	Analysis No.
404	144	48	701	363	497	895		3.5	1.0	2,470	3.36	557	73	2876
648						1,490								2877
976				443		2,570								2878
782	323	99	1,400	564	1,060	1,900	1.6	2.0	3.0	5,060	6.88	1,210	72	2879
575						1,270								2880
429						900								2881
641						1,450								2882
585	254	73	1,030	572	785	1,330	1.2	15	10	3,770	5.13	934	71	2883
549						1,260								2884
738						1,700								2885
628	238	79	1,140	460	853	1,500	.8	11	2.0	4,050	5.51	919	73	2886
599						1,360								2887
592	296	77	990	510	803	1,370	1.0	23	3.5	3,810	5.18	1,060	66	2888
684						1,770								2889
673	212	43	1,260	341	623	1,770	4.6	.5		4,080	5.55	706	80	2890
677				356		1,740			5.5					2891
547	139	28	1,050	215	486	1,460	4.2	1.0	3.0	3,270	4.45	462	83	2892
591				190		1,570								2893
588				174	527	1,550								2894
550						1,510								2895
515				466		1,145								2896
544						1,210								2897
578	278	70	977	376	794	1,390	.7	12	4.0	3,710	5.05	982	68	2898
558						1,480								2899
556	170	35	1,000	200	488	1,460	2.6	5.0	4.6	3,260	4.43	568	79	2900
531						1,440								2901
749						2,050								2902
637						1,780								2903
1,040						2,600								2904
768						1,880								2905
587				188		1,590								2906
564	183	35	1,040	186	526	1,530	3.0	4.0	9.0	3,410	4.64	600	79	2907
558						1,490								2908
555						1,510								2909
558						1,460								2910
548						1,470								2911
551						1,480								2912
968				420	1,137	2,500								2913
1,030	465	138	1,860	660	1,330	2,720	1.4	1.0		6,840	9.30	1,730	70	2914
1,060						2,840			8.5					2915
1,090						2,920								2916
1,050						2,880								2917
1,110						3,020								2918
1,120						2,990								2919
1,190						3,260								2920
946				338		2,470								2921
942						2,390								2922
1,070						2,950								2923
342						720								2924
335	144	34	583	479	352	710	1.0	5.0	2.5	2,060	2.80	500	72	2925
402						860								2926
499	236	59	830	514	631	1,100	1.3	2.5	2.0	3,110	4.23	832	69	2927
413	147	45	673	346	509	880	1.2	1.0	6.0	2,427	3.30	552	73	2928
390						810								2929
399						865								2930
396	173	43	678	457	486	845	1.4	9.6	18	2,460	3.35	608	71	2931
423						920								2932
432						940								2933
454						985								2934
417						880								2935

Chemical character of ground waters in the Gila River Basin, Graham County, Ariz., road bridge

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (°F.)
	Driven observation well—Con.					
2936	20-55	NE¼NW¼ sec. 20	Oct. 31, 1944	18.2	8	67
2937	20-57	SW¼SE¼ sec. 20	Sept. 3, 1943		2	68
2938	20-58	NW¼SE¼ sec. 20	do		8	66
2939	20-58	do	Apr. 19, 1944		6	63
2940	20-59	do	Sept. 3, 1943		2	66
2941	20-59	do	Apr. 19, 1944		.5	63
2942	20-60	SE¼NW¼ sec. 20	Sept. 3, 1943		8	65
2943	20-61	do	do		8	65
2944	20-61	do	Apr. 19, 1944		6	62
2945	20-63	SW¼NE¼ sec. 20	Sept. 3, 1943		2	68
2946	20-63	do	Apr. 19, 1944		1	64
2947	20-64	do	Sept. 3, 1943		2	70
2948	20-64	do	Apr. 19, 1944		1.5	64
2949	20-65	do	Sept. 3, 1943		8	67
2950	20-65	do	Feb. 10, 1944			
2951	20-65	do	do			
2952	20-65	do	Mar. 2, 1944		8	64
2953	20-65	do	Apr. 19, 1944		10	64
2954	20-65	do	July 11, 1944		8	66
2955	20-65	do	Aug. 30, 1944		10	68
2956	20-65	do	Oct. 30, 1944		8	68
2957	20-66	NE¼NW¼ sec. 20	Sept. 3, 1943		8	66
2958	20-66	do	Apr. 19, 1944		10	65
2959	20-67	do	Sept. 3, 1943		8	65
2960	20-67	do	Apr. 19, 1944		8	65
2961	20-69	NW¼NW¼ sec. 20	Sept. 3, 1943		8	66
2962	20-69	do	Nov. 2, 1943		10	68
2963	20-69	do	Jan. 7, 1944		10	66
2964	20-69	do	Mar. 2, 1944		8	66
2965	20-69	do	Apr. 19, 1944		10	66
2966	20-69	do	July 11, 1944		7	67
2967	20-69	do	Aug. 30, 1944		8	68
2968	20-69	do	Oct. 30, 1944		6	68
2969	Spring in fault zone	NE¼NE¼ sec. 21	Feb. 27, 1942		7	81
2970	Seepage in Gila River channel	SW¼NW¼ sec. 21	Sept. 22, 1941		5	
2971	Driven observation well, 19-5	SE¼SE¼ sec. 21	Sept. 6, 1943		6	73
2972	do	do	Apr. 14, 1944		8	63
2973	19-6	do	Sept. 6, 1943		2	85
2974	19-6	do	Apr. 14, 1944		.25	77
2975	19-11	do	Sept. 7, 1943		8	63
2976	19-11	do	Apr. 14, 1944		8	67
2977	19-12	do	Sept. 6, 1943		1	80
2978	19-16	do	do		8	73
2979	19-16	do	Apr. 14, 1944		5	65
2980	19-17	do	Sept. 6, 1943		8	85
2981	19-17	do	Apr. 14, 1944		4	77
2982	19-18	do	Oct. 7, 1943		8	88
2983	19-18	do	Mar. 1, 1944		10	83
2984	19-18	do	Apr. 14, 1944		5	84
2985	19-21	SW¼SE¼ sec. 21	Oct. 13, 1943		8	71
2986	19-21	do	Apr. 14, 1944		3	71
2987	19-22	do	Sept. 3, 1943		8	77
2988	19-22	do	Apr. 14, 1944		8	73
2989	19-23	NW¼SE¼ sec. 21	Sept. 3, 1943		6	94
2990	19-23	do	Apr. 14, 1944		4	84
2991	19-24	SW¼SE¼ sec. 21	Mar. 30, 1943	18.7	5	
2992	19-24	do	Sept. 4, 1943	18.7	8	64
2993	19-24	do	Apr. 18, 1944	18.7	10	63
2994	19-25	do	Sept. 3, 1943		5	75
2995	19-25	do	Apr. 14, 1944		2	73

between the mouth of Bonita Creek near Solomonsville and the Southern Pacific Rail- at Calva—Continued

[Analyses in parts per million]

Specific conductance (K×10⁵ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Total hardness as $CaCO_3$	Percent sodium	Analysis No.
563	308	70	906	534	695	1,320		5.0		3,570	4.86	1,060	65	2936
342						670								2937
412						860								2938
425	182	47	729	484	521	905	1.4	16	2.0	2,640	3.59	648	71	2939
450						1,015								2940
458						960								2941
176						320								2942
195						360								2943
250	106	30	417	454	251	460	1.1	10	.5	1,500	2.04	388	70	2944
202						405								2945
222						415								2946
285						560								2947
292	106	28	517	404	344	570	1.4	6.2	2.0	1,770	2.41	380	75	2948
468						985								2949
425				528		881			5.5					2950
426	174	46	740	523	528	880	1.7	11		2,640	3.59	623	72	2951
412						855								2952
409						850								2953
426						875								2954
443						945								2955
446						955								2956
183						305								2957
195	68	20	331	336	187	345	1.5	12	.4	1,130	1.54	252	74	2958
352						715								2959
387						815								2960
155						270								2961
161	11	7.9	339	285	157	280	.9	4.5	16	941	1.28	60	92	2962
157						262								2963
145						252								2964
167						295								2965
173						300								2966
167						295								2967
171						305								2968
440	96	12	849	115	367	1,170	3.7			2,550	3.47	289	86	2969
459	175	54	815	475	573	1,020	2.2	1.0		2,870	3.90	659	73	2970
851						2,440								2971
794						2,280								2972
540						1,440								2973
453						1,240								2974
776						2,210								2975
790						2,260								2976
513														2977
717				213	587	1,960	3.8		4.0					2978
642						1,770								2979
515						1,380								2980
515	113	18	1,010	140	426	1,400	3.0	1.0	.5	3,040	4.13	356	86	2981
714				152		2,020								2982
490	104	18	959	124	403	1,340	3.1	.5	1.0	2,890	3.93	334	86	2983
475	97	14	935	115	381	1,300	3.1	.5	2.5	2,790	3.79	300	87	2984
656						1,880								2985
581	134	32	1,130	202	461	1,600	3.8	.5	.5	3,460	4.71	466	84	2986
755						1,660								2987
562						1,540								2988
506	86	16	993	118	479	1,300	4.2	.5	5.0	2,940	4.00	280	89	2989
501	96	15	1,000	120	484	1,320	3.8	.5	2.5	2,980	4.05	301	88	2990
594				462		1,400								2991
559						1,300								2992
404	180	52	662	458	444	895	1.0	.5	.5	2,460	3.35	663	68	2993
652						1,770								2994
559	120	26	1,090	182	463	1,520	3.4	.5	1.0	3,310	4.50	406	85	2995

Chemical character of ground waters in the Gila River Basin, Graham County, Ariz., road bridge

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (°F.)
	Driven observation well—Con.					
2996	19-26	SW¼SE¼ sec. 21	Sept. 6, 1943		8	85
2997	19-26	do	Apr. 14, 1944		2	79
2998	19-27	NW¼SE¼ sec. 21	Sept. 3, 1943		2	86
2999	19-27	do	Apr. 14, 1944		1	77
3000	29-28	do	Sept. 6, 1943		2	85
3001	19-28	do	Apr. 14, 1944		1	79
3002	19-29	SE¼SW¼ sec. 21	Sept. 3, 1943		5	74
3003	19-29	do	Apr. 14, 1944		2	74
3004	19-30	do	Sept. 3, 1943		8	81
3005	19-30	do	Apr. 14, 1944		3	76
3006	19-31	NW¼SE¼ sec. 21	Sept. 3, 1943		5	83
3007	19-31	do	Apr. 14, 1944		1	75
3008	19-32	do	Sept. 3, 1943		5	84
3009	19-32	do	Apr. 14, 1944		5	79
3010	19-33	SE¼SW¼ sec. 21	Sept. 3, 1943		8	72
3011	19-33	do	Apr. 14, 1944		6	72
3012	19-34	NE¼SW¼ sec. 21	Sept. 3, 1943		8	81
3013	19-34	do	Apr. 14, 1944		2	78
3014	19-36	SE¼NW¼ sec. 21	Sept. 4, 1943		6	84
3015	19-36	do	Apr. 17, 1944		4	82
3016	19-37	NE¼SW¼ sec. 21	Sept. 4, 1943		8	66
3017	19-37	do	Apr. 19, 1944		4	63
3018	19-38	SE¼SW¼ sec. 21	Sept. 3, 1943		8	75
3019	19-38	do	Apr. 17, 1944		6	73
3020	19-39	NE¼SW¼ sec. 21	Apr. 6, 1943	18.6	5	
3021	19-39	do	Sept. 3, 1943	18.6	2	78
3022	19-39	do	Apr. 17, 1944	18.6	2	73
3023	19-40	do	Sept. 6, 1943		4	78
3024	19-40	do	Apr. 17, 1944		4	74
3025	19-41	SE¼NW¼ sec. 21	Sept. 4, 1943		8	82
3026	19-41	do	Apr. 17, 1944		3	80
3027	19-42	SW¼SW¼ sec. 21	Mar. 30, 1943	18	2	
3028	19-42	do	Sept. 3, 1943	18	8	65
3029	19-42	do	Apr. 19, 1944	18	4	63
3030	19-43	NW¼SW¼ sec. 21	Apr. 6, 1943	18.8	2	
3031	19-43	do	Sept. 3, 1943	18.8	5	74
3032	19-43	do	Apr. 17, 1944	18.8	6	70
3033	19-44	do	Sept. 4, 1943		6	76
3034	19-44	do	Oct. 28, 1943		5	75
3035	19-44	do	Jan. 6, 1944		3	72
3036	19-44	do	Mar. 1, 1944		8	70
3037	19-44	do	Apr. 17, 1944		5	69
3038	19-44	do	July 12, 1944		4	72
3039	19-44	do	Sept. 1, 1944		4	75
3040	19-44	do	Oct. 31, 1944		2	75
3041	19-45	SE¼NW¼ sec. 21	Apr. 6, 1943	18.5	8	
3042	19-45	do	Sept. 4, 1943	18.5	8	77
3043	19-45	do	Apr. 17, 1944	18.5	8	72
3044	19-46	do	Sept. 4, 1943		6	81
3045	19-47	NW¼SW¼ sec. 21	Sept. 3, 1943		8	62
3046	19-47	do	Apr. 19, 1944		5	58
3047	19-48	do	Mar. 30, 1943	18.4	5	
3048	19-48	do	Sept. 3, 1943	18.4	8	69
3049	19-48	do	Apr. 19, 1944	18.4	8	63
3050	19-49	do	Apr. 17, 1944		3	65
3051	19-51	do	Mar. 30, 1943	18.9	5	
3052	19-51	do	Sept. 3, 1943	18.9	8	68
3053	19-51	do	Apr. 19, 1944	18.9	3	66
3054	19-52	SW¼NW¼ sec. 21	Sept. 4, 1943		8	74
3055	19-52	do	Feb. 10, 1944			70

between the mouth of Bonita Creek near Solomonsville and the Southern Pacific Rail- at Calva—Continued

[Analyses in parts per million]

Specific conductance (K×10⁵ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Total hardness as $CaCO_3$	Percent sodium	Analysis No.
561						1,450								2996
523						1,390								2997
520						1,350								2998
509	102	18	1,000	132	486	1,340	3.4	.0	.5	3,010	4.09	328	87	2999
559						1,460								3000
529						1,410								3001
615						1,640								3002
572	129	29	1,120	188	513	1,540	3.8	.0	2.0	3,430	4.66	441	85	3003
526						1,360								3004
564						1,510								3005
563						1,410								3006
560						1,470								3007
548														3008
510	117	21	999	154	491	1,350	3.8	.0	1.5	3,060	4.16	378	85	3009
582						1,530								3010
578	127	29	1,120	191	531	1,530	4.2	.0	1.5	3,440	4.68	436	85	3011
530						1,370								3012
561						1,480								3013
524						1,350								3014
507						1,340								3015
856	569	142	1,246	562	1,180	2,130	1.1	22	2.5	5,570	7.58	2,004	57	3016
880	604	152	1,310	592	1,250	2,240	.6	33	.2	5,880	8.00	2,130	57	3017
692						1,830								3018
590	126	26	1,160	200	573	1,540	4.6	1.0	4.0	3,530	4.80	422	86	3019
607	143	28	1,172	197	563	1,610		1.0	4.5	3,610	4.91	472	84	3020
533						1,390								3021
556						1,440								3022
591						1,570								3023
513						1,350								3024
500						1,300								3025
500	155	24	909	164	465	1,300	3.4	1.5	2.5	2,940	4.00	486	80	3026
733				507		1,740								3027
843						2,080								3028
795	501	132	1,230	644	1,130	1,950	1.1	24	.4	5,290	7.19	1,790	60	3029
675				464		1,760								3030
727						1,930								3031
616	142	27	1,210	218	599	1,610	4.6	1.0	3.0	3,700	5.03	466	85	3032
806						2,190								3033
851	272	64	1,630	308	868	2,350	4.0	1.0	15	5,340	7.26	942	79	3034
744						1,990								3035
728						1,970								3036
713						1,910								3037
814						2,190								3038
803						2,190								3039
1,020	356	66	1,960	312	1,030	2,900		1.0		6,470	8.80	1,160	79	3040
538				297		1,330								3041
616						1,590								3042
568	196	43	1,020	256	571	1,470	3.4	1.0	2.5	3,430	4.66	666	76	3043
563						1,470								3044
714						1,660								3045
589						1,320								3046
613	296	78	1,023	586	803	1,390		8.9	4.5	3,890	5.29	1,059	68	3047
746														3048
704						1,730								3049
971						2,720								3050
560				227		1,460								3051
526						1,380								3052
500	136	33	918	164	447	1,320	2.6	2.0	2.0	2,940	4.00	475	81	3053
505														3054
494	128	28	914	165	440	1,290	3.4	.5		2,890	3.93	434	82	3055

Chemical character of ground waters in the Gila River Basin, Graham County, Ariz., road bridge

