Geothermal Studies in Southwest New Mexico

Technical Completion Report

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GEOHERMAL STUDIES IN SOUTHWEST NEW MEXICO

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Technical Report

by

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FOREWORD

The era of cheap and plentiful fuels is over; alternate sources of energy and fuel to take the place of oil and gas must be developed if the standard of living and quality of life are to be maintained. New Mexico's once large reserves of hydrocarbon resources will not last forever, and while the state is blessed with enormous quantities of solar energy, geothermal energy, wind energy and uranium ore, the technology to tap many of these sources is still being perfected. These must be wisely developed and invested if the state is to earn a fair, equitable and permanent return on its resources. New Mexico's economic future may well rest with the judicious development of its alternative energy resources.

The overall goal of the state energy research and development program is to develop solutions to the fuel and energy problems of the citizens of New Mexico. The program is designed to respond to state needs and to fill in the gaps where the national program is not responsive to unique state needs, to work with other programs when its aims coincide with state needs, to develop information and technology to the point that industry and commercialization are attracted to New Mexico and to continually review New Mexico work so state efforts can be directed to the best effect.

Creation of the three New Mexico Energy Institutes signalled a beginning at accelerating energy research and development in a programmatic way while still leaving the door open for innovative, individually initiated and developed projects. Funded by the State of New Mexico through the Energy Resources Board, the Institutes are responsible for working toward the development and conduct of state wide programs. As planning and coordinating agencies, the Institutes represent all the university, nonprofit entities and citizens of the State of New Mexico. To organize the research efforts, each Institute is assigned different areas of technical responsibility.

The New Mexico Energy Institute at New Mexico State University is responsible for the areas of solar energy, wind energy, geothermal energy and energy from waste conversion. Within each of these four areas, the Institute attempts to develop and promote projects which confront such aspects as assessment and resource availability, research, conceptual system analysis, component and sub-component development, testing, complete system development, demonstrations, environmental and institutional problems, performance analysis of complete systems and commercialization, among others. In all developments, the needs of low income citizens, the public sector and regional problems are specifically considered.

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Conclusions, opinions and other evaluative portions of this document solely reflect the views of the author. Their inclusion herein does not indicate either their acceptance or rejection by the New Mexico Energy Institute at New Mexico State University, project subcontractors or any other cooperating or funding agencies.

ABSTRACT

The research that has been conducted during the tenure of Grant 67 consists of three parts: 1) A detailed water chemistry study of thermal and non thermal waters in Dona Ana County, 2) a reconnaissance water chemistry study of the hot spring of southwest New Mexico, and 3) a detailed gravity and magnetic study of the Lightning Dock KGRA (Known Geothermal Resource Area) located in the Animas Valley of southwest New Mexico. The principal features resulting from this state supported research program are as follows:

1. A new geothermal prospect has been located in Dona Ana County, near Las Cruces, New Mexico. The prospect owes its origin to thermal waters ascending along the Valley fault, a structural fracture which trends NW-SE and intersects university (NMSU) owned lands near Las Cruces. It is here suggested that this anomaly be developed for space heating of the New Mexico State University campus, a development program which could eventually save the university several hundred thousand dollars a year in heating bills. Geothermal space heating at the Oregon Institute of Mines and Technology, Klamath Falls, Oregon, costs that institution a mere \$12,000/year to heat the campus at a savings of more than \$250,000/year over the previous heating design which utilized fuel oil. The geothermal anomaly is located only several miles from campus, enjoys a reservoir base temperature near 200°C, and part of the anomaly is located on university owned land.

2. A broad geothermal anomaly which encompasses the Kilbourne Hole KGRA southwest of Las Cruces has been confirmed. This anomaly may also

enjoy a reservoir base temperature in excess of 200°C, a value well above the often quoted 150°C minimum value for economic development of geothermal electricity.

3./ A new geothermal anomaly has been postulated near the Portrillo Maar, an explosion crater similar to Kilbourne Hole. This anomaly is located about 35 miles west of Anthony, New Mexico-Texas on the Mexican border.

4. Most of the promising geothermal prospects in New Mexico are located in the Rio Grande Rift, the area which also contains the state's main population centers. Notably, most of the hot spring areas in the western part of the state including those in the Gila area do not appear to have a sufficiently high reservoir base temperature for the development of geothermal electricity. This statement is even valid for the hot springs on Turkey Creek which, at 74°C, are the hottest springs surveyed during the present investigation. Two possible exceptions to the above statement are the lower Frisco Hot Springs, and the Lightning Dock area of the Animas Valley area, both of which have been designated as KGRA's. The majority of thermal areas of western New Mexico may be developed for space heating, industrial processes, or for agricultural purposes but probably not for electricity production.

5. Detailed gravity magnetic and water chemistry investigations at the Lightning Dock KGRA in southwest New Mexico indicate that the hot wells (85°C) are located at the junction of two intersecting faults. A north-south trending dike may control the subsurface flow of geothermal fluids.

Detailed Water Chemistry Studies in Dona Ana County

The results of an extensive water chemistry in Dona Ana County, New Mexico are shown in Figures 1-4 and summarized in the following publication.

DETECTION OF GEOTHERMAL COMPONENTS IN GROUNDWATERS OF DONA ANA COUNTY, SOUTHERN RIO GRANDE RIFT, NEW MEXICO

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SUMMARY

Dona Ana County is located in the southern part of New Mexico and occupies roughly 9,850 km² astride the Rio Grande rift, an area of high regional heat flow and considerable geothermal potential. Two known geothermal resource areas (Kilbourne Hole KGRA and Radium Springs KGRA) having a combined area of 141 km² are located within the county.

Nearly 200 chemical analyses have been completed on waters collected from Dona Ana County. The majority of samples were collected from non-thermal groundwater wells although a few thermal wells and thermal and non-thermal springs are also represented. Thermal waters in the county are represented by Radium Springs (maximum reported temperature of 85°C), two thermal wells (43°C) at the Las Alturas Estates near Las Cruces, and possibly by a cold spring near San Diego Mountain which is located near and possibly associated with late Quaternary travertine deposits.

There are two principle objectives to the present study. The first is to characterize the thermal waters of the county and then determine the extent to which any geothermal indicators can be recognized in the non-thermal groundwaters. The second objective is to assess the geothermal potential of Dona Ana County. On the basis of the data collected to date, the following conclusions can be drawn.

1. Thermal waters in the county are associated with high silica and high sodium-potassium-calcium (Na-K-Ca) geochemical temperatures and high concentrations of fluoride and boron. These four parameters are useful in geothermal reconnaissance and can be used to detect the presence of, and possibly the migration of, geothermal fluids through normal ground-water aquifers.

2. Maximum temperatures estimated by the Na-K-Ca geothermometer are in the 220-230°C range, a range well in excess of the often quoted 180°C limit for economic geothermal development.

3. A prominent north-northwest trend of high geochemical temperatures passes through the county following the path of the major Valley fault (mapped on the basis of steep gravity gradients) and the geochemical temperatures decrease rapidly and systematically away from the fault. These data indicate that the Valley fault acts as a conduit for ascending geothermal fluids. Supporting this conclusion is the fact that the geochemical trend intersects the three occurrences of geothermal water noted above.

4. Two segments of Dona Ana County are particularly promising for geothermal development. These include the above mentioned geochemical trend and an extensive area centered around the Kilbourne Hole KGRA.

5. The majority of samples collected from the northern part of the county fail to reveal any geothermal activity.

Na-K-Ca GEOTHERMOMETER

The use of Na-K-Ca geothermometer as a tool for geothermal prospecting is based on the results of Fournier and Truesdell (1973) who found that Na-K-Ca data can be used to determine the last temperature at which water-rock equilibrium was attained. For most natural waters, Fournier and Truesdell found that a plot of the function $F(T)$ defined as

$$F(T) = \log (Na/K) + \beta \log \sqrt{Ca}/Na \quad (1)$$

against the reciprocal of absolute temperature clustered around a straight line. In Equation (1) concentrations are expressed in molality and $\beta = 1/3$ or $4/3$ depending upon whether the last water-rock equilibrium occurred above or below 100°C, and $F(T)$ is converted to temperature (°C) using the equation (based on Fournier and Truesdell 1973, Fig. 6).

$$T(^{\circ}C) = \frac{-1647}{2.24 + F(T)} - 273.15 \quad (2)$$

Thus the only data required to estimate the temperatures expected within a geothermal system are Na-K-Ca analyses from samples of geothermal fluid. A further description of the technique and its limitations can be found in Fournier and Truesdell (1973) and Swanberg (1974).

The water samples collected from Dona Ana County yield a wide range of Na-K-Ca estimated temperatures (Fig. 1). The majority of samples give temperatures of less than 50°C, whereas a few samples yield temperatures in excess of 200°C. There is a striking correlation between high Na-K-Ca estimated temperatures and mapped and postulated faults (Fig. 1). Five of the seven samples giving estimated temperatures in excess of 200°C are located on a north-northwest geochemical trend which extends for over 80 km from just west of the Franklin Mountains to San Diego Mountain. This geochemical trend is congruent with the inferred Valley fault for the southern two-thirds of the total distance. This geochemical trend also intersects nearly all known occurrences of thermal water in Dona Ana County, including Radium Springs, the hot wells at Las Alturas Estates, and the Quaternary travertine deposits near San Diego Mountain (Fig. 1). The coincidence among the Valley fault, the geochemical trend, and areas of known thermal water indicate that this fault is acting as a conduit for ascending geothermal fluids. This conclusion is also supported by the rapid and systematic decrease in estimated temperatures away from the fault where presumably, the thermal waters mix with the non-thermal groundwaters. It is significant that the thermal water from Radium Springs yields the same Na-K-Ca temperature as several of the cold waters along this geochemical trend. This similarity demonstrates the use of the Na-K-Ca geothermometer in detecting the presence of geothermal water, even when water temperatures show no trace of

Figure 1. Temperature estimated by Na-K-Ca geothermometry. For explanation of structural symbols see Figure 1 in paper by Seager, this guidebook.

Figure 2. Temperature estimated by silica geothermometry.

GROUNDWATERS OF DONA ANA COUNTY

Figure 4. Concentration of boron in groundwater of Dona Ana County.

geothermal activity. This similarity also indicates that the entire geochemical trend has essentially the same geothermal potential as the Radium Springs KGRA.

The remaining two samples giving Na-K-Ca estimated temperatures in excess of 200°C are located in the Kilbourne area (Fig. 1). One of these samples is located just west of the KGRA and the other is located near the international boundary not far from a major "Kilbourne Hole-type" maar—the "Potrillo maar" (Reeves and DeHon, 1965) in Mexico. These samples are part of an extensive geochemical anomaly, which extends south from the Cedar Hills area (Fig. 1) to the international boundary; it is apparently bounded on the west by the Ward Tank fault.

In contrast to the high Na-K-Ca temperatures which dominate the geochemical anomaly surrounding the Kilbourne Hole KGRA and the linear geochemical trend, are the low Na-K-Ca temperatures which dominate the remainder of the county, particularly to the north. These cold areas provide a good contrast to the high temperature areas and indicate the general reliability of the data in addition to outlining broad regions of apparent low geothermal potential.

SILICA GEOTHERMOMETER

A second approach to assessing the geothermal potential of Dona Ana County is the application of the silica geothermometer (Fournier and Rowe, 1966). The temperatures estimated by the silica geothermometer are shown in Figure 2. These temperatures are generally lower than those estimated by the Na-K-Ca geothermometer. This reflects (1) the more rapid reequilibration of the silica geothermometer to lower temperatures, (2) the fact that the silica geothermometer is based on absolute concentrations of silica (the Na-K-Ca geothermometer is based on atomic ratios) and is thus more strongly affected by dilution with non-thermal, near-surface waters, and (3) the fact that the silica geothermometer is based on results from hot springs and wet-steam wells and all of the present samples except Radium Springs and Las Alturas represent cold waters. Thus the actual temperatures estimated by the silica geothermometer cannot be expected to accurately reflect expected temperatures at depth.