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (°F.)
	Driven observation well—Con.					
3056	19-52	SW¼NW¼ sec. 21	Feb. 10, 1944	-------	-------	70
3057	19-52	do	Mar. 1, 1944	-------	6	70
3058	19-52	do	Apr. 25, 1944	-------	6	70
3059	19-52	do	July 12, 1944	-------	6	63
3060	19-52	do	Sept. 1, 1944	-------	8	73
3061	19-52	do	Oct. 31, 1944	-------	5	73
3062	19-54	SE¼SW¼ sec. 21	Sept. 4, 1943	-------	8	65
3063	19-54	do	Apr. 18, 1944	-------	4	66
3064	19-56	NW¼SE¼ sec. 21	Sept. 6, 1943	-------	8	93
3065	19-56	do	Apr. 14, 1944	-------	.25	79
3066	19-57	NE¼SE¼ sec. 21	Sept. 6, 1943	-------	8	97
3067	19-57	do	Feb. 10, 1944	-------	-------	91
3068	19-57	do	do	-------	-------	-------
3069	19-57	do	Apr. 14, 1944	-------	6	91
3070	19-57	do	Oct. 27, 1944	-------	8	96
3071	19-58	NW¼SE¼ sec. 21	Oct. 13, 1943	-------	8	89
3072	19-59	NE¼SE¼ sec. 21	Sept. 3, 1943	-------	6	95
3073	19-59	do	Apr. 14, 1944	-------	8	92
3074	19-60	SW¼NE¼ sec. 21	Sept. 3, 1943	-------	8	91
3075	19-60	do	Oct. 28, 1943	-------	10	92
3076	19-60	do	Jan. 6, 1944	-------	12	91
3077	19-60	do	Mar. 1, 1944	-------	12	89
3078	19-60	do	Apr. 25, 1944	-------	10	88
3079	19-60	do	July 12, 1944	-------	10	90
3080	19-60	do	Sept. 1, 1944	-------	10	91
3081	19-60	do	Oct. 27, 1944	-------	8	91
3082	20-1	NW¼SW¼ sec. 21	Sept. 4, 1943	-------	8	56
3083	20-1	do	Apr. 19, 1944	-------	6	56
3084	Spring at fault zone, USGS 109	NE¼SW¼ sec. 22	Dec. 17, 1941	-------	5	72
3085	USGS 110	SE¼NW¼ sec. 22	do	-------	5	83
3086	USGS 111-C	SW¼NW¼ sec. 22	Apr. 14, 1940	-------	20	-------
3087	USGS 111-C	do	Dec. 17, 1941	-------	-------	-------
3088	USGS 111-C	do	Feb. 10, 1944	-------	10	61
3089	USGS 111-C	do	do	-------	-------	61
3090	Driven observation well, 18-61	SW¼SW¼ sec. 22	Sept. 6, 1943	-------	1	72
3091	do	do	Apr. 12, 1944	-------	2	66
3092	18-62	SE¼SW¼ sec. 22	Sept. 6, 1943	-------	4	72
3093	18-62	do	Oct. 28, 1943	-------	10	72
3094	18-62	do	Jan. 6, 1944	-------	8	71
3095	18-62	do	Mar. 1, 1944	-------	-------	69
3096	18-62	do	May 3, 1944	-------	2	69
3097	18-62	do	July 12, 1944	-------	5	70
3098	18-62	do	Sept. 1, 1944	-------	6	71
3099	18-62	do	Oct. 27, 1944	-------	5	72
3100	18-63	SW¼SW¼ sec. 22	Oct. 7, 1943	-------	8	70
3101	18-63	do	Apr. 12, 1944	-------	2	70
3102	18-64	do	Sept. 6, 1943	-------	4	73
3103	18-64	do	Apr. 12, 1944	-------	2	71
3104	18-65	do	Sept. 6, 1943	-------	2	92
3105	18-65	do	Apr. 14, 1944	-------	3	88
3106	18-66	NW¼SW¼ sec. 22	Sept. 6, 1943	-------	4	90
3107	18-66	do	Apr. 14, 1944	-------	1	86
3108	18-67	do	Sept. 6, 1943	-------	3	93
3109	18-78	SE¼SW¼ sec. 22	Apr. 17, 1944	-------	6	86
3110	18-78	do	Sept. 6, 1943	-------	8	87
3111	USGS 96	SW¼SW¼ sec. 26	May 29, 1940	14	-------	62
3112	Seepage in Gila River channel	do	Oct. 2, 1941	-------	-------	-------
3113	Driven observation well, 17-35	SW¼SE¼ sec. 26	Oct. 6, 1943	-------	8	73
3114	17-39	SE¼SW¼ sec. 26	Sept. 8, 1943	-------	3	79
3115	17-44	do	Oct. 6, 1943	-------	8	64

between the mouth of Bonita Creek near Solomonsville and the Southern Pacific Rail- at Calva—Continued

[Analyses in parts per million]

Specific conductance (K×10⁵ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Total hardness as $CaCO_3$	Percent sodium	Analysis No.
501				200		1,290			2.9					3056
491						1,300								3057
491						1,300								3058
511						1,300								3059
569	178	33	1,050	206	512	1,520	3.0	1.5	10	3,400	4.62	580	80	3060
699						1,930								3061
931	696	178	1,250	505	1,290	2,420	.6	20	3.8	6,100	8.30	2,469	52	3062
936						2,450								3063
485	94	18	933	111	368	1,320		2.0		2,790	3.79	308	87	3064
587						1,540								3065
501	84	13	1,010	106	454	1,340	3.8	.5	5.0	2,960	4.03	263	89	3066
516	96	14	1,010	120	484	1,340	3.8	.5		3,010	4.09	297	88	3067
520				128		1,340			4.4					3068
511						1,350								3069
494						1,300								3070
494				150		1,310								3071
500						1,280								3072
506	96	14	1,000	130	500	1,300	3.8	2.0	4.5	2,980	4.05	297	88	3073
516						1,370								3074
491	134	23	937	146	468	1,310	3.8	2.0	5.0	2,950	4.01	429	83	3075
480	129	17	910	132	448	1,280	3.4	2.0	8.0	2,910	3.96	392	83	3076
486						1,300								3077
497						1,320								3078
561						1,480								3079
541						1,440								3080
522						1,400								3081
621	310	84	1,026	542	852	1,420	1.2	14	5.0	3,970	5.40	1,119	67	3082
427						915								3083
462	100	11	903	116	385	1,250				2,710	3.69	294	87	3084
397	160	16	671	94	294	1,090	1.4			2,279	3.10	466	76	3085
480	124	17	908	159	421	1,265				2,810	3.82	379	84	3086
370	120	17	898	134	420	1,250	4.3			2,780	3.78	370	84	3087
445	103	14	852	118	381	1,180	3.5	1.0		2,590	3.52	314	85	3088
449				136		1,160			2.7					3089
739						2,080								3090
726						2,030								3091
732														3092
700	286	83	1,190	325	523	2,000	2.6	3.5	8.0	4,250	5.78	1,060	71	3093
715						2,040								3094
720						2,080								3095
733						2,130								3096
772						2,230								3097
757						2,220								3098
734						2,160								3099
821						2,360								3100
714						1,970								3101
591						1,590								3102
543	152	26	1,000	158	466	1,450	2.6	6.3	1.0	3,180	4.32	486	82	3103
555						1,550								3104
468	92	12	919	107	360	1,280	3.1	1.0	2.0	2,720	3.70	279	88	3105
521						1,410								3106
485						1,340								3107
519						1,390								3108
509	122	17	977	118	414	1,390	3.0	4.0	3.5	2,990	4.07	374	85	3109
505						1,370								3110
1,190	740	260	1,651	194	1,382	3,480	.0			7,220	9.82	2,920	55	3111
467				316		1,075								3112
701				383		1,940								3113
829						2,320								3114
395						955								3115

Chemical character of ground waters in the Gila River Basin, Graham County, Ariz., road bridge

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (°F.)
	Driven observation well—Con.					
3116	17-50	SW¼SW¼ sec. 26	Sept. 8, 1943		4	76
3117	17-51	SE¼SE¼ sec. 26	Oct. 6, 1943		8	72
3118	17-52	SW¼SW¼ sec. 26	Sept. 8, 1943		2	68
3119	17-53	do	do		2	75
3120	17-54	do	do		1	66
3121	17-55	do	Mar. 27, 1943	18.6	2	
3122	17-55	do	Sept. 7, 1943	18.6	6	67
3123	H. Uhli irrigation well	SE¼NE¼ sec. 27	June 19, 1940	65	1,382	68
3124	do	do	May 17, 1943	65	1,750	68
3125	W. F. Bollinger stock well	NW¼NE¼ sec. 27	Feb. 27, 1942	29		
3126	T. L. Willis stock well	SW¼SW¼ sec. 27	Feb. 25, 1942	54		
3127	Driven observation well, USGS 93	NE¼SE¼ sec. 27	June 7, 1940	21		
3128	USGS 94	do	May 30, 1940	22		61
3129	USGS 94	do	Nov. 5, 1943	22		65
3130	USGS 95	SE¼SE¼ sec. 27	May 29, 1940	19		62
3131	USGS 95	do	Nov. 5, 1943	19		71
3132	Seepage in Gila River channel	NE¼SW¼ sec. 27	Sept. 22, 1941		2	
3133	T. L. Willis irrigation well	SW¼SW¼ sec. 27	July 1, 1944			
3134	Driven observation well, 18-5	SE¼SE¼ sec. 27	Oct. 7, 1943		8	72
3135	do	do	Oct. 28, 1943		5	73
3136	do	do	Jan. 6, 1944		5	71
3137	do	do	Mar. 1, 1944		10	66
3138	do	do	Apr. 25, 1944		3	62
3139	do	do	July 10, 1944		8	62
3140	do	do	Aug. 29, 1944		10	67
3141	do	do	Oct. 27, 1944		8	71
3142	18-9	do	Mar. 29, 1943	18.7	5	
3143	18-9	do	Sept. 6, 1943	18.7	8	
3144	18-9	do	Apr. 11, 1944	18.7	6	61
3145	18-10	do	Oct. 7, 1943		8	65
3146	18-10	do	Apr. 11, 1944		8	65
3147	18-12	SW¼SE¼ sec. 27	July 27, 1943		4	63
3148	18-12	do	Apr. 11, 1944		10	61
3149	18-13	do	Mar. 30, 1943	18.3	1	
3150	18-13	do	Sept. 6, 1943	18.3	1	68
3151	18-13	do	Apr. 11, 1944	18.3	1	61
3152	18-14	SE¼SE¼ sec. 27	Mar. 29, 1943	18.8	5	
3153	18-14	do	Sept. 6, 1943	18.8	5	69
3154	18-14	do	Apr. 11, 1944	18.8	5	63
3155	18-15	NE¼SE¼ sec. 27	Sept. 8, 1943		8	65
3156	18-15	do	Apr. 11, 1944		6	64
3157	18-16	SW¼SE¼ sec. 27	July 27, 1943		2	62
3158	18-16	do	Apr. 18, 1944		5	56
3159	18-17	do	Mar. 30, 1943	18.4	2	
3160	18-17	do	Sept. 6, 1943	18.4	4	63
3161	18-17	do	Apr. 11, 1944	18.4	3	61
3162	18-18	do	Mar. 30, 1943	18.7	1	
3163	18-18	do	Sept. 6, 1943	18.7	4	64
3164	18-18	do	Apr. 11, 1944	18.7	1.5	63
3165	18-19	NW¼SE¼ sec. 27	Sept. 8, 1943		8	74
3166	18-19	do	Apr. 11, 1944		8	59
3167	18-20	SE¼SW¼ sec. 27	July 27, 1943			65
3168	18-20	do	Apr. 11, 1944		4	60
3169	18-21	SW¼SE¼ sec. 27	Mar. 29, 1943	18.6	5	
3170	18-21	do	Sept. 6, 1943	18.6	5	
3171	18-21	do	Apr. 11, 1944	18.6	2	61
3172	18-22	NW¼SE¼ sec. 27	Mar. 29, 1943	18.8	5	
3173	18-22	do	Sept. 6, 1943	18.8	8	66
3174	18-22	do	Apr. 11, 1944	18.8	8	64
3175	18-23	NW¼SW¼ sec. 27	Sept. 8, 1943		8	64

between the mouth of Bonita Creek near Solomonsville and the Southern Pacific Rail- at Calva—Continued

[Analyses in parts per million]

Specific conductance (K×10⁵ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids		Total hardness as $CaCO_3$	Percent sodium	Analysis No.
										Parts per million	Tons per acre-foot			
207	---	---	---	---	---	395	---	---	---	---	---	---	---	3116
418	---	---	---	297	---	1,030	---	---	---	---	---	---	---	3117
604	---	---	---	---	---	1,640	---	---	---	---	---	---	---	3118
481	---	---	---	---	---	1,175	---	---	---	---	---	---	---	3119
398	---	---	---	---	---	970	---	---	---	---	---	---	---	3120
695	---	---	---	674	---	1,610	---	---	---	---	---	---	---	3121
802	---	---	---	---	---	2,030	---	---	---	---	---	---	---	3122
540	---	---	---	371	400	1,388	---	---	---	---	---	990	---	3123
460	245	67	654	345	402	1,140	---	---	---	2,680	3.64	887	62	3124
678	248	69	1,134	288	400	1,925	---	---	---	3,920	5.33	902	73	3125
960	---	---	---	---	---	2,475	---	---	---	---	---	---	---	3126
420	168	62	630	165	436	1,030	1.0	---	---	2,408	3.27	674	67	3127
600	---	---	---	---	---	1,474	---	---	---	---	---	---	---	3128
664	---	---	---	---	---	1,840	---	---	---	---	---	---	---	3129
760	---	---	---	---	---	1,980	---	---	---	---	---	---	---	3130
615	310	91	962	337	634	1,630	1.3	1.0	15	3,800	5.17	1,150	65	3131
149	67	18	236	294	111	280	1.0	.5	---	858	1.17	241	68	3132
477	248	61	758	413	591	1,100	1.0	15	4.2	2,980	4.05	870	66	3133
589	---	---	---	---	---	1,530	---	---	---	---	---	---	---	3134
612	351	97	929	374	672	1,620	1.3	.5	12	3,860	5.25	1,280	61	3135
603	---	---	---	---	---	1,560	---	---	---	---	---	---	---	3136
636	---	---	---	---	---	1,650	---	---	---	---	---	---	---	3137
615	---	---	---	---	---	1,570	---	---	---	---	---	---	---	3138
806	496	143	1,140	382	859	2,190	.8	.0	5.0	5,020	6.83	1,830	57	3139
901	532	158	1,330	406	971	2,490	.7	1.5	5.0	5,700	7.75	1,980	59	3140
444	186	54	745	392	461	1,060	2.2	4.0	---	2,710	3.69	686	70	3141
1,140	677	203	1,723	655	1,307	3,100	---	---	---	7,330	9.97	2,520	60	3142
1,070	---	---	---	---	---	2,900	---	---	---	---	---	---	---	3143
895	476	144	1,470	609	1,180	2,290	.7	25	4.0	5,890	8.01	1,780	64	3144
533	---	---	---	374	---	1,370	---	---	---	---	---	---	---	3145
594	406	110	788	395	612	1,570	1.0	1.0	2.0	3,680	5.00	1,470	54	3146
931	---	---	---	---	---	2,410	---	---	---	---	---	---	---	3147
817	---	---	---	---	---	1,970	---	---	---	---	---	---	---	3148
1,220	---	---	---	673	---	3,350	---	---	---	---	---	---	---	3149
1,040	---	---	---	---	---	2,750	---	---	---	---	---	---	---	3150
908	---	---	---	---	---	2,330	---	---	---	---	---	---	---	3151
818	---	---	---	468	---	2,180	---	---	---	---	---	---	---	3152
795	---	---	---	---	---	2,140	---	---	---	---	---	---	---	3153
891	608	169	1,270	548	1,070	2,400	.8	17	4.0	5,800	7.89	2,210	55	3154
555	---	---	---	---	---	1,370	---	---	---	---	---	---	---	3155
621	---	---	---	---	---	1,640	---	---	---	---	---	---	---	3156
784	348	98	1,383	580	1,101	1,860	---	40	---	5,120	6.96	1,272	70	3157
830	---	---	---	---	---	1,920	---	---	---	---	---	---	---	3158
1,150	---	---	---	618	---	3,070	---	---	---	---	---	---	---	3159
991	---	---	---	---	---	2,650	---	---	---	---	---	---	---	3160
939	---	---	---	---	---	2,400	---	---	---	---	---	---	---	3161
1,210	---	---	---	606	---	3,370	---	---	---	---	---	---	---	3162
1,160	---	---	---	---	---	3,190	---	---	---	---	---	---	---	3163
1,010	587	174	1,620	638	1,290	2,700	.7	29	4.0	6,720	9.14	2,180	62	3164
413	---	---	---	---	---	990	---	---	---	---	---	---	---	3165
528	---	---	---	---	---	1,380	---	---	---	---	---	---	---	3166
1,120	627	185	1,872	675	1,588	2,970	---	---	---	7,570	10.3	2,326	64	3167
838	---	---	---	---	---	2,000	---	---	---	---	---	---	---	3168
1,390	876	264	2,073	687	1,633	3,910	1.0	---	4.0	9,100	12.4	3,270	58	3169
1,180	---	---	---	---	---	3,210	---	---	---	---	---	---	---	3170
995	---	---	---	---	---	2,540	---	---	---	---	---	---	---	3171
1,190	---	---	---	637	---	3,330	---	---	---	---	---	---	---	3172
1,090	---	---	---	---	---	3,100	---	---	---	---	---	---	---	3173
1,170	---	---	---	---	---	3,290	---	---	---	---	---	---	---	3174
692	---	---	---	---	---	1,840	---	---	---	---	---	---	---	3175

Chemical character of ground waters in the Gila River Basin, Graham County, Ariz., road bridge