Despite these shortcomings, the silica geothermometer can be used as a relative indicator of geothermal activity. In fact, the same trends are apparent in the silica data (Fig. 2) that were observed for the Na-K-Ca geothermometer. The geochemical trend which extends from just west of the Franklin Mountains in the south to San Diego Mountain in the north is well defined by the silica data. Furthermore, comparable estimated temperatures are obtained for Radium Springs, the wells at the Las Alturas Estates, the cold spring near the Quaternary travertine deposits near San Diego Mountain, and

the remainder of cold wells along the geochemical trend. The estimated temperatures also decrease very rapidly away from the Valley fault as they did for the Na-K-Ca data. Similarly, the broad region south from Cedar Hills to the international boundary and including the Kilbourne Hole KGRA yield high estimated temperatures, while the remainder of the county generally gives low silica temperatures.

FLUORIDE AND BORON

Total concentrations of fluoride and boron have been examined to determine their potential use as geothermal indicators. A fluoride concentration of 1.55 ppm is the Environmental Protection Agency's limit for potable water and it has been reported that hot springs in New Mexico are routinely high in fluoride (W. K. Summers, personal communication). Relatively high boron concentrations have also been linked with high ground-water temperatures (Mahon, 1970).

Concentrations of fluoride and boron in Dona Ana County are shown in Figures 3 and 4, and high concentrations of both ions generally reinforce the pattern of distribution of geothermal water as indicated by the chemical geothermometers and the pattern of known thermal waters.

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GRAVITY AND MAGNETIC INVESTIGATIONS

Regional gravity and selective detailed gravity and magnetic profiling have been conducted at the Lightning Dock KGRA, located in the lower Animas Valley near Lordsburg, New Mexico. The regional gravity survey covered 600 square kilometers geographically located at

$109^{\circ} 00' - 108^{\circ} 45'$

$32^{\circ} 00' - 32^{\circ} 15'$

excluding the Peloncillo Mountains and Pyramid Mountains on the western and eastern boundary of the above area (Figure 5). Gravity measurements were made at over five hundred locations in the above area using a Lacoste-Romberg temperature stable gravimeter with an accuracy of .01 milligals. All points of known elevation (section corners, wells, road intersection, fence intersections, and benchmarks) were occupied. Also, approximately two hundred elevation points were added using differential leveling techniques in areas where the elevation was not known and gravity station spacing was inadequate to give good coverage. All gravity data was reduced using Dr. Shawn Biehler's (Professor of Geophysics at the University of California at Riverside) program, "Total Gravity Reduction and Interpretation by Digital Computer." This system of computer programs reduces gravity readings to complete Bouguer anomalies, point plots the field observations, produces digitally contoured gravity maps of the free air, Bouguer, regional or residual anomalies, and produces a series of tables of the relationships between the average gravity anomalies and average surface elevations for a given unit area. From the gravity measurements a complete Bouguer gravity map was produced (Figure 6). There are several interesting features on this map:

- (1) Gravity generally increases toward the boundaries of the valley to the east and west.

- (2) Gravity generally decreases toward the center of the valley and to the north and south.
- (3) Gravity generally increases toward the southeastern boundary.
- (4) There is an elongated gravity high ridge located just east of the hot wells.

The increasing gravity trends toward the boundaries of the valley to the east and west are expected results and are due to the proximity of higher density basement rock. On the eastern margin of the valley the Pyramid Mountains are composed of andesite and a monzonite stock and on the western margin of the valley the Peloncillo Mountains are composed of a thick sequence of Paleozoic margin sediments and granite stocks. The decrease in gravity towards the center of the valley and to the north and south is due to an increasing thickness of detrital sedimentary fill. The increase in gravity towards the southeast is due to decreasing depth to higher density basement rock. Several small rhyolitic and pyroclastic outcrops occur in this area of the lower Animas Valley.

The elongated gravity high ridge is an interesting feature because of lack of surface expression and close proximity to the hot wells and north trending fault. This gravity high ridge feature was resolved in more detail by selective detailed gravity and magnetic profiling. Five east-west gravity and magnetic profiles (Figures 7-11) were run across the ridge feature with a station spacing of seven stations per kilometer. East-west profiles were separated in a north-south direction by a distance of .73 kilometers. Elevation at these station locations accurate to $\pm .1$ meter was obtained by using differential leveling techniques. The residual gravity and magnetic profile results are shown in the accompanying graphs. There are several interesting features shown on these graphs:

E/W PROFILES 1

Figure 7

Figure 8

Figure 9

E/W PROFILES 4

Figure 10

Figure 11

- (1) The maximum residual gravity value is + 5 milligals.
- (2) The maximum residual magnetic value is + 500 gammas.
- (3) The general shape of the residual magnetic profile curves suggest that this gravity and magnetic high ridge is a slightly inclined dike dipping to the west.
- (4) Variations in the general shape and magnitude of the gravity and magnetic profiles suggest variable shape, size, and composition of this dike.

Magnetic profile curves are quite useful in interpreting subsurface geological structures. Diagnostic features of magnetic profile curves over theoretical geologic structures are well documented and aid interpretation of magnetic field data. The residual magnetic profile curves obtained over the gravity and magnetic high ridge in the lower Animas Valley generally show theoretical diagnostic features associated with an inclined dike. However, this interpretation is certainly not unique. The diagnostic features shown by the residual magnetic profile curves are:

- (1) A slight decrease in magnetic intensity at the eastern edge of the magnetic anomaly.
- (2) A high magnetic gradient just after the slight decrease in magnetic intensity before the maximum magnetic intensity is encountered.
- (3) A low magnetic gradient just after the maximum magnetic intensity all magnetic profile curves generally show these features.

All magnetic and gravity profile curves show variations in general shape and magnitude of gravity and magnetic intensity. These variations suggest possible variations in shape, size, composition, and or distortions caused by other structural features in this area. In profile number 4, (Fig. 10) the minimum gravity value is associated with the maximum magnetic intensity whereas in profile numbers 2 and 3, (Figs. 8,9) the maximum gravity value is associated with the minimum magnetic intensity. These variations indicate possible variations

in composition as might be expected in a composite dike. One other known structural feature in this area that could cause possible distortions of the profile curves is the north trending lower Animas Valley fault. The western edge of the gravity and magnetic profiles do cross this fault zone. The steep gravity gradients on the western edge of the gravity profiles could be caused by this fault zone. However, the magnetic profile curves do not appear to be affected by this fault zone.

All geophysical and geologic information indicate that this ridge is not associated with the current geothermal activity except for possible subsurface control of the flow of geothermal fluids. This dike was delineated by the University of New Mexico resistivity survey which was found to be resistivity high. Most geothermal activity is associated with resistivity lows. Kintzinger's shallow (1-2 meter) temperature and temperature gradient survey did not show this dike feature as might be expected if this dike was hot enough to produce the current geothermal activity. However, this effect could possibly be marked by near surface fast flowing cool waters directly above this dike feature. In the area directly above this dike no distortion of the near surface temperature contour lines was observed. Geologic information indicates that this intrusion may be related to other known intrusions in the Animas Valley which date from mid to late Tertiary. A small shallow dike of mid to late Tertiary age could not retain its original heat to the present date and therefore could not be associated with any present day geothermal activity. However, close proximity of the dike to the hot wells and fault zone indicates possible subsurface control of the flow of geothermal fluids. Furthermore, close association and parallel alignment of the long axis of the dike with the north trending fault suggest that this dike forcefully intruded into the structurally weakened fault zone. It is also possible that this dike is related to the calderas

proposed by Elston. The gravity survey delineated no other gravity anomalies that could be associated with cap rocks, silicification, or buried magma chambers, common features associated with geothermal reservoirs.

HOT SPRINGS RECONNAISSANCE

The wells and springs that were visited and sampled during the present study are shown in Table 1, and the chemical analyses of these waters shown in Table 2. All but a few of the hot springs and wells in southern New Mexico have been sampled and the remainder will be visited and sampled this summer under sponsorship of a grant from the U.S. Geological Survey. The sampling procedure has been to collect several non-thermal waters from each hot spring area in order to establish background chemistry against which to compare the chemistry of the thermal waters. All samples have been analyzed for T, TDS, pH, Na, K, Ca, Mg, CO_3 , HCO_3 , Cl, SO_4 , PO_4 , B, F, Fe, and SiO_2 . In addition, the thermal waters have been analyzed for Mo, Co, Zn, Mn, Cu, Cd, Ba, Ni, Cu, Ag, Pb, Li, As, Se, Sb, Hg, Br, NO_3 , H_2S , NH_4 , and Al. This list includes all elements which may involve adverse environmental effects of geothermal development in addition to those that are of use in assessing the potential of geothermal area.

The hottest springs in southern New Mexico are located in the Gila National Forest in the southwest part of the state. Many of these springs including Faywood, Gila, Mimbres, and the hot springs on Turkey Creek have temperatures in excess of 50°C . Despite the high surface temperature of these springs, their chemistry does not suggest the existence of a suitably high reservoir base temperature for economic development of geothermal electricity. By applying standard geothermometers to chemistry data of these springs, possible reservoir base temperatures below 125°C are

generally obtained. Such values fall far short of the 150-180°C minimum values generally quoted for commercial development of geothermal electricity. These springs are also low in such elements as Boron, Arsenic and Mercury, all of which are frequently found in promising geothermal fields. However, the high quality (low total salts) of the hot springs in the Gila National Forest make these waters ideal for non electric uses of geothermal energy such as space heating, industrial processes, and agricultural uses.

One area in western New Mexico that does show good geothermal potential is the Lightning Dock KGRA, located in the Animas Valley. Both the silica and Na-K-Ca geothermometers suggest a reservoir base temperature near 170°C for this geothermal area.

The geothermal prospects in southern New Mexico which show the greatest geothermal potential are generally located within the Rio Grande Rift, a tectonic province also associated with high regional heat flow. At least seven thermal areas within the Rift are likely to be associated with reservoir base temperatures in excess of 200°C. These include the KGRA's at Radium Springs and Kilbourne Hole in addition to the hot springs at Truth or Consequences and Derry Springs, and near San Diego Mountain. Two other very promising areas are the Las Alturas area near Las Cruces, New Mexico, and the Portrillo Maar area on the Mexican border.

TABLE 1

Sample	Latitude	Longitude	Temperature °C	Comment
W1	32° 9.2	106° 59.4	28	well
W2	32° 4.2	106° 58.7	--	well
W3	31° 55.6	106° 54.7	--	well
W4	31° 55.0	106° 50.2	--	well
W5	32° 16.6	107° 2.3	22	well
W6	32° 17.4	107° 1.3	22	well
W7	32° 21.2	107° 7.5	21	well
W8	32° 23.2	107° 9.3	21	well
W9	32° 26.1	107° 4.8	--	well
W10	32° 41.8	106° 56.6	--	well
W11	32° 42.5	106° 49.4	23	Red Lake Well
W12	32° 41.5	106° 47.2	21	Middle Well
W13	32° 38.8	106° 40.6	24	well
W14	32° 34.5	106° 40.5	22	Taylor Well
W15	32° 32.2	106° 45.0	23	well
W16	32° 34.3	106° 48.6	26	well
W17	32° 39.6	106° 50.3	--	Wagoner Well
W18	32° 38.8	106° 55.8	24	well
W19	32° 45.2	107° 00.6	--	well
W20	32° 34.2	107° 8.1	--	well
W21	32° 34.4	107° 6.7	17	well
W22	32° 35.8	107° 9.4	21	well
W23	32° 11.5	107° 6.0	22	well
W24	32° 1.2	107° 4.9	27	well
W25	31° 59.6	107° 1.2	27	well
W26	31° 55.4	106° 57.9	22	well
W27	31° 55.0	106° 50.2	28	well
W28	32° 2.2	106° 57.6	26	well
W29	32° 20.3	106° 37.4	18	well
W30	32° 25.6	106° 35.9	--	well
W31	31° 56.9	106° 45.1	--	well