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (°F.)
	Driven observation well—Con.					
3176	18-23	NW¼SW¼ sec. 27	Apr. 11, 1944		6	66
3177	18-24	SE¼SW¼ sec. 27	Mar. 29, 1943	15.8	1	
3178	18-24	do	Sept. 6, 1943	15.8	.5	69
3179	18-24	do	Apr. 18, 1944	15.8	1	63
3180	18-25	NW¼SE¼ sec. 27	Sept. 8, 1943		4	69
3181	18-25	do	Apr. 12, 1944		2	61
3182	18-26	do	Sept. 8, 1943		8	72
3183	18-26	do	Apr. 12, 1944		4	59
3184	18-27	NE¼SE¼ sec. 27	Sept. 8, 1943		8	69
3185	18-27	do	Apr. 11, 1944		5	62
3186	18-28	SW¼NE¼ sec. 27	Sept. 7, 1943		4	65
3187	18-28	do	Apr. 11, 1944		6	67
3188	18-29	SE¼SW¼ sec. 27	Mar. 29, 1943	18.4	5	
3189	18-29	do	Sept. 6, 1943	18.4	6	63
3190	18-29	do	Apr. 18, 1944	18.4	2	61
3191	18-30	NE¼SW¼ sec. 27	Sept. 7, 1943		8	70
3192	18-30	do	Apr. 12, 1944		5	63
3193	18-31	do	Sept. 7, 1943		2	62
3194	18-31	do	Apr. 12, 1944		3	62
3195	18-32	SE¼NW¼ sec. 27	Sept. 7, 1943		3	65
3196	18-32	do	Apr. 12, 1944		4	65
3197	18-33	SW¼NE¼ sec. 27	Sept. 7, 1943		3	66
3198	18-33	do	Apr. 11, 1944		3	66
3199	18-34	NW¼SW¼ sec. 27	Sept. 6, 1943		3	63
3200	18-34	do	Apr. 18, 1944		1.5	63
3201	18-35	NE¼SW¼ sec. 27	Sept. 6, 1943		2	75
3202	18-35	do	Apr. 18, 1944		.25	59
3203	18-36	SE¼NW¼ sec. 27	Sept. 7, 1943		1	65
3204	18-37	do	do		8	67
3205	18-37	do	Apr. 12, 1944		2	66
3206	18-38	NW¼SW¼ sec. 27	Mar. 29, 1943	29.3	10	
3207	18-38	do	Sept. 6, 1943	29.3		61
3208	18-38	do	Apr. 18, 1944	29.3	4	61
3209	18-39	do	Mar. 29, 1943	15.8	10	
3210	18-39	do	Sept. 6, 1943	15.8	8	64
3211	18-39	do	Apr. 18, 1944	15.8	10	61
3212	18-40	SW¼NW¼ sec. 27	Mar. 30, 1943	18.3	5	
3213	18-40	do	Sept. 6, 1943	18.3	8	74
3214	18-40	do	Apr. 18, 1944	18.3	6	60
3215	18-41	SE¼NW¼ sec. 27	Sept. 6, 1943		8	63
3216	18-41	do	Apr. 18, 1944		6	65
3217	18-42	do	Mar. 30, 1943	18.1	5	
3218	18-42	do	Sept. 6, 1943	18.1	8	68
3219	18-42	do	Apr. 18, 1944	18.1	5	60
3220	18-43	do	Sept. 7, 1943		.5	70
3221	18-44	SW¼NE¼ sec. 27	do		5	66
3222	18-44	do	Apr. 11, 1944		5	66
3223	18-45	NW¼SW¼ sec. 27	Mar. 30, 1943	23	5	
3224	18-45	do	Sept. 6, 1943	23	8	64
3225	18-45	do	Apr. 18, 1944	23	4	63
3226	18-46	SW¼NW¼ sec. 27	Sept. 7, 1943		8	74
3227	18-46	do	Apr. 12, 1944		2	60
3228	18-47	do	Sept. 7, 1943		8	70
3229	18-47	do	Apr. 12, 1944		5	62
3230	18-48	do	Sept. 7, 1943		8	66
3231	18-48	do	Apr. 12, 1944		4	65
3232	18-49	NE¼NW¼ sec. 27	Oct. 7, 1943		8	67
3233	18-49	do	Apr. 12, 1944		5	64
3234	18-50	do	Sept. 7, 1943		8	66
3235	18-50	do	Apr. 12, 1944		5	65

between the mouth of Bonita Creek near Solomonsville and the Southern Pacific Rail- at Calva—Continued

[Analyses in parts per million]

Specific conductance (K×10⁵ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Total hardness as $CaCO_3$	Percent sodium	Analysis No.
621	412	110	871	433	646	1,660	1.3	1.0	2.5	3,910	5.32	1,480	56	3176
1,070				566		2,850								3177
705						1,680								3178
554						1,210								3179
1,190						3,340								3180
1,030						2,750								3181
442						1,065								3182
1,120						3,190								3183
439														3184
493						1,260								3185
572						1,460								3186
551				412		1,420								3187
1,130				672		2,900								3188
852						2,070								3189
664	292	79	1,180	556	1,000	1,490	1.0	30	4.5	4,350	5.92	1,050	71	3190
673						1,790								3191
758						2,060								3192
728						2,000								3193
912						2,570								3194
456						1,135								3195
499						1,280								3196
681						1,800								3197
595	327	97	896	428	624	1,530	1.7	1.0	1.5	3,690	5.02	1,220	62	3198
923						2,475								3199
953						2,420								3200
333						770								3201
617						1,630								3202
551						1,460								3203
613						1,590								3204
550						1,440								3205
1,100				661		2,850								3206
959	534	146	1,560	580	1,352	2,425		29		6,330	8.61	1,933	64	3207
795						1,860								3208
618	393	112	848	456	628	1,600		2.0		3,810	5.18	1,442	56	3209
1,050						3,020								3210
764	490	135	1,110	516	886	2,020	.8	1.0	2.5	4,900	6.66	1,780	58	3211
319				340		705								3212
516						1,320								3213
602	396	108	826	432	630	1,570	.9	1.0	2.5	3,740	5.09	1,430	56	3214
604						1,580								3215
723						1,970								3216
256	120	33	391	324	242	540	1.3	2.0	2.0	1,489	2.03	435	66	3217
450						1,100								3218
504						1,290								3219
540														3220
524						1,330								3221
509						1,280								3222
857	553	159	1,200	534	963	2,270		3.0		5,410	7.36	2,034	56	3223
988						2,700								3224
951	570	159	1,520	600	1,340	2,460	.7	26	4.5	6,370	8.66	2,080	61	3225
195						390								3226
590	415	125	745	464	581	1,560	1.0	1.0	.5	3,670	4.99	1,550	51	3227
444						1,125								3228
536	366	94	699	374	541	1,380	1.0	.5	.1	3,270	4.45	1,300	54	3229
588						1,500								3230
698	432	116	1,010	441	716	1,850	1.3	1.0	.1	4,330	5.89	1,530	59	3231
653						1,690								3232
675	400	106	986	440	689	1,770	1.3	1.0	.2	4,170	5.67	1,430	60	3233
545						1,390								3234
528						1,340								3235

Chemical character of ground waters in the Gila River Basin, Graham County, Ariz., road bridge

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (°F.)
	Driven observation well—Con.					
3236	18-52	SW1/4NW1/4 sec. 27	Sept. 7, 1943	----	8	65
3237	18-52	do	Apr. 12, 1944	----	8	64
3238	18-53	NW1/4NW1/4 sec. 27	Sept. 7, 1943	----	8	67
3239	18-53	do	Apr. 12, 1944	----	5	63
3240	18-54	do	Sept. 7, 1943	----	8	67
3241	18-54	do	Apr. 12, 1944	----	6	65
3242	18-55	do	Sept. 7, 1943	----	8	62
3243	18-55	do	Apr. 12, 1944	----	6	64
3244	18-56	NE1/4NW1/4 sec. 27	Sept. 7, 1943	----	8	69
3245	18-56	do	Apr. 12, 1944	----	5	65
3246	18-57	NW1/4NW1/4 sec. 27	Sept. 7, 1943	----	8	62
3247	18-57	do	Apr. 12, 1944	----	3	62
3248	18-58	do	Sept. 6, 1943	----	1	74
3249	18-58	do	Apr. 12, 1944	----	1.5	67
3250	18-59	do	Oct. 7, 1943	----	8	68
3251	18-59	do	Apr. 12, 1944	----	8	66
3252	18-60	do	Oct. 7, 1943	----	8	63
3253	18-60	do	Apr. 12, 1944	----	6	67
3254	18-69	SE1/4NE1/4 sec. 27	Sept. 7, 1943	----	3	66
3255	18-69	do	Apr. 11, 1944	----	2	66
3256	18-70	do	Sept. 8, 1943	----	8	67
3257	18-70	do	Apr. 11, 1944	----	10	68
3258	18-71	SW1/4NE1/4 sec. 27	Oct. 7, 1943	----	8	69
3259	18-71	do	Apr. 12, 1944	----	4	68
3260	18-72	NE1/4NE1/4 sec. 27	Sept. 8, 1943	----	6	74
3261	18-72	do	Apr. 11, 1944	----	2	75
3262	18-73	NW1/4NE1/4 sec. 27	Sept. 8, 1943	----	2	75
3263	18-73	do	Apr. 11, 1944	----	.5	73
3264	18-74	do	Sept. 8, 1943	----	4	74
3265	18-74	do	Apr. 11, 1944	----	5	74
3266	18-75	do	Sept. 7, 1943	----	8	69
3267	18-75	do	Apr. 12, 1944	----	5	66
3268	18-77	NE1/4NW1/4 sec. 27	Sept. 8, 1943	----	1	72
3269	18-77	do	Apr. 12, 1944	----	1	68
3270	18-86	SW1/4SW1/4 sec. 27	Oct. 7, 1943	----	8	65
3271	18-86	do	Apr. 18, 1944	----	2	66
3272	Ben Montierth stock well	SW1/4NE1/4 sec. 28	Feb. 25, 1942	----	----	----
3273	Wendell Montierth domestic well	NE1/4SW1/4 sec. 28	do	30	----	----
3274	Elliot Montierth irrigation well	NW1/4NW1/4 sec. 28	May 3, 1943	----	420	----
3275	Driven observation well, 18-51	SE1/4NE1/4 sec. 28	Sept. 7, 1943	----	8	67
3276	do	do	Apr. 12, 1944	----	3	63
3277	19-1	do	Sept. 7, 1943	----	.5	77
3278	19-1	do	Apr. 12, 1944	----	.25	64
3279	19-2	do	Sept. 7, 1943	----	3	64
3280	19-2	do	Apr. 12, 1944	----	1	63
3281	19-3	NE1/4NE1/4 sec. 28	Sept. 7, 1943	----	8	67
3282	19-3	do	Apr. 12, 1944	----	4	64
3283	19-4	do	Sept. 7, 1943	----	3	62
3284	19-4	do	Apr. 12, 1944	----	2	64
3285	19-7	SE1/4NE1/4 sec. 28	Mar. 29, 1943	24.2	12	----
3286	19-7	do	Sept. 6, 1943	24.2	8	65
3287	19-7	do	Apr. 18, 1944	24.2	8	65
3288	19-8	do	Sept. 6, 1943	----	8	65
3289	19-8	do	Jan. 7, 1944	----	2	65
3290	19-8	do	Apr. 18, 1944	----	3	64
3291	19-9	NE1/4NE1/4 sec. 28	Sept. 6, 1943	----	8	65
3292	19-9	do	Apr. 18, 1944	----	6	63
3293	19-10	do	Sept. 7, 1943	----	8	67
3294	19-10	do	Apr. 14, 1944	----	3	63
3295	19-13	NW1/4NE1/4 sec. 28	Mar. 30, 1943	18.5	12	----

between the mouth of Bonita Creek near Solomonsville and the Southern Pacific Rail- at Calva—Continued

[Analyses in parts per million]

Specific conductance (K×10⁵ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Total hardness as $CaCO_3$	Percent sodium	Analysis No.
387	------	------	------	------	------	945	------	------	------	------	------	------	------	3236
509	------	------	------	------	------	1,280	------	------	------	------	------	------	------	3237
711	------	------	------	------	------	1,960	------	------	------	------	------	------	------	3238
760	------	------	------	------	------	2,060	------	------	------	------	------	------	------	3239
643	------	------	------	------	------	1,670	------	------	------	------	------	------	------	3240
607	------	------	------	------	------	1,540	------	------	------	------	------	------	------	3241
578	------	------	------	------	------	1,460	------	------	------	------	------	------	------	3242
567	------	------	------	------	------	1,430	------	------	------	------	------	------	------	3243
568	------	------	------	------	------	------	------	------	------	------	------	------	------	3244
526	------	------	------	------	------	1,330	------	------	------	------	------	------	------	3245
665	------	------	------	------	------	1,700	------	------	------	------	------	------	------	3246
757	------	------	------	------	------	2,010	------	------	------	------	------	------	------	3247
604	------	------	------	------	------	1,600	------	------	------	------	------	------	------	3248
547	276	71	851	384	527	1,390	2.2	4.0	.5	3,310	4.50	981	65	3249
617	------	------	------	------	------	1,600	------	------	------	------	------	------	------	3250
600	------	------	------	------	------	1,570	------	------	------	------	------	------	------	3251
665	------	------	------	------	------	1,800	------	------	------	------	------	------	------	3252
620	------	------	------	------	------	1,640	------	------	------	------	------	------	------	3253
473	------	------	------	------	------	1,270	------	------	------	------	------	------	------	3254
508	290	78	715	255	503	1,320	1.4	.5	.2	3,030	4.12	1,040	60	3255
506	------	------	------	------	------	1,340	------	------	------	------	------	------	------	3256
482	------	------	------	------	------	1,230	------	------	------	------	------	------	------	3257
516	------	------	------	281	------	1,390	------	------	------	------	------	------	------	3258
527	------	------	------	------	------	1,400	------	------	------	------	------	------	------	3259
773	270	84	1,305	259	456	2,240	3.9	1.0	7.5	4,490	6.11	1,020	74	3260
753	------	------	------	------	------	2,180	------	------	------	------	------	------	------	3261
850	------	------	------	76	499	2,600	------	------	------	------	------	------	------	3262
802	------	------	------	------	------	2,390	------	------	------	------	------	------	------	3263
872	------	------	------	290	544	2,540	------	------	------	------	------	------	------	3264
841	251	86	1,510	318	496	2,460	3.8	1.5	.5	4,960	6.75	980	77	3265
548	------	------	------	------	------	1,350	------	------	------	------	------	------	------	3266
550	------	------	------	------	------	1,450	------	------	------	------	------	------	------	3267
731	------	------	------	------	------	------	------	------	------	------	------	------	------	3268
661	------	------	------	------	------	1,880	------	------	------	------	------	------	------	3269
619	------	------	------	------	------	1,450	------	------	------	------	------	------	------	3270
462	------	------	------	------	------	1,000	------	------	------	------	------	------	------	3271
370	------	------	------	------	------	840	------	------	------	------	------	------	------	3272
172	------	------	------	------	------	352	------	------	------	------	------	------	------	3273
300	250	56	295	124	391	700	------	------	------	1,753	2.38	854	43	3274
535	------	------	------	------	------	------	------	------	------	------	------	------	------	3275
481	------	------	------	------	------	1,200	------	------	------	------	------	------	------	3276
529	------	------	------	------	------	1,380	------	------	------	------	------	------	------	3277
673	------	------	------	------	------	1,770	------	------	------	------	------	------	------	3278
600	318	90	896	317	593	1,580	1.8	.5	4.0	3,640	4.95	1,164	63	3279
605	332	99	896	411	590	1,580	1.8	.5	.2	3,700	5.03	1,240	61	3280
724	------	------	------	------	------	1,880	------	------	------	------	------	------	------	3281
673	356	97	1,060	472	722	1,740	1.7	.5	1.0	4,210	5.73	1,290	64	3282
760	------	------	------	------	------	2,120	------	------	------	------	------	------	------	3283
670	------	------	------	------	------	1,780	------	------	------	------	------	------	------	3284
644	------	------	------	400	------	1,560	------	------	------	------	------	------	------	3285
702	------	------	------	------	------	1,760	------	------	------	------	------	------	------	3286
818	468	128	1,300	466	1,180	2,040	.7	35	2.0	5,380	7.32	1,690	62	3287
681	------	------	------	------	------	1,730	------	------	------	------	------	------	------	3288
817	604	152	1,110	489	1,020	2,170	.8	14	9.0	5,310	7.22	2,130	53	3289
861	------	------	------	------	------	2,270	------	------	------	------	------	------	------	3290
718	------	------	------	------	------	1,860	------	------	------	------	------	------	------	3291
580	374	99	824	382	619	1,540	1.0	.5	.1	3,650	4.96	1,340	57	3292
844	------	------	------	------	------	2,320	------	------	------	------	------	------	------	3293
701	292	75	1,250	476	686	1,870	2.9	.5	.5	4,410	6.00	1,040	72	3294
456	------	------	------	418	------	1,025	------	------	------	------	------	------	------	3295

Chemical character of ground waters in the Gila River Basin, Graham County, Ariz., road bridge

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (°F.)
	Driven observation well—Con.					
3296	19-13	NW¼NE¼ sec. 28	Sept. 4, 1943	18.5	8	66
3297	19-13	do	Apr. 18, 1944	18.5	6	60
3298	19-14	do	Sept. 4, 1943		8	63
3299	19-14	do	Apr. 18, 1944		5	55
3300	19-15	NE¼NE¼ sec. 28	Sept. 7, 1943		6	69
3301	19-15	do	Apr. 14, 1944		5	64
3302	19-19	NW¼NE¼ sec. 28	Sept. 4, 1943		8	65
3303	19-19	do	Apr. 18, 1944		5	64
3304	19-20	do	Mar. 30, 1943	18.6	1	
3305	19-20	do	Sept. 4, 1943	18.6	4	63
3306	19-20	do	Apr. 18, 1944	18.6	.5	58
3307	19-55	SE¼NE¼ sec. 28	Sept. 7, 1943		4	71
3308	19-55	do	Apr. 12, 1944		1.5	65
3309	19-64	SW¼NE¼ sec. 28	Sept. 6, 1943		8	65
3310	19-64	do	Apr. 18, 1944		8	66
3311	19-66	do	Oct. 7, 1943		8	65
3312	19-66	do	Apr. 18, 1944		2	63
3313	19-67	NW¼NE¼ sec. 28	Sept. 4, 1943		8	65
3314	19-70	NW¼NW¼ sec. 28	do		8	66
3315	19-70	do	Nov. 2, 1943		5	67
3316	19-70	do	Jan. 5, 1944		3	66
3317	19-70	do	Mar. 2, 1944		4	66
3318	19-70	do	Apr. 19, 1944		4	66
3319	19-70	do	July 11, 1944		3	67
3320	19-70	do	Aug. 30, 1944		4	67
3321	Ben Montierth irrigation well	NW¼SE¼ sec. 29	July 31, 1940	83	850	70
3322	do	do	July 16, 1941	83		69
3323	Wendell Montierth irrigation well	SE¼NE¼ sec. 33	June 8, 1940	90	760	69
3324	do	do	July 16, 1941	90		70
3325	do	do	Apr. 14, 1943	90	710	69
3326	Ned Curtis stock well	NE¼NE¼ sec. 34	Aug. 30, 1940	45		
3327	do	do	Sept. 7, 1943	45		
3328	J. H. Fines domestic well	NW¼SW¼ sec. 34	Mar. 29, 1940			69
3329	Ellis Welker irrigation well	do	July 1, 1941	77		68
3330	Stock well, owner unknown	SE¼NW¼ sec. 34	Feb. 25, 1942			
3331	Driven observation well, 18-1	NE¼NE¼ sec. 34	Mar. 29, 1943	18.5	18	
3332	do	do	Sept. 7, 1943	18.5	8	65
3333	do	do	Apr. 11, 1944	18.5	6	63
3334	18-2	do	Mar. 29, 1943	18.5	10	
3335	18-2	do	Sept. 7, 1943	18.5	8	64
3336	18-2	do	Oct. 28, 1943	18.5	15	65
3337	18-2	do	Jan. 5, 1944	18.5	10	64
3338	18-2	do	Mar. 2, 1944	18.5	10	62
3339	18-2	do	Apr. 25, 1944	18.5	10	63
3340	18-2	do	July 10, 1944	18.5	8	64
3341	18-2	do	Aug. 29, 1944	18.5	12	65
3342	18-2	do	Oct. 30, 1944	18.5	10	65
3343	18-3	do	Mar. 29, 1943	13.3	18	
3344	18-3	do	Sept. 7, 1943	13.3	1	65
3345	18-3	do	Apr. 11, 1944	13.3	1	63
3346	18-4	do	Mar. 29, 1943	17.7	5	
3347	18-4	do	Sept. 7, 1943	17.7	8	63
3348	18-4	do	Apr. 11, 1944	17.7	8	62
3349	18-7	SE¼NE¼ sec. 34	July 27, 1943		2	65
3350	18-7	do	Apr. 11, 1944		6	64
3351	18-8	NW¼NE¼ sec. 34	Mar. 30, 1943	18.5	10	
3352	18-8	do	Sept. 6, 1943	18.5	8	63
3353	18-8	do	Apr. 11, 1944	18.5	10	61
3354	18-11	do	Mar. 29, 1943	18.7	.25	
3355	18-11	do	Sept. 6, 1943	18.7	4	66

between the mouth of Bonita Creek near Solomonsville and the Southern Pacific Rail- at Calva—Continued

[Analyses in parts per million]

Specific conductance (K×10⁵ at 25 °C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids		Total hardness as $CaCO_3$	Percent sodium	Analysis No.
										Parts per million	Tons per acre-foot			
647						1,320								3296
613						1,550								3297
539						1,090								3298
526	300	79	775	386	541	1,330	1.0	.5	.2	3,220	4.38	1,070	61	3299
892						2,600								3300
803	305	83	1,410	389	594	2,290	3.0	.5	.5	4,880	6.64	1,100	74	3301
750				481	939	1,890	1.2		5.0					3302
642						1,600								3303
522	288	80	773	434	602	1,235	1.1	2.0	3.5	3,190	4.34	1,048	62	3304
431						1,005								3305
322						685								3306
493						1,285								3307
668	462	123	893	424	711	1,780	.9	.5	.1	4,180	5.68	1,660	54	3308
933						2,340								3309
816						2,010								3310
685						1,360								3311
782	20	8.5	1,890	1,330	738	1,630	14	12	5.0	4,970	6,76	85	98	3312
933						2,420								3313
287						625								3314
334	127	37	564	268	367	760	1.4	23	15	2,010	2.73	469	72	3315
383						880								3316
440	212	55	729	523	469	995	.8	22	2.0	2,740	3.73	755	68	3317
444						990								3318
482						1,085								3319
507	280	67	761	310	623	1,210	1.0	22	2.0	3,120	4.24	974	63	3320
46				156	48	39	1.0	1.2				172		3321
69.6	70	21	53	164	98	97	.6	2.0		422	.57	261	31	3322
35				151	20	13						142		3323
34.8	41	7.9	21	148	40	11	.6	.8		195	.27	135	25	3324
37.9				150		17								3325
1,340	632	251	2,327	168	1,667	4,110				9,070	12.3	2,620	66	3326
557						1,190								3327
38				127	36	28	.5	1.2				93		3328
182	193	42	130	170	249	378	.4	5.0		1,081	1.47	654	30	3329
433						960								3330
752	344	82	1,273	548	925	1,780		51		4,720	6.42	1,196	70	3331
595						1,350								3332
582						1,310								3333
1,010				628.		2,650								3334
923						2,425								3335
891	512	152	1,440	628	1,090	2,390	.7	23	12	5,920	8.05	1,900	63	3336
889						2,320								3337
869						2,250								3338
858						2,200								3339
868						2,200								3340
876						2,250								3341
992						2,650								3342
835				570		2,010								3343
734						1,730								3344
684						1,550								3345
1,050				672		2,770								3346
936						2,400								3347
838	432	131	1,410	601	1,110	2,120	.8	40	3.5	5,540	7.53	1,620	65	3348
592	228	64	1,080	502	827	1,320	1.2	52	7.0	3,820	5.20	832	74	3349
546						1,170								3350
952				604		2,400								3351
912						2,300								3352
759						1,840								3353
644				468		1,620								3554
570						1,260								3355

Chemical character of ground waters in the Gila River Basin, Graham County, Ariz., road bridge

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (°F.)
	Driven observation well—Con.					
3356	18-11	NW¼NE¼ sec. 34	Apr. 11, 1944	18.7	2	62
3357	18-79	SW¼NE¼ sec. 34	Sept. 7, 1943	-------	8	67
3358	18-79	do	Nov. 2, 1943	-------	10	66
3359	18-79	do	Jan. 5, 1944	-------	8	66
3360	18-79	do	Mar. 2, 1944	-------	12	64
3361	18-79	do	Apr. 18, 1944	-------	6	63
3362	18-79	do	July 10, 1944	-------	6	63
3363	18-79	do	Aug. 29, 1944	-------	6	65
3364	18-79	do	Oct. 30, 1944	-------	7	66
3365	18-80	SE¼NE¼ sec. 34	Sept. 7, 1943	-------	6	64
3366	18-80	do	Apr. 18, 1944	-------	8	62
3367	18-81	do	Sept. 7, 1943	-------	8	64
3368	18-81	do	Apr. 18, 1944	-------	8	65
3369	18-82	NW¼NE¼ sec. 34	Sept. 7, 1943	-------	4	64
3370	18-82	do	Apr. 18, 1944	-------	2	63
3371	18-83	SE¼NE¼ sec. 34	Sept. 7, 1943	-------	4	65
3372	18-83	do	Apr. 18, 1944	-------	6	65
3373	Kelly unused well	NW¼SW¼ sec. 35	Jan. 17, 1941	34	-------	-------
3374	Driven observation well, USGS 98	NW¼NW¼ sec. 35	June 7, 1940	21	-------	64
3375	do	do	Nov. 5, 1943	21	-------	65
3376	USGS 99	do	May 30, 1940	12	-------	65
3377	Tom Hammon stock well	NW¼SW¼ sec. 35	Feb. 25, 1942	50	-------	-------
3378	L. L. Morrison domestic well	SW¼SW¼ sec. 35	June 23, 1941	60	-------	-------
3379	W. O. Tyler irrigation well	SE¼SE¼ sec. 35	July 19, 1940	50.5	450	-------
3380	Seepage in Gila River channel	NE¼SE¼ sec. 35	Sept. 12, 1941	-------	2	-------
3381	Driven observation well, 17-6	SE¼NE¼ sec. 35	Sept. 9, 1943	-------	3	79
3382	17-8	do	do	-------	4	75
3383	17-10	NE¼NE¼ sec. 35	Oct. 6, 1943	-------	8	82
3384	17-11	do	Sept. 9, 1943	-------	2	78
3385	17-14	NE¼SE¼ sec. 35	Sept. 18, 1943	-------	8	75
3386	17-15	NE¼SW¼ sec. 35	do	-------	8	74
3387	17-16	NE¼SE¼ sec. 35	Sept. 9, 1943	-------	2	70
3388	17-17	SE¼NE¼ sec. 35	Sept. 8, 1943	-------	3	71
3389	17-18	do	do	-------	2	74
3390	17-19	NW¼NE¼ sec. 35	do	-------	3	71
3391	17-20	do	do	-------	3	72
3392	17-21	SE¼SE¼ sec. 35	Sept. 20, 1943	-------	8	65
3393	17-22	do	Mar. 26, 1943	18.2	10	-------
3394	17-22	do	Sept. 8, 1943	18.2	8	64
3395	17-23	NE¼SE¼ sec. 35	Mar. 27, 1943	18.2	10	-------
3396	17-23	do	Sept. 8, 1943	18.2	8	64
3397	17-24	do	Sept. 9, 1943	-------	8	67
3398	17-25	SE¼SE¼ sec. 35	Sept. 20, 1943	-------	8	63
3399	17-26	do	Mar. 26, 1943	18.7	15	-------
3400	17-26	do	Sept. 8, 1943	18.7	8	63
3401	17-27	NE¼SE¼ sec. 35	do	-------	3	67
3402	17-28	SW¼NE¼ sec. 35	Sept. 20, 1943	-------	8	64
3403	17-29	do	Mar. 27, 1943	18.4	1	-------
3404	17-29	do	Sept. 20, 1943	18.4	8	64
3405	17-30	do	Mar. 17, 1943	18.2	1	-------
3406	17-30	do	Sept. 7, 1943	18.2	4	69
3407	17-31	NW¼NE¼ sec. 35	Mar. 27, 1943	15.8	5	-------
3408	17-31	do	Sept. 7, 1943	15.8	8	73
3409	17-32	do	Sept. 8, 1943	-------	1	72
3410	17-33	do	Mar. 27, 1943	22.8	2	-------
3411	17-33	do	Sept. 7, 1943	22.8	1	67
3412	17-34	do	Sept. 20, 1943	-------	8	74
3413	17-36	NE¼NW¼ sec. 35	Mar. 27, 1943	18.4	12	-------
3414	17-36	do	Sept. 7, 1943	18.4	8	66
3415	17-37	do	Mar. 27, 1943	18.5	15	-------

between the mouth of Bonita Creek near Solomonsville and the Southern Pacific Rail- at Calva—Continued

[Analyses in parts per million]

Specific conductance (K×10⁵ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Total hardness as $CaCO_3$	Percent sodium	Analysis No.
565						1,250								3356
557						1,170								3357
556	218	61	1,020	545	804	1,200	1.2	53	14	3,630	4.94	795	74	3358
506						1,080								3359
466						965								3360
443	141	42	827	496	600	890	1.3	41	1.0	2,790	3.79	524	78	3361
372						700								3362
387						750								3363
391						745								3364
594						1,280								3365
560						1,180								3366
547						1,170								3367
313						580								3368
461						1,000								3369
391	114	34	730	426	506	785	1.8	31	2.0	2,410	3.28	424	79	3370
554				480		1,170								3371
434						865								3372
552	548	106	529	306	903	1,250	.4			3,490	4.75	1,803	39	3373
850						2,328								3374
781						2,080								3375
820						2,158								3376
524						1,180								3377
84.1	45	11	117	176	69	135	.8	5.0		470	.64	158	62	3378
1,300				518	2,500	2,950						1,365		3379
507	162	42	905	319	411	1,310	3.0	2.0		2,990	4.07	577	77	3380
525				269		1,420								3381
559						1,560								3382
517				206		1,440								3383
434				133		1,230								3384
503				279		1,250								3385
860						2,400								3386
1,000						2,850								3387
1,200				491	1,029	3,490								3388
831						2,480								3389
754						2,090								3390
591						1,670								3391
1,450						4,510								3392
1,560	1,009	298	2,266	384	1,591	4,750				10,100	13.7	3,740	57	3393
1,550						4,730								3394
1,570				539		4,630								3395
1,770	1,077	382	2,790	538	2,119	5,440	1.6		7.4	12,100	16.5	4,258	59	3396
1,500						4,500								3397
1,510						4,400								3398
1,290				586		3,580								3399
1,330						3,660								3400
1,080						2,920								3401
1,320						3,710								3402
1,080				378		3,040								3403
1,370						3,960								3404
586				476		1,455								3405
826						2,260								3406
475	245	66	700	382	434	1,160	1.4	1.0	1.5	2,800	3.81	883	63	3407
577						1,480								3408
529						1,480								3409
644				348		1,690								3410
735				212	654	2,080								3411
431						1,040								3412
717				630		1,790								3413
777	390	114	1,258	578	883	1,970		8.7		4,910	6.68	1,442	65	3414
842	495	135	1,236	642	846	2,170		14		5,210	7.09	1,790	60	3415

879751—50——14

Chemical character of ground waters in the Gila River Basin, Graham County, Ariz., road bridge

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (°F.)
	Driven observation well—Con.					
3416	17-37	NE¼NW¼ sec. 35	Sept. 7, 1943	18.5	8	68
3417	17-38	do	Mar. 27, 1943	18.2	5	----
3418	17-38	do	Sept. 7, 1943	18.2	8	68
3419	17-42	do	do	----	.5	68
3420	17-43	do	do	----	.5	69
3421	17-45	NW¼NW¼ sec. 35	Mar. 30, 1943	18.4	1	----
3422	17-45	do	Sept. 7, 1943	18.4	4	68
3423	17-46	do	Mar. 29, 1943	18.6	3	----
3424	17-46	do	Sept. 7, 1943	18.6	8	66
3425	17-48	do	July 27, 1943	----	2	66
3426	17-49	do	Mar. 29, 1943	13.5	10	----
3427	17-49	do	Sept. 7, 1943	13.5	8	64
3428	17-59	SE¼NW¼ sec. 35	Sept. 20, 1943	----	8	64
3429	17-59	do	Nov. 2, 1943	----	5	65
3430	17-59	do	Jan. 5, 1944	----	3	64
3431	17-59	do	Mar. 2, 1944	----	8	65
3432	17-59	do	July 10, 1944	----	3	64
3433	17-59	do	Aug. 29, 1944	----	5	64
3434	17-59	do	Oct. 30, 1944	----	6	64
3435	17-60	NW¼SE¼ sec. 35	Sept. 8, 1943	----	8	62
3436	17-60	do	Nov. 2, 1943	----	15	65
3437	17-60	do	Jan. 5, 1944	----	12	66
3438	17-60	do	Mar. 2, 1944	----	12	65
3439	17-60	do	July 10, 1944	----	5	64
3440	17-60	do	Aug. 29, 1944	----	6	64
3441	17-60	do	Oct. 30, 1944	----	6	65
3442	17-63	SE¼SE¼ sec. 35	Sept. 8, 1943	----	8	66
3443	17-63	do	Sept. 20, 1943	----	8	66
3444	17-63	do	Nov. 2, 1943	----	10	67
3445	17-63	do	Jan. 5, 1944	----	8	67
3446	17-63	do	Mar. 2, 1944	----	6	67
3447	17-63	do	May 3, 1944	----	8	66
3448	17-63	do	July 11, 1944	----	5	67
3449	17-63	do	Aug. 29, 1944	----	6	67
3450	17-63	do	Oct. 30, 1944	----	3	68
3451	17-64	do	Sept. 8, 1943	----	8	66
3452	17-65	SW¼NW¼ sec. 35	Sept. 11, 1943	----	8	65
3453	17-66	NW¼SW¼ sec. 35	Sept. 7, 1943	----	3	64
3454	17-66	do	Oct. 28, 1943	----	1.5	66
3455	17-66	do	Jan. 5, 1944	----	1	63
3456	17-66	do	Mar. 2, 1944	----	1	62
3457	17-66	do	Apr. 25, 1944	----	1	62
3458	17-66	do	July 10, 1944	----	1	66
3459	17-66	do	Aug. 29, 1944	----	1.5	66
3460	17-66	do	Oct. 30, 1944	----	2	66
3461	17-67	NE¼SW¼ sec. 35	Sept. 7, 1943	----	5	68
3462	17-1	SW¼SW¼ sec. 36	Sept. 9, 1943	----	3	78
3463	17-2	do	Mar. 26, 1943	20.8	1.5	----
3464	17-2	do	Sept. 8, 1943	20.8	3	71
3465	17-3	NW¼SW¼ sec. 36	Sept. 18, 1943	----	8	76
3466	17-3	do	Nov. 2, 1943	----	5	76
3467	17-3	do	Jan. 6, 1944	----	6	69
3468	17-3	do	Feb. 10, 1944	----	----	66
3469	17-3	do	Mar. 1, 1944	----	5	65
3470	17-3	do	May 3, 1944	----	4	67
3471	17-3	do	July 10, 1944	----	6	73
3472	17-3	do	Aug. 29, 1944	----	8	76
3473	17-3	do	Oct. 27, 1944	----	6	74
3474	17-4	do	Sept. 9, 1943	----	4	70
3475	17-5	do	Sept. 18, 1943	----	8	74

between the mouth of Bonita Creek near Solomonsville and the Southern Pacific Rail- at Calva—Continued

[Analyses in parts per million]

Specific conductance (K×10⁵ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Total hardness as $CaCO_3$	Percent sodium	Analysis No.
756														3416
578				474		1,455								3417
722						1,930								3418
805						2,110								3419
754						2,140								3420
765				680		1,890								3421
724						1,780								3422
752				482		1,980								3423
817						2,200								3424
784	385	117	1,304	660	979	1,910		29		5,050	6.84	1,442	66	3425
900				638		2,370								3426
1,240						3,410								3427
863						2,330								3428
959	483	172	1,560	519	1,180	2,570	.7	40	20	6,260	8.51	1,910	64	3429
912						2,390								3430
891						2,340								3431
900						2,300								3432
955						2,500								3433
989						2,600								3434
765						1,730								3435
717	272	100	1,320	529	1,120	1,620	.3	90	20	4,780	6.50	1,090	72	3436
505	142	53	990	499	756	1,050	1.1	56	9.0	3,290	4.47	572	79	3437
362	77	31	721	416	505	705	1.4	27	3.0	2,270	3.09	320	83	3438
393						735								3439
469	126	48	890	414	723	940	1.0	33	3.0	2,960	4.03	512	79	3440
534						1,130								3441
287						505								3442
280						495								3443
252	56	21	486	254	414	445	.2	21	14	1,570	2.14	226	82	3444
203						340								3445
165	30	12	328	247	256	255	.7	9.8	2.0	1,010	1.37	124	85	3446
178						280								3447
186						295								3448
276	82	30	482	244	442	495	.6	20	5.0	1,670	2.27	328	76	3449
203						365								3450
1,030						2,620								3451
722						1,690								3452
229						425								3453
186	41	16	357	275	275	300	1.4	8.8	7.5	1,130	1.54	168	82	3454
167						256								3455
175						295								3456
221	69	18	398	252	251	445	1.1	16	.2	1,320	1.80	246	78	3457
184						320								3458
144	39	11	262	234	184	224	1.5	9.2	5.0	846	1.15	142	80	3459
149						235								3460
366	114	34	666	450	520	660		38		2,254	3.07	424	77	3461
761						2,120								3462
173				258		295								3463
662	275	88	1,059	310	531	1,800	1.8	.5	9.0	3,910	5.32	1,048	69	3464
589						1,620								3465
554	182	56	970	272	375	1,540	3.1	.5		3,260	4.43	684	75	3466
566						1,560								3467
569				300		1,540			4.1					3468
559						1,550								3469
564						1,430								3470
598						1,630								3471
624	228	65	1,080	316	495	1,700	2.6	.5	8.0	3,730	5.07	838	74	3472
659						1,860								3473
537				247		1,470								3474
638						1,820								3475