TABLE 1 (continued)

Sample	Latitude	Longitude	Temperature °C	Comment
W32	31° 51.7	106° 42.7	27	well
W33	31° 47.3	107° 1.7	--	well
W34	31° 47.2	107° 6.5	--	well
W35	31° 49.1	107° 8.6	17	well
W36	31° 47.5	107° 17.0	27	well
no numbers				
W50 SW238	32° 12.9	107° 9.8	--	well
W51 SW239	32° 14.1	107° 12.0	--	well
W52 SW240	32° 11.6	107° 12.7	--	well
W53 SW241	32° 9.4	107° 14.7	--	well
W54 SW242	32° 7.8	107° 14.8	--	well
W55 SW243	32° 5.3	107° 4.5	23	well
W56 SW244	32° 10.0	107° 7.0	--	well
W57 SW245	32° 9.2	107° 10.1	22	well
W58 SW246	32° 8.5	107° 2.5	--	well
W59 SW247	32° 11.2	107° 0.3	24	well
W60 SW248	32° 11.3	106° 53.4	24	well
W61 SW249	32° 9.5	106° 49.2	--	well
W62 SW250	31° 48.0	107° 24.5	--	well
W63 SW251	31° 48.3	107° 30.1	--	well
W64 SW252	31° 47.7	107° 34.3	--	well
W65 SW253	31° 58.2	107° 23.2	--	well

TABLE 1 (continued)

Sample	Latitude	Longitude	Temperature °C	Comment
W66 SW254	31° 53.2	107° 26.9	--	well
W67 SW255	31° 48.3	107° 30.1	22	well
W68 SW256	31° 47.7	107° 34.3	26	well
W69 SW257	31° 50.5	107° 31.2	30	well
W70 SW258	31° 53.2	107° 26.9	22	well
W71 SW259	31° 56.2	107° 23.1	21	well
W72 SW260	31° 58.2	107° 23.2	22	well
W73 SW261	31° 54.2	107° 35.2	20	well
W74 SW262	32° 1.3	107° 40.1	21	well
W75 SW273	32° 13.3	107° 26.1	22	well
W76 SW274	32° 13.4	107° 28.8	21	well
W77 SW275	32° 11.3	107° 28.9	--	well
W78 SW276	32° 8.0	107° 28.0	21	well
W79 SW277	32° 6.7	107° 28.7	21	well
W80 SW278	32° 5.5	107° 23.3	23	well
W81 SW279	32° 2.2	107° 25.0	20	well
W82 SW280	32° 34.6	107° 0.2	19	well
W83 SW281	32° 30.8	107° 2.6	--	well
W84 SW282	32° 31.0	107° 4.8	--	well
1P	32° 8.7	108° 47.6	23	Road Well
2P	32° 8.7	108° 49.9	85	Hot Well

TABLE 1 (continued)

Sample	Latitude	Longitude	Temperature °C	Comment
3P	32° 8.9	108° 49.9	81	McCants Well
4P	32° 8.7	108° 50.4	71	well
5P	32° 8.1	108° 50.9	22	well
10P	32° 13.6	108° 49.7	23	Hill Well
13P	32° 13.7	108° 52.4	19	well
14P	32° 10.1	108° 52.8	20	well
15P	32° 6.1	108° 50.7	24	well
20P	32° 4.8	108° 54.0	22	well
22P	32° 4.1	108° 52.9	22	well
23P	32° 12.2	108° 48.8	24	Nation Well
24P	32° 10.9	108° 50.7	--	well
25P	32° 9.1	108° 52.8	23	well
LD1 SW132	32° 18.9	108° 38.8	25	well
LD2 SW133	32° 13.7	108° 30.7	33	well
LD3 SW134	32° 10.6	108° 33.6	--	well
LD4 SW135	32° 3.9	108° 34.5	--	Lone Hill Well
LD5 SW136	31° 55.8	108° 36.9	--	well
LD6 SW137	31° 57.0	108° 48.5	--	well
LD7 SW138	31° 48.6	108° 46.5	24	well
LD8 SW139	31° 50.0	108° 52.5	21	well
LD9 SW140	31° 40.2	108° 49.9	19	well
LD10 SW141	31° 35.8	108° 52.2	--	well
LD11 SW142	31° 24.2	108° 51.8	18	well
LD12 SW143	31° 23.2	108° 54.9	18	well

TABLE 1 (continued)

Sample	Latitude	Longitude	Temperature °C	Comment
LD13 SW144	31° 20.4	108° 47.9	17	Cienega Springs
LD14 SW145	31° 28.0	108° 50.4	25	well
LD15 SW146	31° 34.2	108° 52.4	21	well
LD16 SW147	31° 37.3	108° 54.3	19	well
LD17 SW148	31° 44.8	108° 48.6	22	well
LD18 SW149	31° 52.9	108° 48.0	--	well
SW283	32° 11.7	108° 52.2	18	well
SW284	32° 12.2	108° 48.8	19	Nation Well
SW285	32° 10.1	108° 52.8	16	well
SW286	32° 9.7	108° 50.7	24	well
SW287	32° 8.1	108° 50.9	19	well
SW288	32° 7.3	108° 51.2	19	well
SW289	32° 6.3	108° 50.8	20	well
SW290	32° 7.7	108° 53.2	--	well
SW291	32° 4.8	108° 52.8	18	well
SW292	32° 3.5	108° 53.5	18	well
SW293	32° 3.1	108° 54.6	19	well
SW294	32° 4.7	108° 54.0	21	well
SW295	32° 3.1	108° 52.7	26	well
SW296	32° 2.7	108° 55.0	20	Bert Windmill
SW297	32° 47.3	108° 51.2	24	well
SW298	32° 3.6	108° 53.3	20	well
SW299	32° 4.8	108° 52.7	22	well
SW300	32° 5.6	108° 52.2	21	well
SW301	32° 9.1	108° 46.4	--	well
SW302	32° 5.2	108° 53.6	20	well
SW303	32° 7.2	108° 55.3	19	well
SW304	32° 6.3	108° 51.7	19	well
SW305	32° 9.1	108° 52.7	18	well