Chemical character of ground waters in the Gila River Basin, Graham County, Ariz., road bridge

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (°F.)
	Driven observation well—Con.					
3476	17-12	SW¼SW¼ sec. 36	Sept. 8, 1943		3	72
3477	17-13	do	Sept. 18, 1943		8	71
		T. 5. S., R. 23 E.:				
3478	Miles Herbert unused well	NW¼NW¼ sec. 1	Mar. 10, 1943	40		
3479	Roy Layton irrigation well	SW¼SE¼ sec. 1	July 23, 1940	64	1,054	65
3480	do	do	Apr. 12, 1944	64		
3481	do	do	May 3, 1944	64		63
3482	Driven observation well, 15-82	SE¼SW¼ sec. 1	June 20, 1943			
3483	do	do	Sept. 9, 1943		8	64
3484	do	do	Oct. 30, 1943		5	66
3485	do	do	Jan. 5, 1944		8	65
3486	do	do	Mar. 2, 1944		8	64
3487	do	do	May 3, 1944		8	68
3488	do	do	July 11, 1944		8	65
3489	do	do	Aug. 29, 1044		8	65
3490	do	do	Oct. 30, 1944		5	66
3491	16-9	NE¼SE¼ sec. 1	Sept. 9, 1943		8	70
3492	16-11	SE¼SE¼ sec. 1	Mar. 25, 1943	18.3	4	
3493	16-11	do	Sept. 11, 1943	18.3	8	67
3494	16-12	NE¼SE¼ sec. 1	Mar. 25, 1943	23.5	.5	
3495	16-12	do	Sept. 11, 1943	23.5	8	63
3496	16-13	do	Sept. 9, 1943		2	80
3497	16-14	SW¼SW ¼sec. 1	Mar. 25, 1943	17.4	5	
3498	16-14	do	Sept. 11, 1943	17.4	4	67
3499	16-15	NE¼SW¼ sec. 1	Mar. 25, 1943	18	12	
3500	16-15	do	Sept. 11, 1943	18	8	61
3501	16-16	NE¼SE¼ sec. 1	Sept. 22, 1943		8	68
3502	16-17	NW¼SE¼ sec. 1	Sept. 9, 1943		2	65
3503	16-18	SW¼SE¼ sec. 1	Mar. 25, 1943		2	
3504	16-18	do	Sept. 9, 1943		8	65
3505	16-19	NW¼SE¼ sec. 1	Mar. 25, 1943	23.2	1	
3506	16-19	do	Sept. 11, 1943	23.2	1	73
3507	16-20	do	Sept. 9, 1943		8	72
3508	16-21	NE¼SE¼ sec. 1	do		2	65
3509	16-23	SW¼SE¼ sec. 1	do		1	68
3510	16-24	NW¼SE¼ sec. 1	do		1	75
3511	16-25	SE¼NW¼ sec. 1	do		3	64
3512	16-26	do	do		8	75
3513	16-27	NE¼SW¼ sec. 1	Mar. 25, 1943	18.6	6	
3514	16-27	do	Sept. 9, 1943	18.6	8	66
3515	16-28	NW¼SW¼ sec. 1	Sept. 21, 1943		8	66
3516	16-29	NE¼SW¼ sec. 1	Sept. 9, 1943		3	65
3517	16-30	SW¼NW¼ sec. 1	Mar. 26, 1943	18.7	15	
3518	16-30	do	Sept. 9, 1943	18.7	8	63
3519	16-31	NE¼SW¼ sec. 1	Mar. 25, 1943			
3520	16-31	do	Sept. 9, 1943		8	63
3521	16-32	do	Sept. 21, 1943		8	66
3522	16-33	do	Mar. 26, 1943	18.4	10	
3523	16-33	do	Sept. 9, 1943	18.4	8	64
3524	16-34	NW¼SW¼ sec. 1	Mar. 27, 1943	23.8	15	
3525	16-34	do	Sept. 9, 1943	23.8	8	64
3526	16-35	do	Mar. 27, 1943	16.6	12	
3527	16-35	do	Sept. 9, 1943	16.6	8	64
3528	16-36	SW¼NW¼ sec. 1	Mar. 26, 1943	18.3	1	
3529	16-36	do	Sept. 9, 1943	18.3	1	66
3530	16-37	SE¼SW¼ sec. 1	do		8	63
3531	16-38	NE¼NW¼ sec. 1	do		8	77
3532	16-39	NW¼SW¼ sec. 1	do		8	65

between the mouth of Bonita Creek near Solomonsville and the Southern Pacific Rail-
at Calva—Continued

[Analyses in parts per million]

Specific conductance (K×10⁵ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids		Total hardness as $CaCO_3$	Percent sodium	Analysis No.
										Parts per million	Tons per acre-foot			
526	245	73	826	268	584	1,330	1.8	.5	9.0	3,190	4.34	912	66	3476
750						2,020								3477
174				158		295								3478
800				468	500	2,225						1,950		3479
459	257	70	673	372	420	1,160	1.8	13	.1	2,780	3.78	930	61	3480
452						1,120								3481
1,370														3482
1,420						4,110								3483
1,370	786	246	2,270	520	1,650	4,080	.6	20	25	9,310	12.7	2,970	62	3484
1,370						3,980								3485
1,380						4,010								3486
1,400						4,000								3487
1,410						4,010								3488
1,390						4,050								3489
1,380						4,030								3490
799						2,150								3491
692	415	112	1,002	578	702	1,750		1.0		4,270	5.81	1,496	59	3492
690						1,750								3493
804				532		2,070								3494
878						2,350								3495
775						2,120								3496
352				478		725								3497
439				452		1,035								3498
525				604		1,210								3499
394						870								3500
1,230						3,520								3501
685						1,720								3502
435				540		955								3503
472						1,060								3504
499				586		1,175								3505
513				141		1,440								3506
555				548		1,340								3507
718	370	95	1,127	372	843	1,830		2.0		4,450	6.05	1,314	65	3508
428				345		1,045								3509
601				441		1,590								3510
868						2,290								3511
932				238		2,600								3512
525				452		1,290								3513
477						1,170								3514
713						2,000								3515
1,200						3,590								3516
1,240	928	261	1,547	506	1,115	3,670	.9		2.0	7,770	10.6	3,390	50	3517
1,380						4,310								3518
835				470		2,360								3519
811						2,270								3520
864				274	800	2,470								3521
976				572		2,720								3522
1,070				421	1,045	3,120								3523
1,060				546		3,000								3524
1,220						3,510								3525
657				392		1,660								3526
1,080						3,080								3527
1,370				535		4,100								3528
1,390						4,280								3529
1,230	1,065	263	1,454	479	1,185	3,740				7,940	10.8	3,740	46	3530
784						2,150								3531
1,330						3,810								3532

Chemical character of ground waters in the Gila River Basin, Graham County, Ariz., road bridge

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (°F.)
	Driven observation well—Con.					
3533	16-40	SW¼NW¼ sec. 1	Mar. 26, 1943	15.3	2	
3534	16-40	do	Sept. 9, 1943	15.3	8	63
3535	16-41	do	Sept. 21, 1943		8	62
3536	16-42	NW¼NW¼ sec. 1	Sept. 9, 1943		8	64
3537	16-43	NE¼NW¼ sec. 1	do		2	79
3538	16-45	SW¼NW¼ sec. 1	Mar. 27, 1943	13.1	5	
3539	16-45	do	Sept. 8, 1943	13.1	8	63
3540	16-46	NW¼NW¼ sec. 1	Sept. 21, 1943		8	64
3541	16-47	do	Sept. 8, 1943		8	72
3542	16-48	NE¼NW¼ sec. 1	Sept. 9, 1943		8	79
3543	16-48	do	Nov. 2, 1943		15	79
3544	16-48	do	Jan. 6, 1944		10	76
3545	16-48	do	Mar. 1, 1944		10	73
3546	16-48	do	May 3, 1944		8	74
3547	16-48	do	July 10, 1944		6	77
3548	16-48	do	Aug. 29, 1944		5	79
3549	16-48	do	Oct. 27, 1944		4	78
3550	16-50	NW¼NW¼ sec. 1	Mar. 27, 1943	18.2	2	
3551	16-50	do	Sept. 8, 1943	18.2	8	63
3552	16-51	do	Sept. 21, 1943		8	64
3553	16-52	do	Mar. 27, 1943	23.9	10	
3554	16-52	do	Sept. 8, 1943	23.9	4	66
3555	16-56	do	Sept. 20, 1943		8	64
3556	16-59	NE¼SE¼ sec. 1	Mar. 25, 1943	18.4	9	
3557	16-59	do	Sept. 11, 1943	18.4	8	68
3558	16-60	do	do		8	64
3559	16-61	SW¼SW¼ sec. 1	Sept. 9, 1943		8	65
3560	Freland Palmer irrigation well	SE¼SE¼ sec. 2	July 23, 1940		645	67
3561	do	do	Apr. 20, 1943			67
3562	W. C. Rhodes domestic well	SE¼SW¼ sec. 2	Aug. 16, 1940	50		
3563	do	do	Mar. 11, 1943	50		
3564	Roy Layton domestic well	SW¼NE¼ sec. 2	Feb. 25, 1942			
3565	do	do	Mar. 10, 1943			
3566	W. O. Tyler irrigation well	NE¼NE¼ sec. 2	June 18, 1940	54		
3567	A. F. Whitmer irrigation well	NW¼SE¼ sec. 2	May 15, 1943			
3568	do	do	June 28, 1944			
3569	A. C. Atchison domestic well	do	Mar. 12, 1943	65		
3570	Driven observation well, 15-83	SE¼SE¼ sec. 2	June 20, 1943			
3571	Driven observation well, 15-83 (after deepening).	do	do			
3572	do	do	Sept. 9, 1943		4	65
3573	16-49	SE¼NE¼ sec. 2	Mar. 27, 1943	18.7	10	
3574	16-49	do	Sept. 8, 1943	18.7	8	66
3575	16-53	do	Mar. 27, 1943	18.4	10	
3576	16-53	do	Sept. 8, 1943	18.4	8	65
3577	16-54	NE¼NE¼ sec. 2	do		8	66
3578	16-55	do	Sept. 21, 1943		8	62
3579	16-57	do	Mar. 26, 1943	18.8	10	
3580	16-57	do	Sept. 8, 1943	18.8	6	66
3581	16-58	do	Mar. 26, 1943	13.3	15	
3582	16-58	do	Sept. 20, 1943	13.3	8	66
3583	16-62	NE¼SE¼ sec. 2	Sept. 9, 1943		8	64
3584	16-63	do	Sept. 21, 1943		8	65
3585	16-65	NW¼NE¼ sec. 2	Sept. 8, 1943		8	66
3586	16-65	do	Nov. 2, 1943		5	67
3587	16-65	do	Jan. 5, 1944		4	66
3588	16-65	do	Mar. 2, 1944		6	67
3589	16-65	do	May 3, 1944		4	66
3590	16-65	do	June 11, 1944		2	67
3591	Ed. McEuen domestic well	SW¼SE¼ sec. 3	Sept. 17, 1940	39		
3592	Mrs. H. E. Neal domestic well	SE¼SW¼ sec. 3	Oct. 14, 1940	69	375	

between the mouth of Bonita Creek near Solomonsville and the Southern Pacific Rail- at Calva—Continued

[Analyses in parts per million]

Specific conductance (K×10⁵ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Total hardness as $CaCO_3$	Percent sodium	Analysis No.
1,450	------	------	------	581	------	4,120	------	------	------	------	------	------	------	3533
1,450	------	------	------	------	------	4,280	------	------	------	------	------	------	------	3534
1,390	------	------	------	------	------	4,200	------	------	------	------	------	------	------	3535
1,180	------	------	------	------	------	3,440	------	------	------	------	------	------	------	3536
798	------	------	------	122	------	2,240	------	------	------	------	------	------	------	3537
1,520	907	300	2,274	545	1,691	4,420	------	------	------	9,860	13.4	3,500	59	3538
1,420	826	307	2,153	539	1,641	4,150	.9	------	9.0	9,340	12.7	3,324	58	3539
1,550	------	------	------	------	------	4,820	------	------	------	------	------	------	------	3540
790	------	------	------	------	------	2,140	------	------	------	------	------	------	------	3541
770	------	------	------	------	------	2,110	------	------	------	------	------	------	------	3542
742	120	25	1,570	282	605	2,080	5.0	1.0	------	4,540	6.17	402	89	3543
749	------	------	------	------	------	2,070	------	------	6.6	------	------	------	------	3544
734	------	------	------	280	------	2,020	------	------	------	------	------	------	------	3545
725	------	------	------	------	------	1,980	------	------	------	------	------	------	------	3546
672	------	------	------	------	------	1,840	------	------	------	------	------	------	------	3547
709	------	------	------	------	------	1,950	------	------	------	------	------	------	------	3548
804	------	------	------	------	------	2,280	------	------	------	------	------	------	------	3549
1,580	------	------	------	684	------	4,590	------	------	------	------	------	------	------	3550
1,490	------	------	------	------	------	4,400	------	------	------	------	------	------	------	3551
1,570	------	------	------	------	------	4,830	------	------	------	------	------	------	------	3552
195	60	23	308	298	169	350	------	1.0	------	1,058	1.44	244	73	3553
329	140	44	508	267	357	735	2.8	.5	7.5	1,919	2.61	530	68	3554
1,640	------	------	------	------	------	5,170	------	------	------	------	------	------	------	3555
660	415	117	908	622	677	1,610	1.3	1.0	3.0	4,040	5.49	1,516	57	3556
516	------	------	------	594	------	1,170	------	------	------	------	------	------	------	3557
922	------	------	------	------	------	2,500	------	------	------	------	------	------	------	3558
1,250	------	------	------	------	------	3,649	------	------	------	------	------	------	------	3559
1,240	------	------	------	504	1,700	3,380	------	------	------	------	------	2,325	------	3560
1,200	584	252	1,891	508	1,690	3,140	.4	------	2.0	7,810	10.6	2,494	62	3561
29	------	------	------	108	37	17	.1	------	------	------	------	120	------	3562
23.6	------	------	------	------	------	8	------	------	------	------	------	------	------	3563
304	------	------	------	------	------	550	------	------	------	------	------	------	------	3564
71.4	27	8.3	115	146	125	69	.9	1.5	.2	419	.57	102	71	3565
236	------	------	------	145	120	540	------	------	------	------	------	720	------	3566
49.9	------	------	------	------	------	42	------	------	------	------	------	------	------	3567
43.6	23	6.0	65	128	58	38	.8	2.5	------	256	.35	82	63	3568
29.1	29	9.2	18	130	31	6	.8	.5	.1	145	.20	110	26	3569
2,270	------	------	------	------	------	6,470	------	------	------	------	------	------	------	3570
1,280	------	------	------	------	------	3,410	------	------	------	------	------	------	------	3571
1,240	------	------	------	------	------	3,350	------	------	------	------	------	------	------	3572
1,420	------	------	------	617	------	4,030	------	------	------	------	------	------	------	3573
1,390	------	------	------	------	------	3,930	------	------	------	------	------	------	------	3574
1,250	------	------	------	555	------	3,420	------	------	------	------	------	------	------	3575
1,190	------	------	------	------	------	3,210	------	------	------	------	------	------	------	3576
1,410	------	------	------	------	------	3,960	------	------	------	------	------	------	------	3577
1,780	1,126	381	2,690	470	1,986	5,510	1.3	9.9	17	11,900	16.2	4,380	57	3578
1,310	------	------	------	211	------	3,650	------	------	------	------	------	------	------	3579
1,380	------	------	------	------	------	3,830	------	------	------	------	------	------	------	3580
1,520	------	------	------	370	------	4,470	------	------	------	------	------	------	------	3581
1,550	------	------	------	------	------	4,620	------	------	------	------	------	------	------	3582
1,450	------	------	------	------	------	4,110	------	------	------	------	------	------	------	3583
997	------	------	------	481	1,788	2,300	------	------	------	------	------	------	------	3584
198	88	22	305	209	270	355	.8	21	3.0	1,165	1.58	310	68	3585
151	60	16	244	191	222	245	.7	15	------	897	1.22	216	71	3586
127	------	------	------	------	------	188	------	------	------	------	------	------	------	3587
136	------	------	------	------	------	222	------	------	------	------	------	------	------	3588
137	------	------	------	------	------	224	------	------	------	------	------	------	------	3589
148	------	------	------	------	------	250	------	------	------	------	------	------	------	3590
24	29	6.3	13	109	26	6	.4	.2	------	135	.18	98	22	3591
21	------	------	------	106	14	6	.4	------	------	------	------	111	------	3592

Chemical character of ground waters in the Gila River Basin, Graham County, Ariz., road bridge

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (°F.)
3593	Mrs. H. E. Neal domestic well	SE¼SW¼ sec. 3	Mar. 12, 1943	69		
3594	do	do	July 16, 1941	69		66
3595	Bryce Allen domestic well	NE¼SE¼ sec. 3	Mar. 12, 1943	65		
3596	Sam Horlocker domestic well	SW¼NE¼ sec. 10	Mar. 10, 1943	60		
3597	D. Steele stock well	NW¼NW¼ sec. 11	Mar. 29, 1940	66		68
3598	do	do	Mar. 18, 1941	66		
3599	do	do	Mar. 11, 1943	66		
3600	John Revel unused well	SE¼SE¼ sec. 11	Feb. 25, 1942	20		
3601	Freland Moody well	SE¼NE¼ sec. 12	Mar. 9, 1943	30		
3602	Roy Layton irrigation test well	NE¼SE¼ sec. 12	May 17, 1944	38		
3603	O. O. Hall unused well	SE¼SW¼ sec. 12	Feb. 25, 1942	23		
3604	do	do	Mar. 10, 1943	23		
3605	Driven observation well, 15-56	NE¼NE¼ sec. 12	Mar. 24, 1943	18.9	15	
3606	do	do	Sept. 13, 1943	18.9	8	65
3607	15-59	do	Mar. 24, 1943	23.7	15	
3608	15-59	do	Sept. 13, 1943	23.7	8	64
3609	15-60	do	Mar. 24, 1943	23.9	12	
3610	15-60	do	Sept. 9, 1943	23.9	8	66
3611	Sampled by bailing	do	Mar. 15, 1944	23.9		60
3612	do	do	do	23.9		62
3613	Sampled by pumping	do	do	23.9	5	
3614	do	do	do	23.9	5	66
3615	15-61	do	Mar. 24, 1943	24.5	12	
3616	15-61	do	Sept. 9, 1943	24.5	8	64
3617	15-61	do	Oct. 30, 1943	24.5	10	66
3618	15-61	do	Jan. 5, 1944	24.5	10	66
3619	15-61	do	Mar. 2, 1944	24.5	8	64
3620	15-61	do	May 3, 1944	24.5	6	64
3621	15-61	do	July 11, 1944	24.5	7	64
3622	15-61	do	Aug. 29, 1944	24.5	8	64
3623	15-61	do	Oct. 30, 1944	24.5	6	65
3624	15-62	do	Mar. 24, 1943	23.8	.25	
3625	15-62	do	Sept. 9, 1943	23.8	3	66
3626	15-70	SE¼SE¼ sec. 12	Sept. 14, 1943		8	63
3627	15-70	do	Oct. 30, 1943		12	71
3628	15-70	do	Jan. 5, 1944		10	70
3629	15-70	do	Mar. 2, 1944		8	68
3630	15-70	do	May 3, 1944		8	66
3631	15-70	do	July 11, 1944		5	64
3632	15-70	do	Aug. 30, 1944		8	64
3633	15-70	do	Oct. 30, 1944		7	71
3634	15-71	NE¼SE¼ sec. 12	Sept. 13, 1943		8	73
3635	15-72	do	Sept. 14, 1943		8	62
3636	15-73	do	do		8	62
3637	15-74	do	Sept. 13, 1943		8	63
3638	15-75	SE¼NE¼ sec. 12	do		8	64
3639	15-76	NW¼NE¼ sec. 12	June 20, 1943			
3640	15-76	do	Sept. 9, 1943		2	66
3641	15-77	SW¼SE¼ sec. 12	Sept. 27, 1943		6	64
3642	15-79	NW¼SE¼ sec. 12	Sept. 9, 1943		2	66
3643	15-80	NW¼NE¼ sec. 12	do		1.5	68
3644	14-59	NE¼NE¼ sec. 13	Mar. 23, 1943	20.5	12	
3645	14-59	do	Sept. 14, 1943	20.5	8	64
3646	14-69	do	Sept. 9, 1943		8	66
3647	14-70	SE¼SE¼ sec. 13	Oct. 6, 1943		8	64
3648	14-71	NE¼SE¼ sec. 13	Sept. 14, 1943		4	65
3649	14-71	do	Oct. 30, 1943		8	67
3650	14-71	do	Jan. 5, 1944		4	66
3651	14-71	do	Mar. 2, 1944		5	67
3652	14-71	do	May 3, 1944		3	66

between the mouth of Bonita Creek near Solomonsville and the Southern Pacific Rail- at Calva—Continued

[Analyses in parts per million]

Specific conductance (K×10⁶ at 25 °C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Total hardness as $CaCO_3$	Percent sodium	Analysis No.
28.2				115		5								3593
22.8	31	6.6	7.3	108	23	4	.6	1.0		127	.17	105	13	3594
26.1				105		4								3595
25.4						2								3596
27				110	26	11	.2	1.4				105		3597
23.0	30	8.7	6.0	106	30	4				131	.18	111	11	3598
26.8						6								3599
2,430						6,720								3600
245				385		475								3601
341														3602
599						1,160								3603
845						1,680								3604
296				464		585								3605
282						575								3606
325				456		680								3607
306	166	42	443	424	273	650		4.0		1,787	2.43	587	62	3608
607	330	89	910	488	610	1,510	.7	1.0	3.5	3,690	5.02	1,190	62	3609
492						1,165								3610
393	104	49	709	142	416	1,030		1.0		2,380	3.24	461	77	3611
393	105	49	712	134	417	1,040		1.0		2,390	3.25	464	77	3612
390	194	51	653	513	412	895		1.0		2,460	3.35	694	67	3613
403	206	51	670	523	422	930		1.0		2,540	3.45	724	67	3614
414				424		960								3615
348						650								3616
331	173	48	510	382	318	770	2.3	2.5	7.0	2,010	2.73	629	64	3617
322						705								3618
329						750								3619
354						790								3620
357						805								3621
354						805								3622
325						720								3623
428				480		865								3624
344														3625
164						290								3626
223	102	34	344	276	238	470	1.9	1.0	6.0	1,330	1.81	394	65	3627
247						570								3628
250						545								3629
473	324	91	583	347	393	1,240	1.1	5.0	.2	2,810	3.82	1,180	52	3630
643	514	135	719	394	554	1,770	.6	5.8	2.0	3,890	5.29	1,840	46	3631
585						1,520								3632
93.9	20	7.6	173	208	87	138		1.0		529	.72	81	82	3633
106						155								3634
298				315	276	670								3635
260						555								3636
259						535								3637
378						895								3638
492						1,170								3639
510	262	80	937	378	445	1,580		22		3,510	4.77	983	67	3640
794				692		1,650								3641
1,450						4,560								3642
1,280						3,870								3643
1,370				520		4,090								3644
1,220						3,610								3645
1,280						3,890								3646
1,600						5,030								3647
1,380						4,030								3648
1,350	771	221	2,210	414	1,500	4,060	1.8	12	20	8,980	12.2	2,830	63	3649
1,360						4,060								3650
1,340						3,960								3651
1,350						3,980								3652

Chemical character of ground waters in the Gila River Basin, Graham County, Ariz., road bridge

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (°F.)
	Driven observation well—Con.					
3653	14-71	NE¼SE¼ sec. 13	July 11, 1944		4	67
3654	14-71	do	Aug. 30, 1944		5	68
3655	14-71	do	Oct. 30, 1944		4	67
3656	14-72	NE¼NW¼ sec. 13	Sept. 14, 1943		8	65
3657	14-73	SE¼NW¼ sec. 13	do		5	67
3658	14-74	NE¼NW¼ sec. 13	do		8	66
3659	14-75	SW¼NE¼ sec. 13	do		8	65
3660	14-76	NW¼NE¼ sec. 13	Sept. 27, 1943		8	64
3661	14-76	do	Oct. 30, 1943		8	65
3662	14-76	do	Jan. 5, 1944		3	65
3663	14-76	do	Mar. 2, 1944		10	65
3664	14-76	do	May 3, 1944		2	64
3665	14-76	do	July 11, 1944		6	65
3666	14-76	do	Aug. 30, 1944		8	65
3667	14-76	do	Oct. 30, 1944		7	65
3668	Sam Henry unused well	SW¼SW¼ sec. 14	Feb. 26, 1942	150		
3669	do	do	Mar. 15, 1943	150		
3670	YL Ranch stock well	SE¼ sec. 19	Jan. 22, 1941			
3671	Brimhall unused well	SE¼SE¼ sec. 25	Sept. 16, 1943			
		T. 7 S., R. 23 E.:				
3672	Bill Napier flowing well, USGS 461	SE¼NE¼ sec. 1	Apr. 4, 1940	600	50	73
3673	USGS 462	do	Mar. 4, 1940	200	2	70
3674	USGS 463	do	Apr. 4, 1940	80	1	71
3675	Ben Brown flowing well, USGS 464	NE¼SW¼ sec. 1	Mar. 4, 1940	80	2	
3676	do	do	Apr. 4, 1940	80	2	71
3677	do	do	Jan. 7, 1941	80		
3678	USGS 465	do	Apr. 4, 1940	310	30	70
3679	USGS 465	do	Jan. 7, 1941	310		
3680	Ben Brown domestic well, USGS 466	do	Jan. 4, 1941	48		
3681	Ben Brown flowing well, USGS 467	do	do		10	
3682	USGS 468	SW¼NW¼ sec. 1	Jan. 9, 1941		30	
3683	Old Cowboy Corral spring	NW¼SE¼ sec. 2	Jan. 8, 1941		7	
3684	Spring in Matthews Wash	SW¼SW¼ sec. 5	do		3	
3685	Spring at Bear Springs Flat	NW¼NE¼ sec. 11	do		1	
		T. 4 S., R. 22 E.:				
3686	Driven observation well, 22-82	SE¼SE¼ sec. 11	July 29, 1943		8	66
3687	do	do	Apr. 26, 1944		4	64
3688	22-87	do	Aug. 2, 1943		8	69
3689	22-87	do	May 23, 1944		6	66
3690	22-88	do	July 29, 1943		8	67
3691	22-88	do	Apr. 26, 1944		5	63
3692	22-89	NE¼SE¼ sec. 11	July 29, 1943		8	64
3693	22-92	SE¼SE¼ sec. 11	Apr. 4, 1943	18.5	10	
3694	22-92	do	Aug. 13, 1943	18.5	5	66
3695	22-93	NE¼SE¼ sec. 11	Apr. 4, 1943	18.9	12	
3696	22-93	do	Aug. 13, 1943	18.9	8	63
3697	22-97	SE¼NE¼ sec. 11	Apr. 5, 1943	24.1	13	
3698	22-98	NW¼SE¼ sec. 11	do	23.9	10	
3699	22-98	do	Sept. 1, 1943	23.9	8	68
3700	S. L. Claridge irrigation well	SE¼SE¼ sec. 12	Apr. 18, 1944			
3701	do	do	Apr. 21, 1944			
3702	do	do	Apr. 24, 1944			
3703	S. L. Claridge stock well	SW¼NE¼ sec. 12	Feb. 27, 1942			
3704	do	do	Apr. 4, 1943			
3705	do	do	Apr. 27, 1944			67
3706	Ed. McEuen drilled well	SE¼SE¼ sec. 12	Feb. 27, 1942	30		
3707	Driven observation well, 22-10	do	Apr. 1, 1943	18.7	10	
3708	do	do	Sept. 2, 1943	18.7	8	71
3709	do	do	May 26, 1944	18.7	7	65
3710	22-11	do	July 28, 1943		5	64

between the mouth of Bonita Creek near Solomonsville and the Southern Pacific Rail- at Calva—Continued

[Analyses in parts per million]

Specific conductance (K×10⁵ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids		Total hardness as $CaCO_3$	Percent sodium	Analysis No.
										Parts per million	Tons per acre-foot			
1,380						4,060								3653
1,380						4,100								3654
1,390						4,150								3655
1,000						2,550								3656
1,180						3,290								3657
1,330						3,860								3658
1,480	1,002	265	2,157	471	1,576	4,430	.2	7.5	6.5	9,670	13.2	3,590	56	3659
1,580						4,830								3660
1,550	1,050	291	2,380	446	1,710	4,850	.2	5.0	15	10,510	14.3	3,820	58	3661
1,580						4,800								3662
1,560						4,770								3663
1,560						4,780								3664
1,570						4,780								3665
1,570						4,800								3666
1,530						4,720								3667
764						700								3668
804	2.5	7.0	1,998	356	2,930	730	2.2	1.0	40	5,850	7.96	35	99	3669
19.1	24	9.6	<10	79	21	5	.5			99	.13	99		3670
761	406	121	1,182	563	838	1,940	1.7	7.7	9.0	4,770	6.49	1,510	63	3671
80				124	65	138	2.2					48		3672
35				148	20	28						69		3673
25				130	3	9	4.2					42		3674
81				162	95	104	5.9					14		3675
107				132	90	212	2.3					132		3676
76.2	5.0	9.2	152	160	85	104	5.5			440	.60	50	87	3677
243				115	280	550						360		3678
106	47	6.6	166	122	103	205	3.1			591	.80	144	71	3679
83.2	24	8.3	147	163	77	133	4.6			474	.64	94	77	3680
214	104	12	326	102	242	480	2.0			1,216	1.65	309	70	3681
241	97	12	401	125	276	540	4.8			1,393	1.89	291	75	3682
186	66	6.1	330	151	201	400	4.1			1,081	1.47	190	79	3683
25.6	25	10	18	144	13	5	1.3			143	.19	104	27	3684
37.8	34	7.9	43	205	16	15	1.6			218	.30	117	44	3685
198	84	24	310	352	153	375	1.5	1.0	3.0	1,122	1.53	308	69	3686
242						510								3687
270						590								3688
250	118	35	374	276	250	540	1.5	.5	.5	1,460	1.99	438	65	3689
345						810								3690
229	109	28	356	343	190	480	1.5	.5	.1	1,330	1.81	387	67	3691
484	316	77	628	387	382	1,245		1.0		2,840	3.86	1,105	55	3692
423	251	65	560	320	342	1,055	1.3	1.0	1.0	2,433	3.31	894	58	3693
376				324		920								3694
646	291	117	975	369	453	1,810		1.0		3,830	5.21	1,207	64	3695
596				398		1,630								3696
274				293		620								3697
279	172	35	373	283	259	625		1.0		1,604	2.18	573	59	3698
268						610								3699
285						635								3700
279						640								3701
284	132	35	434	233	287	655	1.5	.5	.5	1,660	2.26	474	67	3702
273	152	38	382	236	245	650				1,583	2.15	536	61	3703
247				249		550								3704
490	396	74	600	292	569	1,250	1.0	1.5	.2	3,040	4.13	1,290	50	3705
167	95	20	237	235	152	342				962	1.31	319	62	3706
120				270		184								3707
129						204								3708
117	70	22	163	286	131	174	1.1	.0	.2	702	.95	265	57	3709
427	250	64	599	278	447	1,060		1.0		2,560	3.48	887	59	3710

Chemical character of ground waters in the Gila River Basin, Graham County, Ariz., road bridge

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (°F.)
	Driven observation well—Con.					
3711	22-11	SE¼SE¼ sec. 12	Jan. 6, 1944		5	67
3712	22-11	do	Apr. 24, 1944		8	58
3713	22-11	do	July 14, 1944		3	67
3714	22-11	do	Sept. 1, 1944		5	73
3715	22-11	do	Oct. 31, 1944		4	73
3716	22-15	do	Aug. 3, 1943		4	69
3717	22-15	do	May 26, 1944		5	
3718	22-16	do	Apr. 4, 1943	18.9	15	
3719	22-16	do	Sept. 1, 1943	18.9	8	76
3720	22-16	do	Apr. 25, 1944	18.9	8	60
3721	22-21	SW¼SE¼ sec. 12	July 30, 1943		8	79
3722	22-21	do	Apr. 25, 1944		3	62
3723	22-22	SE¼SE¼ sec. 12	July 30, 1943		8	71
3724	22-22	do	Nov. 2, 1943		5	75
3725	22-22	do	Jan. 6, 1944		5	62
3726	22-22	do	Mar. 3, 1944		8	54
3727	22-22	do	Apr. 25, 1944		4	54
3728	22-22	do	July 14, 1944		4	64
3729	22-22	do	Sept. 1, 1944		6	73
3730	22-22	do	Oct. 31, 1944		6	75
3731	22-23	NE¼SE¼ sec. 12	Apr. 2, 1943	24	10	
3732	22-28	SW¼SE¼ sec. 12	Sept. 2, 1943		8	74
3733	22-28	do	Apr. 25, 1944		3	58
3734	22-29	do	Apr. 4, 1943	23.5	10	
3735	22-29	do	Aug. 3, 1943	23.5	8	70
3736	22-31	NE¼SE¼ sec. 12	Apr. 4, 1943	29.4	5	
3737	22-31	do	Sept. 1, 1943	29.4	6	67
3738	22-31	do	Apr. 25, 1944	29.4	6	65
3739	22-36	SW¼SE¼ sec. 12	Apr. 2, 1943	23.5	15	
3740	22-37	do	Apr. 4, 1943	23.4	1	
3741	22-38	NW¼SE¼ sec. 12	Apr. 3, 1943	18.5	7	
3742	22-43	SE¼SW¼ sec. 12	do	18.5	8	
3743	22-43	do	Sept. 1, 1943	18.5	8	68
3744	22-43	do	Nov. 2, 1943	18.5	15	68
3745	22-43	do	Jan. 6, 1944	18.5	8	65
3746	22-43	do	Feb. 10, 1944	18.5		
3747	22-43	do	Mar. 3, 1944	18.5	10	64
3748	22-43	do	Apr. 25, 1944	18.5	8	64
3749	22-43	do	Sept. 1, 1944	18.5	8	69
3750	22-44	do	July 29, 1943		8	67
3751	22-45	NW¼SE¼ sec. 12	Apr. 3, 1943	18.6	5	
3752	22-51	SE¼SW¼ sec. 12	Apr. 2, 1943	18.6	1	
3753	22-51	do	Sept. 1, 1943	18.6	8	68
3754	22-51	do	Apr. 26, 1944	18.6	10	61
3755	22-52	do	Apr. 3, 1943	18.5	15	
3756	22-52	do	Sept. 1, 1943	18.5	8	67
3757	22-52	do	Apr. 26, 1944	18.5	6	64
3758	22-53	NE¼SW¼ sec. 12	July 28, 1943		5	67
3759	22-60	SE¼SW¼ sec. 12	Apr. 4, 1943	23.8	5	
3760	22-60	do	Sept. 1, 1943	23.8	6	67
3761	22-60	do	Apr. 26, 1944	23.8	2	66
3762	22-61	NE¼SW¼ sec. 12	Apr. 4, 1943	18.7	15	
3763	22-61	do	Aug. 13, 1943	18.7	8	67
3764	22-62	do	July 28, 1943		5	67
3765	22-63	SE¼NW¼ sec. 12	Apr. 4, 1943	23.9	6	
3766	22-67	SW¼SW¼ sec. 12	July 30, 1943		8	64
3767	22-67	do	Apr. 26, 1944		6	64
3768	22-68	do	Apr. 3, 1943	18.7	15	
3769	22-68	do	Sept. 1, 1943	18.7	8	66
3770	22-68	do	Apr. 26, 1944	18.7	8	64

between the mouth of Bonita Creek near Solomonsville and the Southern Pacific Rail- at Calva—Continued