TABLE 1 (continued)

Sample	Latitude	Longitude	Temperature °C	Comment
TR4-1	32° 15.3	105° 38.2	--	well
TR4-2	32° 15.4	105° 32.3	--	well
TR4-3	32° 10.3	105° 26.4	--	well
TR4-4	32° 14.9	105° 25.6	--	well
TR4-5	32° 9.6	105° 22.6	21	well
TR4-6	32° 7.8	105° 34.7	19	well
TR4-7	32° 6.5	105° 39.2	17	well
TR4-8	32° 6.6	105° 39.3	18	well
TR4-9	32° 5.3	105° 44.5	13	well
TR4-10	32° 2.3	105° 52.8	--	well
JW1	32° 53.4	108° 21.5	26	Allen Spring
JW2	33° 49.8	108° 47.9	37	Upper Frisco Hot Springs
JW3	33° 14.6	108° 52.7	43	Lower Frisco Hot Springs
JW4	33° 14.9	108° 52.6	40	Lower Frisco Hot Springs
JW5	33° 14.5	108° 52.8	49	Lower Frisco Hot Springs
JW6	33° 1.6	108° 41.5	21	well
JW7	32° 58.5	108° 37.9	25	Warm Spring
1B	32° 28.2	106° 49.2	--	Cleofas Wells
2B	32° 30.1	106° 55.7	53	Radium Springs (well)
3B	32° 29.6	106° 56.0	--	well
4B	32° 38.8	106° 55.8	--	well
5B	32° 47.7	107° 16.6	--	Derry Spring
6B	32° 47.6	107° 16.6	--	Derry Spring
7B	32° 48.7	107° 16.4	--	well
8B	32° 34.1	106° 59.9	--	well
9B	33° 8.1	107° 15.2	45	well (Mineral Bath- Blackstone)

TABLE 1 (continued)

Sample	Latitude	Longitude	Temperature °C	Comment
10B	33° 8.2	107° 14.9	41	Well (Mineral Bath-Sierra)
11B	33° 8.0	107° 14.5	41	Warm Spring
12B	33° 16.7	107° 33.8	--	Warm Spring
13B	34° 2.2	106° 56.2	34	Sedillo Spring
14B	34° 2.8	106° 56.2	--	Cook Spring
15B	33° 14.1	107° 21.4	--	well
16B	33° 30.3	107° 40.4	--	well
17B	33° 34.38	107° 36.05	28	Spring
18B	33° 34.37	107° 35.95	21	Spring
19B	33° 8.1	107° 15.2	41	Yucca Springs
20B SW19	33° 3.8	107° 0.6	--	well
21B SW20	33° 17.4	106° 56.2	--	well
22B SW21	33° 28.6	106° 53.5	--	Malpais Well
23B SW22	33° 25.1	106° 52.4	18	Chavez Well
24B SW23	33° 23.3	106° 55.6	24	Tuscon Spring
25B SW24	33° 34.4	106° 35.6	29	Ojo Caliente
26B SW25	33° 53.1	107° 31.7	4	Spring
27B SW26	33° 54.0	107° 32.2	4	Spring
28B SW27	33° 45.8	107° 21.0	30	well
Gila 1 SW28	32° 28.7	107° 57.5	18	well
Gila 2 SW29	32° 33.3	107° 59.7	54	Faywood Hot Spring
Gila 3 SW30	32° 33.5	107° 58.1	21	well
Gila 4 SW31	32° 44.9	107° 50.1	58	Mimbres Hot Spring

TABLE 1 (continued)

Sample	Latitude	Longitude	Temperature °C	Comment
Gila 5 SW32	33° 12.0	108° 12.5	63	Gila Hot Spring
Gila 6 SW33	33° 12.0	108° 12.6	66	Gila Hot Spring
Gila 7 SW34	33° 14.0	108° 14.2	65	Hot Spring
Gila 8 SW35	33° 9.8	108° 12.7	44	Hot Spring
Gila 9 SW36	32° 34.6	108° 00.5	--	well
Gila 10 SW37	32° 35.1	108° 00.0	--	well
Gila 11 SW38	32° 33.8	108° 2.5	--	well
no numbers				
Gila 20 SW150	33° 6.5	108° 29.0	74	Spring on Turkey Creek
Gila 21 SW151	33° 6.5	108° 29.0	28	Turkey Creek
Gila 22 SW152	33° 6.5	108° 29.0	70	Spring on Turkey Creek
Gila 23 SW153	33° 1.1	108° 35.8	29	well
Gila 24 SW154	32° 52.6	108° 35.0	31	Spring
Gila 25 SW155	32° 56.1	108° 36.7	--	well
Gila 26 SW156	32° 55.4	108° 35.0	19	well
Gila 27 SW157	32° 57.9	108° 36.4	20	well
Gila 28 SW158	32° 57.9	108° 36.8	22	Artesian Well
Gila 29 SW159	32° 50.5	108° 30.6	27	Mangas Springs
Gila 30 SW160	32° 48.8	108° 35.5	24	Spring

TABLE 1 (continued)

Sample	Latitude	Longitude	Temperature °C	Comment
MF61 SW161	33° 17.0	108° 15.8	31	Spring
MF62 SW162	33° 17.4	108° 16.9	37	Spring
MF63 SW163	33° 17.4	108° 16.9	36	Spring
MF64 SW164	33° 16.4	108° 15.0	26	Spring
R1 SW165	32° 32.7	106° 54.8	25	well
R2 SW166	32° 34.8	106° 55.3	23	well
SW306	33° 16.4	108° 15.0	34	Spring
SW307	33° 16.4	108° 15.0	32	Spring
SW308	33° 16.4	108° 15.0	7	Middle Fork Gila River
SW309	33° 10.6	108° 12.1	--	East Fork Gila River
SW310	33° 10.8	108° 12.3	--	West Fork Gila River