[Analyses in parts per million]

Specific conductance (K×10⁵ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Total hardness as $CaCO_3$	Percent sodium	Analysis No.
325	152	42	510	328	330	740	1.4	1.0	6.0	1,940	2.64	552	67	3711
419	232	61	610	302	448	1,020	1.0	.5		2,520	3.43	830	61	3712
489						1,060								3713
282	93	27	487	304	288	600	1.9	1.0	3.5	1,650	2.24	343	76	3714
298						655								3715
148						270								3716
130	60	16	209	287	135	208		.5		770	1.05	216	68	3717
308	183	50	401	326	295	680		.5		1,770	2.41	662	57	3718
155						280								3719
424						1,030								3720
443				278		1,080								3721
545	237	71	887	308	598	1,370	1.4	2.0	1.5	3,320	4.52	884	69	3722
445														3723
198	57	20	348	229	202	410	1.9	.5	8.0	1,150	1.56	224	77	3724
372	199	51	556	350	374	875	1.4	1.0	5.0	2,230	3.03	706	63	3725
312						705								3726
524	331	79	753	353	583	1,340	.5	0		3,260	4.43	1,150	59	3727
542						1,350								3728
436	174	45	736	350	470	1,020	1.6	1.0	5.0	2,620	3.56	619	72	3729
168	36	10	325	277	172	300	3.1	1.0		984	1.34	131	84	3730
167				251		310								3731
297														3732
445						1,100								3733
287				319		610								3734
128						185								3735
316	114	28	518	281	287	705		1.0	1.5	1,791	2.44	400	74	3736
916	437	107	1,653	412	1,800	2,060	2.0	3.0	5.0	6,260	8.51	1,530	70	3737
384						855								3738
335				312		765								3739
270				261		585								3740
218				284		440								3741
301				301		665								3742
405				308		985								3743
417	260	69	573	312	435	1,040	.8	.5		2,530	3.44	932	57	3744
360						865								3745
360				298		842			3.2					3746
357						865								3747
364						880								3847
416						1,020								3749
296						670								3750
304	164	40	421	297	289	665	1.9	1.0	1.0	1,728	2.35	574	61	3751
270				307		580								3752
237						500								3753
306						710								3754
321				301		730								3755
322				324		725								3756
391						950								3757
221	114	29	315	271	207	460		1.0		1,260	1.71	404	63	3758
248				318		530								3759
263				218		595								3760
263						610								3761
456	249	75	641	424	380	1,120		1.0		2,670	3.63	930	60	3762
429				420		1,035								3763
230														3764
248				283		530								3765
114						190								3766
236	170	43	279	306	226	510	.7	.5	.1	1,380	1.88	602	50	3767
307				349										3768
320						730								3769
326						770								3770

Chemical character of ground waters in the Gila River Basin, Graham County, Ariz., road bridge

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (°F.)
	Driven observation well—Con.					
3771	22-69	NW¼SW¼ sec. 12	Apr. 4, 1943	18.8	4	
3772	22-70	do	Apr. 5, 1943	23.9	10	
3773	22-74	SW¼SW¼ sec. 12	Apr. 3, 1943	18.7	.5	
3774	22-74	do	July 30, 1943	18.7	8	66
3775	22-74	do	Apr. 26, 1944	18.7	4	64
3776	22-75	do	Apr. 3, 1943	18.7	6	
3777	22-75	do	Sept. 1, 1943	18.7	6	67
3778	22-75	do	Apr. 26, 1944	18.7	6	64
3779	22-83	NW¼SW¼ sec. 12	July 29, 1943		8	65
3780	22-84	do	Apr. 5, 1943	18.8	12	
3781	Bert Hinton irrigation well	SE¼NW¼ sec. 13	May 12, 1940	76		68
3782	Bert Hinton domestic well	do	Mar. 29, 1940	27		68
3783	do	do	July 14, 1944	27		
3784	R. Knowles flowing well	SE¼SE¼ sec. 13	Apr. 24, 1941	810	21	
3785	do	do	Jan. 5, 1944	810		83
3786	do	do	Jan. 6, 1944	810		82
3787	H. A. McBeath stock well	do	Feb. 25, 1942	53		
3788	do	do	Mar. 17, 1943	53		
3789	Driven observation well, 22-3	SE¼NE¼ sec. 13	Apr. 1, 1943	23.3	.1	
3790	do	do	Aug. 4, 1943	23.3		68
3791	do	do	Nov. 3, 1943	23.3	1	65
3792	do	do	Jan. 6, 1944	23.3	1	54
3793	do	do	Mar. 3, 1944	23.3	1	54
3794	do	do	Apr. 27, 1944	23.3	2	58
3795	do	do	July 14, 1944	23.3	1.5	62
3796	do	do	Aug. 30, 1944	23.3	1	63
3797	do	do	Oct. 31, 1944	23.3	1	63
3798	22-5	do	Apr. 2, 1943	22.2	3	
3799	22-5	do	July 29, 1943	22.2	4	66
3800	22-6	do	Apr. 2, 1943	23.5	7	
3801	22-6	do	Sept. 1, 1943	23.5	6	68
3802	22-6	do	July 14, 1944	23.5	1	70
3803	22-7	SW¼NE¼ sec. 13	Apr. 2, 1943	23.4	5	
3804	22-7	do	Sept. 1, 1943	23.4	8	68
3805	22-7	do	May 25, 1944	23.4	6	67
3806	22-8	NE¼NE¼ sec. 13	Apr. 1, 1943	23.9	10	
3807	22-8	do	Sept. 1, 1943	23.9	8	65
3808	22-8	do	May 25, 1944	23.9	5	64
3809	22-9	do	Aug. 3, 1943		8	72
3810	22-9	do	Apr. 27, 1944		3	64
3811	22-12	SE¼NE¼ sec. 13	Aug. 3, 1943		8	67
3812	22-12	do	May 24, 1944		5	65
3813	22-13	NE¼NE¼ sec. 13	Apr. 1, 1943	18.6	.2	
3814	22-13	do	Aug. 3, 1943	18.6	8	71
3815	22-13	do	May 25, 1944	18.6	7	64
3816	22-14	do	do		6	65
3817	22-18	SW¼NE¼ sec. 13	Apr. 2, 1943	18.6	10	
3818	22-18	do	Sept. 1, 1943	18.6	8	65
3819	22. 18	do	May 24, 1944	18.6	9	65
3820	22-19	NW¼NE¼ sec. 13	Apr. 1, 1943	18.3	1	
3821	22-19	do	Sept. 1, 1943	18.3	3	68
3822	22-19	do	May 25, 1944	18.3	3	66
3823	22-20	do	do		7	66
3824	22-24	SE¼NE¼ sec. 13	Apr. 1, 1943	23.7	5	
3825	22-24	do	Sept. 1, 1943	23.7	4	65
3826	22-24	do	May 24, 1944	23.7	2	66
3827	22-25	do	Aug. 3, 1943		8	64
3828	22-25	do	May 25, 1944		6	63
3829	22-26	NW¼NE¼ sec. 13	Aug. 3, 1943		8	66
3830	22-26	do	May 25, 1944		10	65

between the mouth of Bonita Creek near Solomonsville and the Southern Pacific Rail- at Calva—Continued

[Analyses in parts per million]

Specific conductance (K×10⁵ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Total hardness as $CaCO_3$	Percent sodium	Analysis No.
304				342		685								3771
236				271		500								3772
255	125	35	379	393	180	545		1.0		1,459	1.98	456	64	3773
172						315								3774
253						555								3775
316				352		725								3776
258						565								3777
297	156	39	443	327	270	680	1.5	0	.1	1,750	2.38	550	64	3778
516						1,365								3779
230				270		490								3780
80				212	130	112						248		3781
67				188	60	81	1.1	.6				120		3782
148	76	23	204	151	196	282	.7	0	3.0	856	1.16	284	61	3783
2,217	127	89	5,170	479	1,921	6,750				14,290	19.4	683	94	3784
2,220														3785
2,230	138	88	5,190	476	1,910	6,800	4.2	7.4	16	14,400	19.6	706	94	3786
65.4						93								3787
59.8	34	8.1	83	161	60	71	1.2	2.5	.4	339	.46	118	60	3788
115				202		196								3789
122						202								3790
128	80	19	169	217	142	222	.9	3.0	8.0	743	1.01	278	57	3791
404	204	44	694	362	789	755	4.4	5.0	8.0	2,670	3.63	690	69	3792
499	414	85	640	385	737	1,190	2.1	8.5		3,270	4.45	1,380	50	3793
454						1,070								3794
345	270	61	393	300	393	790	1.4	8.5	2.0	2,060	2.80	925	48	3795
353						830								3796
190	114	27	254	257	223	355		5.0		1,100	1.50	396	58	3797
129	42	9.8	232	348	123	168		.5	1.0	747	1.02	146	78	3798
366						910								3799
137				233		216								3800
109						146								3801
95.7						124								3802
152				234		255								3803
145						226								3804
142						230								3805
106				252		154								3806
103						146								3807
130						206								3808
99.4	55	16	145	257	100	144		.5		587	.80	204	61	3809
108						162								3810
137						220								3811
187						330								3812
126				293		190								3813
111						156								3814
109						148								3815
115						168								3816
164				319		265								3817
140						208								3818
142	74	19	218	322	164	212	1.5	0	.2	847	1.15	262	64	3819
142	45	12	243	301	120	222	2.3	.5		793	1.08	162	77	3820
121						176								3821
115						164								3822
118	59	17	182	301	127	164	.7	0	.5	698	.95	217	65	3823
137				290		210								3824
143						230								2825
170						285								3826
168						285								3827
138	50	12	249	339	139	204	2.3	0	.5	823	1.12	174	76	3828
140						220								3829
120						170								3830

Chemical character of ground waters in the Gila River Basin, Graham County, Ariz., road bridge

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (°F.)
	Driven observation well—Con.					
3831	22-27	NW¼NE¼ sec. 13	Apr. 14, 1943	13.3	8	
3832	22-27	do	Sept. 2, 1943	13.3	8	70
3833	22-27	do	May 25, 1944	13.3		66
3834	22-32	SE¼SW¼ sec. 13	Aug. 2, 1943		3	64
3835	22-32	do	May 24, 1944		1	65
3836	22-33	NE¼NW¼ sec. 13	Apr. 1, 1943	18.5	5	
3837	22-33	do	Sept. 1, 1943	18.5	8	63
3838	22-33	do	May 24, 1944	18.5	6	64
3839	22-34	do	Aug. 3, 1943		8	67
3840	22-34	do	May 25, 1944		4	63
3841	22-35	NW¼NE¼ sec. 13	July 30, 1943		3	69
3842	22-35	do	Apr. 25, 1944		1	62
3843	22-39	SE¼NW¼ sec. 13	Apr. 3, 1943	24.1	10	
3844	22-39	do	Sept. 1, 1943	24.1	8	64
3845	22-39	do	May 25, 1944	24.1	7	65
3846	22-40	do	Apr. 3, 1943	23.4	15	
3847	22-40	do	Sept. 1, 1943	23.4	8	62
3848	22-40	do	May 24, 1944	23.4	8	63
3849	22-41	NE¼NW¼ sec. 13	Aug. 3, 1943		8	66
3850	22-41	do	May 24, 1944		5	66
3851	22-42	do	Apr. 3, 1943	18.7	5	
3852	22-42	do	Sept. 2, 1943	18.7	.5	75
3853	22-42	do	Apr. 26, 1944	18.7	.25	65
3854	22-46	SW¼NE¼ sec. 13	Aug. 2, 1943		8	66
3855	22-46	do	May 24, 1944		5	65
3856	22-47	SW¼NW¼ sec. 13	July 31, 1943		8	67
3857	22-47	do	Nov. 3, 1943		5	66
3858	22-47	do	Jan. 6, 1944		4	65
3859	22-47	do	Mar. 3, 1944		5	66
3860	22-47	do	May 3, 1944		2	66
3861	22-47	do	July 14, 1944		2	68
3862	22-47	do	Sept. 1, 1944		2	67
3863	22-47	do	Oct. 31, 1944		2	67
3864	22-48	do	July 31, 1943		8	67
3865	22-48	do	Nov. 3, 1943		4	65
3866	22-48	do	Jan. 6, 1944		5	65
3867	22-48	do	Mar. 3, 1944		5	64
3868	22-48	do	May 3, 1944		4	64
3869	22-48	do	July 14, 1944		4	65
3870	22-48	do	Sept. 1, 1944		3	65
3871	22-48	do	Oct. 31, 1944		4	65
3872	22-49	NE¼NW¼ sec. 13	Sept. 1, 1943		8	68
3873	22-49	do	Nov. 3, 1943		12	68
3874	22-49	do	Jan. 6, 1944		8	66
3875	22-49	do	Mar. 3, 1944		5	64
3876	22-49	do	May 3, 1944		8	63
3877	22-49	do	July 14, 1944		3	64
3878	22-49	do	Sept. 1, 1944		8	65
3879	22-49	do	Oct. 31, 1944		10	69
3880	22-50	do	Apr. 2, 1943	18.5	5	
3881	22-50	do	Sept. 2, 1943	18.5	5	66
3882	22-50	do	Apr. 26, 1944	18.5	2	65
3883	22-56	SW¼NW¼ sec. 13	Apr. 3, 1943	24.2	12	
3884	22-56	do	Sept. 1, 1943	24.2	8	65
3885	22-56	do	May 24, 1944	24.2		66
3886	24-57	NW¼NW¼ sec. 13	Apr. 3, 1943	23.9	5	
3887	22-57	do	Sept. 1, 1943	23.9	8	63
3888	22-57	do	May 24, 1944	23.9	6	64
3889	22-58	do	Aug. 5, 1943		8	68
3890	22-58	do	Apr. 26, 1944		2	65

between the mouth of Bonita Creek near Solomonsville and the Southern Pacific Rail- at Calva—Continued

[Analyses in parts per million]

Specific conductance (K×10⁵ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Total hardness as $CaCO_3$	Percent sodium	Analysis No.
153				307		255								3831
297						680								3832
135						220								2833
315						685								3834
194						350								3835
150				327		246								3836
155						255								2837
132	44	12	238	310	123	204	2.3	.5	2.0	776	1.06	160	76	3838
186						360								3839
163						295								3840
456				296		1,125								3841
333	158	38	522	292	349	765	1.4	.5		1,980	2.69	550	67	3942
207	132	27	278	326	198	405		1.0		1,202	1.63	440	58	3843
190						350								3844
158						265								3845
200				329		375								3846
157						270								3847
154						260								2848
396						955								3849
314	179	48	444	293	322	730	1.5	.5	.5	1,870	2.54	644	60	3850
312				306		700								3851
405						985								3852
326						750								3853
165						275								3854
154						250								3855
153														3856
151	116	29	166	281	155	265	1.1	.5	6.0	871	1.18	408	47	3857
153						266								3858
142						248								3859
150						230								3860
143						236								3861
142						234								3862
142						235								3863
237						495								3864
189	86	25	296	310	172	370	2.3	.5	13	1,100	1.50	318	67	3865
180						342								3866
190						375								3867
190						355								3868
196						375								3869
203						395								3870
160						275								3871
412						995								3872
384	224	56	552	292	391	950	.8	.5	13	2,320	3.16	790	60	3873
352						840								3874
288	160	39	429	320	284	660	1.5	.5	.2	1,730	2.35	560	62	3875
282						620								3876
266						575								3877
278						600								3878
343	188	46	498	303	356	795		1.0		2,030	2.76	658	62	3879
276				295		585								3880
384				293		930								3881
347	203	48	498	302	358	825	1.0	.5	.2	2,080	2.83	704	61	3882
359				281		880								3883
326						745								3884
237						490								3885
306				313		705								3886
284						635								3887
219						440								3888
357						855								3889
282	150	33	417	260	292	635	1.5	0	.5	1,660	2.26	510	64	3890

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Chemical character of ground waters in the Gila River Basin, Graham County, Ariz., road bridge

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (°F.)
	Driven observation well—Con.					
3891	22-59	NW¼NW¼ sec. 13	Apr. 26, 1944		2	65
3892	22-64	do	July 31, 1943		8	66
3893	22-64	do	May 24, 1944		5	65
3894	22-65	do	Aug. 2, 1943		3	67
3895	22-65	do	May 24, 1944		2	61
3896	22-66	do	Apr. 2, 1943	19.1	10	
3897	22-66	do	Sept. 1, 1943	19.1	8	67
3898	22-66	do	Apr. 26, 1944	19.1	8	65
3899	22-73	do	Aug. 2, 1943		6	68
3900	22-73	do	May 24, 1944		5	60
3901	22-71	NE¼NE¼ sec. 14	July 31, 1943		8	66
3902	22-71	do	Nov. 3, 1943		3	65
3903	22-71	do	Jan. 6, 1944		5	65
3904	22-71	do	Mar. 3, 1944		8	65
3905	22-71	do	May 3, 1944		5	65
3906	22-71	do	July 14, 1944		4	66
3907	22-71	do	Sept. 1, 1944		3	66
3908	22-71	do	Oct. 31, 1944		4	66
3909	22-72	do	Aug. 2, 1943		8	64
3910	22-72	do	May 24, 1944		5	63
3911	22-79	do	Apr. 2, 1943	18.5	7	
3912	22-79	do	Sept. 1, 1943	18.5	8	63
3913	22-79	do	May 23, 1943	18.5	5	63
3914	22-80	do	Aug. 2, 1943		8	65
3915	22-80	do	May 23, 1944		5	61
3916	22-86	do	July 31, 1943		8	65
3917	22-86	do	May 23, 1944		3	61
3918	Paul Higgins irrigation well	SW¼NE¼ sec. 24	July 18, 1940	80	1,500	70
3919	do	do	May 3, 1943	80	1,500	
3920	do	do	Mar. 16, 1944	80		
3921	T. L. Willis unused well	SE¼SW¼ sec. 24	Mar. 17, 1943	77.8		
3922	U. S. Grazing Service well	SW¼SW¼ sec. 31	Jan. 30, 1944			
3923	Pat Hinton domestic well	NE¼NE¼ sec. 35	Mar. 29, 1940	75		71
		T. 5 S., R. 22 E.:				
3924	YL Ranch stock well	SW¼SE¼ sec. 18	Mar. 6, 1940			
		T. 6 S., R. 22 E.:				
3925	Stock well in Telegraph Wash	SW¼NW¼ sec. 29	Jan. 16, 1941	10		
3926	Spring from gneiss	SW¼ sec. 31	do		3	
		T. 7 S., R. 22 E.:				
3927	Tripp Canyon Spring	Sec. 30	May 3, 1944			
		T. 4 S., R. 21 E.:				
3928	Spring in Goodwin Wash	NE¼NW¼ sec. 33	Mar. 6, 1940			
3929	Roy Layton stock well	SE¼ sec. 35	May 9, 1944			
		T. 5 S., R. 21 E.:				
3930	YL Ranch stock well	NW¼SW¼ sec. 24	Mar. 6, 1940			
3931	do	SW¼NE¼ sec. 27	do	38		61
3932	Hinton Ranch well	SE¼SW¼ sec. 35	Jan. 17, 1941	[4] 18		
3933	do	do	do	[4] 17		
		T. 6 S., R. 21 E.:				
3934	Halliday Ranch east well	SE¼SW¼ sec. 3	do	14		
3935	Halliday Ranch stock well	NE¼NE¼ sec. 10	do	18		
3936	Fault zone warm spring	NW¼NW¼ sec. 15	Dec. 1, 1940			
		San Carlos Indian Reservation:				
3937	Goodwin Spring	Near Geronimo, Ariz.	June 4, 1942		400	74
3938	do	do	Aug. 24, 1943			
3939	do	do	Jan. 5, 1944			71
3940	do	do	June 14, 1944			70
3941	Goodwin Spring (pool outlet)	do	do			70