TABLE 2

Sample	ppm	pH	mg/l							
			Na	K	Ca	Mg	CO ₃	HCO ₃	Cl	SO ₄
W-1	952	7.75	225.5	15.2	28.8	8.6		320.9	88.6	280.5
W-2	1236	8.25	405.8	26.2	46.3	16.4	14.4	439.3	318.7	222.9
W-3	720	8.66	223.0	10.6	10.2	7.2	37.2	334.4	82.2	132.6
W-4	552	8.50	180.7	16.8	8.2	8.3	25.2	335.6	54.2	94.1
W-5	784	8.00	255.4	14.1	9.0	7.5	0	317.3	77.6	263.2
W-6	888	7.93	286.4	14.1	20.0	10.0	0	358.8	83.7	293.9
W-7	604	8.36	238.8	0.4	3.0	5.8	22.8	369.8	41.5	130.6
W-8	840	7.94	238.8	0.8	24.8	13.0	0	454.0	79.1	146.0
W-9	604	9.26	236.1	8.2	21.4	6.3	90.0	263.6	95.7	105.7
W-10	2600	8.60	414.5	22.7	264.1	48.2	7.2	46.4	314.4	1219.9
W-11	1860	7.56	64.6	7.0	345.7	80.6	0	145.2	19.1	1114.3
W-12	1392	7.54	72.4	7.4	322.2	80.0	0	119.6	30.1	1085.5
W-13	1848	7.49	140.2	5.1	240.5	113.3	0	175.7	90.4	1027.9
W-14	1328	7.69	176.5	3.9	123.8	70.6	0	179.4	129.0	624.4
W-15	1224	7.81	164.8	9.4	110.8	50.8	0	120.8	25.2	979.8
W-16	2480	7.15	197.2	9.8	472.7	14.7	0	52.5	22.0	1498.6
W-17	1968	7.94	152.4	9.0	321.4	49.0	0	45.1	20.6	1181.6
W-18	2616	7.59	144.1	11.7	502.8	29.2	0	43.9	20.2	1575.4
W-19	2120	8.87	388.5	22.3	155.7	58.3	27.6	37.8	229.7	1018.2
W-20	372	8.35	32.2	5.5	36.9	17.9	1.2	197.7	20.9	44.2
W-21	548	7.85	65.0	4.7	36.9	30.4	0	328.3	31.5	61.5
W-22	364	7.57	33.8	4.7	43.9	19.8	0	225.8	19.8	48.0

TABLE 2 (continued)

Sample	Mg/l				
	P	B	F	Fe	SiO ₂
W-1	.02	.99	2.68	.20	69.5
W-2	.02	1.02	1.36	.04	73.8
W-3	.02	.67	2.15	.12	55.6
W-4	.02	.42	2.15	.10	58.8
W-5	.01	.55	2.24	.15	47.1
W-6	.02	.69	2.68	.42	65.2
W-7	.05	.35	3.67	.42	37.9
W-8	.02	.33	2.68	.34	47.1
W-9	.02	.29	2.68	.01	4.3
W-10	.01	.74	1.40	.21	8.3
W-11	.01	.14	.86	1.24	28.4
W-12	.01	.16	.78	.88	26.5
W-13	.01	.25	1.00	2.24	27.4
W-14	.01	.35	1.26	1.94	23.3
W-15	.01	.55	1.11	.30	48.1
W-16	.01	.27	1.07	.90	14.3
W-17	.01	.16	.93	.10	13.3
W-18	.01	.23	1.15	2.96	68.4
W-19	.01	.90	1.50	.62	43.0
W-20	.02	.10	.86	.88	66.3
W-21	.02	.10	1.04	.46	68.4
W-22	.02	.07	.67	.25	65.2

TABLE 2 (continued)

Sample	(ppm) TDS	pH	----- mg/l -----							
			Na	K	Ca	Mg	CO ₃	HCO ₃	Cl	SO ₄
W-23	344	8.21	52.9	0.8	40.3	18.3	0	248.9	23.7	63.4
W-24	616	8.75	265.1	4.3	5.6	1.6	13.2	428.3	50.7	50.0
W-25	348	8.59	120.0	17.6	8.4	4.2	0	299.0	14.2	50.0
W-26	728	9.02	271.0	5.5	2.6	1.1	42.0	454.0	42.9	126.8
W-27	500	8.50	170.6	16.4	8.4	8.0	13.2	333.2	46.4	80.7
W-28	768	8.44	232.0	12.1	24.4	8.6	0	222.7	178.0	178.7
W-29	228	7.48	18.6	1.2	48.9	7.8	0	109.8	3.2	96.1
W-30	1436	7.83	71.0	3.9	270.0	39.8	0	158.6	80.1	739.7
W-31	616	8.95	211.7	5.5	15.8	6.1	21.6	234.3	70.9	186.4
W-32	720	8.53	242.1	7.8	19.2	6.3	0	379.5	67.0	194.0
W-33	720	9.42	233.3	16.8	10.0	2.1	69.6	371.0	29.4	101.8
W-34	604	10.56	190.1	20.3	3.6	2.3	199.2	41.5	23.7	71.1
W-35	556	8.66	196.8	14.1	9.6	5.5	13.2	458.9	22.3	59.6
W-36	2028	8.09	671.3	37.9	84.5	27.5	54.0	445.4	606.9	475.5

TABLE 2 (continued)

Sample	mg/l				
	P	B	F	Fe	SiO ₂
W-23	.04	.14	.80	<.15	41.9
W-24	.02	.76	2.50	.61	19.5
W-25	.03	.32	2.50	1.43	41.9
W-26	.28	.90	8.00	.29	53.5
W-27	.04	.41	2.25	<.15	63.1
W-28	.02	.47	1.65	1.00	77.0
W-29	.02	.05	1.15	.27	33.6
W-30	.01	.15	2.50	<.15	39.8
W-31	.01	.40	2.65	<.15	39.8
W-32	.10	.55	2.05	<.15	52.4
W-33	.02	.49	3.30	<.15	93.5
W-34	.02	.25	1.85	.15	85.8
W-35	.05	.21	1.40	2.94	39.8
W-36	.01	.73	3.00	.83	48.1