[4] Samples taken during drilling.

between the mouth of Bonita Creek near Solomonsville and the Southern Pacific Rail-at Calva—Continued

[Analyses in parts per million]

Specific conductance (K×10⁵ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Total hardness as $CaCO_3$	Percent sodium	Analysis No.
368	----	----	----	----	----	895	----	----	----	----	----	----	----	3891
402	----	----	----	----	----	995	----	----	----	----	----	----	----	3892
247	140	33	354	306	242	530	1.5	.5	2.0	1,450	1.97	485	61	3893
289	----	----	----	----	----	650	----	----	----	----	----	----	----	3894
337	----	----	----	----	----	800	----	----	----	----	----	----	----	3895
227	107	29	334	286	198	475	----	1.0	----	1,285	1.75	386	65	3896
277	----	----	----	----	----	615	----	----	----	----	----	----	----	3897
310	----	----	----	----	----	730	----	----	----	----	----	----	----	3898
367	----	----	----	----	----	885	----	----	----	----	----	----	----	3899
403	274	73	506	302	426	985	1.0	.5	.2	2,410	3.28	984	53	3900
328	----	----	----	----	----	775	----	----	----	----	----	----	----	3901
352	334	67	333	302	329	880	.7	.5	----	2,090	2.84	1,110	40	3902
356	----	----	----	----	----	880	----	----	----	----	----	----	----	3903
339	----	----	----	----	----	835	----	----	----	----	----	----	----	3904
336	----	----	----	----	----	850	----	----	----	----	----	----	----	3905
324	----	----	----	----	----	760	----	----	----	----	----	----	----	3906
298	252	49	317	320	283	680	.9	.5	.5	1,740	2.37	830	45	3907
258	----	----	----	----	----	570	----	----	----	----	----	----	----	3908
469	----	----	----	----	----	1,195	----	----	----	----	----	----	----	3909
370	----	----	----	----	----	890	----	----	----	----	----	----	----	3910
432	----			251	----	1,115	----	----				----	----	3911
407	----	----	----	----	----	1,035	----	----	----	----	----	----	----	3912
398	----	----	----	----	----	1,010	----	----	----	----	----	----	----	3913
264	----	----	----	----	----	575	----	----	----	----	----	----	----	3914
306	----	----	----	----	----	680	----	----	----	----	----	----	----	3915
530	----	----	----	406	462	1,355	----	----	----	----	----	----	----	3916
431	284	77	556	334	404	1,090	1.0	.5	.4	2,580	3.51	1,030	54	3917
51	----	----	----	131	14	71	----	----	----	----	----	90	----	3918
53.7	----	----	----	----	----	60	----	----	----	----	----	----	----	3919
49.7	32	7.4	66	142	52	54	1.6	2.9	0	286	.39	110	56	3920
50.9	----	----	----	75	----	107	----	----	----	----	----	----	----	3921
29.2	20	13	31	179	15	5	0	2.5	.5	175	.24	104	40	3922
54	----	----	----	203	16	49	.6	1.0	----	----	----	120	----	3923
28	----	----	----	137	32	8	.4	4.5	----	----	----	112	----	3924
50.7	55	24	24	273	42	13	1.2	----	----	294	.40	236	18	3925
56.2	60	21	37	270	59	19	2.6	----	----	332	.45	236	25	3926
25.9	32	9.0	9.8	129	24	5	----	0	----	143	.19	117	15	3927
50	77	14	<10	205	56	14	----	----	----	350	.48	250	----	3928
93.7	87	26	100	386	120	30	.7	69	2.0	623	.85	324	40	3929
27	----	----	----	71	24	7	.7	4.7	----	----	----	99	----	3930
28	----	----	----	122	40	5	.1	2.0	----	----	----	105	----	3931
17.3	19	9.6	1.4	57	33	5	.7	----	----	97	.13	87	3	3932
37.6	40	13	4.9	92	52	24	.2	----	----	179	.24	153	6	3933
10.2	12	6.6	<10	22	29	5	.3	----	----	64	.09	57	----	3934
31.7	32	12	<10	65	49	10	.8	----	----	136	.18	129	----	3935
25	24	18	.42	133	9.9	11	----	----	----	129	.18	134	1	3936
54.1	26	7.3	79	147	50	62	1.8	2.0	----	300	.41	95	64	3937
49.8	----	----	----	----	----	54	----	----	----	----	----	----	----	3938
47.1	----	----	----	----	----	51	----	----	----	----	----	----	----	3939
50.6	26	5.2	75	139	46	58	1.2	2.5	.2	282	.38	86	65	3940
53.7	----	----	----	----	----	60	----	----	----	----	----	----	----	3941

Chemical character of ground waters in the Gila River Basin, Graham County, Ariz., road bridge

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Yield (gallons per minute)	Temperature (°F.)
3942	Seepage in Gila River channel	Black Point, Ariz.	Mar. 31, 1944		1	
3943	do	do	do			72
3944	Driven observation well, USGS 16	Near Bylas, Ariz.	June 13, 1940	16		
3945	USGS 17	do	June 12, 1940	14		
3946	USGS 18	do	June 11, 1940	14		64
3947	USGS 18	do	Nov. 9, 1943	14		67
3948	USGS 20	do	June 13, 1940	19		
3949	USGS 21	do	do	20		69
3950	U. S. Indian Service domestic well	At Bylas, Ariz.	Mar. 8, 1940	500	40	
3951	U. S. Indian Service irrigation well	Near Bylas, Ariz.	Aug. 6, 1941	105		66
3952	Public supply well, Bylas, Ariz.	At Bylas, Ariz.	Dec. 22, 1941	537		78
3953	U. S. Indian Service irrigation well	do	July 16, 1941	100		66
3954	Spring in limestone, USGS 29	1½ miles northeast of Bylas, Ariz.	Dec. 22, 1941		250	67
3955	USGS 30	1 mile northeast of Bylas, Ariz.	July 12, 1940		600	
3956	USGS 30	do	Dec. 22, 1941			
3957	USGS 30	do	Mar. 31, 1944			79
3958	USGS 30 (flow at river)	do	do			
3959	USGS 30 (at spring)	do	June 30, 1944			
3960	Spring in bed of wash	do	Mar. 31, 1944		5	78
3961	do	do	do		2	77
3962	Spring in limestone, USGS 33	2 miles north of Bylas, Ariz.	Mar. 2, 1942		40	69
3963	Spring	1½ miles west of Bylas, Ariz.	July 12, 1940		20	
3964	Driven obervation well, USGS 8	At Calva, Ariz.	June 17, 1940	14		69
3965	do	do	Nov. 11, 1943	14		
3966	USGS 9	do	June 17, 1940	15		66
3967	USGS 9	do	Nov. 11, 1943	15		66
3968	USGS 11	do	June 17, 1940	15		66
3969	USGS 11	do	Nov. 11, 1943	15		70
3970	USGS 12	do	June 14, 1940	15		67
3971	USGS 13	do	do	20		66
3972	USGS 13	do	Nov. 11, 1943	20		66
3973	USGS 14	do	June 17, 1940	16		
3974	U. S. Indian Service irrigation well	1 mile east of Calva	July 14, 1941	100		

between the mouth of Bonita Creek near Solomonsville and the Southern Pacific Rail- at Calva—Continued

[Analyses in parts per million]

Specific conductance (K×10⁵ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Total hardness as $CaCO_3$	Percent sodium	Analysis No.
317	159	39	485	333	311	720	------	.5	.5	1,880	2.56	558	65	3942
254	134	36	375	318	247	550	1.5	.5	.4	1,500	2.04	482	63	3943
610	165	55	1,038	180	305	1,718	2.8	------	------	3,370	4.58	638	78	3944
520	------	------	------	------	------	1,406	------	------	------	------	------	------	------	3945
350	153	51	510	129	319	892	1.5	------	------	1,990	2.71	592	65	3946
346	181	50	514	277	349	835	1.8	1.0	14	2,070	2.82	657	63	3947
350	210	50	454	287	316	814	1.5	------	------	1,986	2.70	730	57	3948
300	------	------	------	------	------	748	------	------	------	------	------	------	------	3949
77	------	------	------	233	230	42	3.5	------	------	------	------	48	------	3950
325	178	45	473	313	306	765	.8	2.5	------	1,924	2.62	630	62	3951
64.7	5.5	4.8	127	184	88	43	2.2	.2	------	361	.49	33	89	3952
282	184	45	361	324	261	630	1.1	.5	------	1,642	2.23	644	55	3953
460	146	40	783	293	198	1,260	3.5	------	------	2,580	3.51	529	76	3954
450	132	27	796	198	318	1,190	------	------	------	2,560	3.48	440	80	3955
448	137	29	783	192	335	1,175	------	------	1.0	2,550	3.47	461	79	3956
426	120	26	776	183	303	1,150	1.9	1.5	1.0	2,470	3.36	406	81	3957
445	126	26	812	200	312	1,200	1.9	.5	1.5	2,580	3.51	422	81	3958
441	------	------	------	------	------	1,180	------	------	------	------	------	------	------	3959
413	114	25	741	174	291	1,100	------	1.5	1.0	2,360	3.21	388	81	3960
414	117	25	752	178	288	1,120	1.5	1.0	1.0	2,390	3.25	395	81	3961
399	96	35	705	266	87	1,140	------	------	------	2,194	2.98	384	80	3962
330	41	25	603	159	77	925	------	------	------	1,750	2.38	205	86	3963
550	------	------	------	------	------	1,568	------	------	------	------	------	------	------	3964
455	------	------	------	------	------	1,180	------	------	------	------	------	------	------	3965
690	404	121	978	166	560	2,062	2.2	------	------	4,210	5.73	1,506	59	3966
476	236	64	731	288	434	1,240	1.8	.5	14	2,850	3.88	852	65	3967
260	102	38	383	169	214	622	1.5	------	------	1,444	1.96	411	67	3968
368	206	57	518	242	352	925	1.8	.5	12	2,180	2.96	748	60	3969
330	------	------	------	------	------	834	------	------	------	------	------	------	------	3970
550	------	------	------	------	------	1,522	------	------	------	------	------	------	------	3971
488	------	------	------	------	------	1,320	------	------	------	------	------	------	------	3972
450	------	------	------	------	------	1,218	------	------	------	------	------	------	------	3973
472	291	91	606	355	410	1,200	1.1	5.0	------	2,780	3.78	1,100	54	3974

Chemical character of waters of San Carlos River near Peridot, Ariz.

[Analyses in parts per million]

Analysis No.	Date	Mean discharge (second-feet)	Specific conductance (K×10[5] at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Dissolved solids			Hardness as $CaCO_3$		Percent sodium
										Parts per million	Tons per acre-foot	Tons per day	Total	Noncarbonate	
3975	Aug. 1-10, 1037	79	70.8	52	19	78	262	24	98	400	0.54	85	208	0	45
3976	Aug. 11-20	40.2	69.9	55	17	73	266	20	91	387	.53	42	207	0	44
3977	Aug. 21-31	27.3	77.8	61	18	78	289	18	99	416	.57	31	226	0	43
3978	Sept. 1-10	7.8	90.2	61	22	100	311	23	129	488	.66	10	243	0	47
3979	Sept. 11-20	13.3	86.6	57	20	97	291	21	124	462	.63	17	224	0	48
3980	Sept. 21-30	4.5	92.8	58	21	97	300	20	125	469	.64	5.7	231	0	48

Chemical character of ground waters in the Gila River Basin between the Southern Pacific Railroad bridge at Calva, Ariz., and Coolidge Dam

[Analyses in parts per million]

Analysis No.	Source	Location	Date sampled	Depth of well (feet)	Temperature (° F.)	Specific conductance ($K \times 10^5$ at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Dissolved solids		Total hardness as $CaCO_3$	Percent sodium
														Parts per million	Tons per acre-foot		
3981	Driven observation well, USGS 4, 210 feet south of Gila River.	Graham County, San Carlos Indian Reservation at mouth of Kelly Canyon.	June 18, 1940	21	68	230						526					
3982	USGS 6, 790 feet south of Gila River.	do	do	21	68	210	88	72	242	136	273	456	0.8	1,199	1.62	515	50
3983	USGS 7, 1,110 feet south of Gila River.	do	June 19, 1940	20	67	179						362					
3984	USGS 1, 1,790 feet north of Gila River.	Gila County, San Carlos Reservation at mouth of Kelly Canyon.	June 21, 1940	14	66	111						198					
3985	USGS 2, 1,250 feet north of Gila River.	do	do	14	68	136						252					
3986	USGS 3, 670 feet north of Gila River.	do	do	18	68	170						312					

Chemical character of public water supplies

Analysis No.	Description	Date sampled
	Bylas, Ariz., U. S. Indian Service, Well 537 feet deep. *See* analysis 3952.	
	Duncan, Ariz., Duncan Utilities Co. Water from 2 wells in Duncan mixed; water softened to 100 parts per million total hardness before delivery to users.	
3987	Well 28 feet deep, generally provides most of the water used in Duncan. Temperature 56°, yield 150 gallons per minute.	May 20, 1942
3988	Well more than 200 feet deep, top water cased off. Yield 17 gallons per minute	do
3989	Tap sample, mixture of water from both wells after softening	July 11, 1941
	Morenci, Ariz., Morenci Water and Electric Co. (controlled by Phelps Dodge Corp.). Well in canyon of Eagle Creek at Phelps Dodge Corp. pumping station west of Morenci. *See* analyses 246–263.	
	Pima, Ariz., Duncan Utilities Co. Flowing wells along Cottonwood Wash south of Pima. A nonflowing well in Pima provides an additional supply for emergency use (*see* analysis 1306).	
3990	Tap sample, water from flowing wells	July 30, 1943
	Safford, Ariz., Safford Municipal Utilities. Infiltration gallery on Bonita Creek about 5 miles above mouth provides most of supply. Storage reservoirs on Frye Creek in Pinaleno Mountains formerly were main source; now provide an emergency supply. An additional emergency supply is obtained from a well 74 feet deep in Roosevelt Park in Safford.	
3991	Tap sample, water from Bonita Creek infiltration gallery	July 8, 1940
3992	Tap sample, water from Bonita Creek infiltration gallery and Roosevelt Park well.	July 13, 1940
3993	Tap sample, water from Bonita Creek infiltration gallery	Feb. 28, 1941
3994	do	Mar. 18, 1942
3995	do	Aug. 26, 1943
3996	do	Jan. 11, 1944
3997	do	Mar. 23, 1944
3998	Tap sample, water from Roosevelt Park well	Sept. 27, 1944
3999	Tap sample, water from Frye Creek reservoirs	Oct. 2, 1944

[1] Includes 2.3 parts per million potassium (K).
[2] Includes 52 parts per million silica (SiO_2) and 0.09 part per million iron (Fe).
[3] Includes 2.4 parts per million potassium (K).
[4] Includes 41 parts per million silica (SiO_2) and 0.04 part per million iron (Fe).

in the Gila River Basin above Coolidge Dam

[Analyses in parts per million]

Specific conductance (K×10[5] at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium and potassium (Na+K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Borate (BO_3)	Dissolved solids		Total hardness as $CaCO_3$	Percent sodium	Analysis No.
										Parts per million	Tons per acre-foot			
141	------	------	------	365	265	139	2.7	------	------	------	------	322	------	3987
89.5	------	------	------	209	133	85	9.6	------	------	------	------	52	------	3988
116	24	9.6	231	284	195	104	6.9	1.0	------	711	0.97	99	83	3989
34.6	1.2	.8	83	164	12	23	2.0	.6	1.6	204	.28	6	97	3990
------	------	------	------	253	4	5	.1	.4	------	------	------	159	------	3991
104	------	------	------	354	30	132	1.4	8.7	------	------	------	285	------	3992
38.2	40	24	10	239	11	7	1.2	1.2	------	212	.29	199	10	3993
40.2	42	22	15	256	7.2	6.0	.3	.8	------	219	.30	195	14	3994
40.4	38	19	24	253	6.8	6.0	.3	1.0	.1	220	.30	173	23	3995
39.1	38	19	[1] 22	255	6.1	6.2	.2	.9	.1	[2] 270	.37	173	20	3996
38.6	38	19	[3] 26	257	5.7	6.0	.4	.4	.0	[4] 264	.36	173	23	3997
231	182	34	[5] 280	476	153	435	.9	47	.5	[6] 1,410	1.92	594	50	3998
9.9	10	2.4	[7] 7.8	34	16	1.4	.5	.2	.1	[8] 72	.10	35	26	3999

[5] Includes 4.8 parts per million potassium (K).
[6] Includes 46 parts per million silica (SiO_2) and 0.06 part per million iron (Fe).
[7] Includes 1.9 parts per million potassium (K).
[8] Includes 16 parts per million silica (SiO_2) and 0.73 part per million iron (Fe).

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