TABLE 2 (continued)

<u>Sample</u>	(ppm)	mg/l								
	<u>TDS</u>	<u>pH</u>	<u>Ca</u>	<u>Mg</u>	<u>Na</u>	<u>K</u>	<u>CO₃</u>	<u>HCO₃</u>	<u>Cl</u>	<u>SO₄</u>
1P	484	8.20	28.0	7.3	68.7	1.9	0	183.1	20.5	79.3
2P	1116	7.71	22.0	0.5	333.6	23.5	0	106.8	88.3	497.1
3P	1024	8.16	23.2	0.8	318.6	21.1	0	103.7	87.6	480.0
4P	1608	7.84	67.3	5.3	493.1	27.8	0	118.9	111.3	893.4
5P	1660	8.08	159.3	34.9	231.7	9.0	0	209.3	181.9	956.3
10P2	1708	8.18	67.9	17.1	366.2	6.3	0	255.0	133.6	939.0
13P	756	7.90	38.3	2.7	105.5	3.1	0	237.9	16.7	298.7
14P	668	8.00	47.9	4.4	71.0	2.7	0	209.3	23.0	289.6
15P	868	8.07	78.7	12.6	152.2	5.9	0	201.4	80.5	483.7
20P	632	8.02	43.2	4.1	97.0	2.3	0	192.2	21.3	305.0
22P	600	7.90	49.3	4.4	111.3	2.7	0	192.2	38.6	311.7
23P	640	8.08	18.6	2.4	120.2	1.6	0	250.2	29.1	308.3
24P	1348	7.92	38.5	1.8	321.4	18.0	0	275.8	79.1	768.5
25P	604	8.35	38.1	5.7	78.8	3.5	0	183.1	8.9	285.8

TABLE 2 (continued)

<u>Sample</u>	----- mg/L -----									
	<u>Fe</u>	<u>F</u>	<u>B</u>	<u>P</u>	<u>SiO₂</u>	<u>Ag</u>	<u>Al</u>	<u>As</u>	<u>Ba</u>	<u>Br</u>
1P	1.10	.35	.08	.01	31.3					
2P	.20	12.6	.48	.02	147.5					
3P	.40	12.0	.50	.02	143.0	<.03	<2.5	.019	<.70	.56
4P	.83	7.25	.42	.01	115.6					
5P	<.10	3.55	.25	.01	42.3					
10P2	.53	7.25	.51	.01	60.7					
13P	1.31	3.90	.10	.01	74.1					
14P	.16	.85	.06	.01	48.4					
15P	<.10	2.35	.18	.01	34.3					
20P	<.10	2.65	.10	.01	50.4					
22P	<.10	1.20	.06	.01	43.3					
23P	7.66	1.15	.12	.01	29.3					
24P	21.18	9.35	.50	.01	149.7					
25P	.36	3.55	.12	.01	34.3					
--										

TABLE 2 (continued)

<u>Sample</u>	meq/l									
	<u>Ca</u>	<u>Mg</u>	<u>Na</u>	<u>K</u>	<u>Total Cations</u>	<u>CO₃</u>	<u>HCO₃</u>	<u>Cl</u>	<u>SO₄</u>	<u>Total Anions</u>
1P	1.40	.60	2.99	.05	5.04	0	3.00	.58	1.65	5.23
2P	1.19	.04	14.51	.60	16.34	0	1.75	2.49	10.35	14.59
3P	1.16	.07	13.86	.54	15.63	0	1.70	2.47	10.00	14.17
4P	3.36	.44	21.45	.71	25.96	0	1.95	3.14	18.60	23.69
5P	7.95	2.87	10.08	.23	21.13	0	3.43	5.13	11.35	19.91
10P2	3.39	1.41	15.93	.16	20.89	0	4.18	3.77	11.60	19.55
13P	1.91	.22	4.59	.08	6.80	0	3.90	.47	1.85	6.22
14P	2.39	.36	3.09	.07	5.91	0	3.43	.65	1.95	6.03
15P	3.93	1.04	6.62	.15	11.74	0	3.30	2.27	4.50	10.07
20P	2.16	.34	4.22	.06	6.78	0	3.15	.60	2.60	6.35
22P	2.46	.36	4.84	.07	7.73	0	3.15	1.09	2.25	6.49
23P	.93	.20	5.23	.04	6.40	0	4.10	.82	1.50	6.42
24P	1.92	.15	13.98	.46	16.51	0	4.52	2.23	9.25	16.00
25P	1.90	.47	3.43	.09	5.89	0	3.00	.25	2.70	5.95

TABLE 2 (continued)

-----mg/l-----										
Sample	TDS	pH	Ca	Mg	Na	K	CO ₃	HCO ₃	Cl	SO ₄
132	564	8.09	7.6	1.4	143.2	5.9	0	234.3	27.6	93.7
133	816	7.86	28.0	2.7	216.1	11.7	0	314.8	47.5	223.8
134	740	7.48	117.4	18.7	98.6	10.2	0	218.4	116.6	181.5
135	592	7.94	10.2	1.8	159.3	1.5	0	301.4	33.0	104.2
136	796	7.82	15.6	1.3	234.5	5.5	0	400.3	50.7	154.6
137	208	7.92	22.0	7.3	27.6	2.0	0	147.7	3.5	19.2
138	208	7.82	40.3	4.9	15.2	2.0	0	156.2	2.5	4.3
139	184	7.57	26.0	2.2	21.1	1.2	0	109.8	2.8	4.3
140	176	7.39	21.0	3.2	6.2	4.5	0	65.9	0.7	33.6
141	156	7.31	17.8	3.3	6.9	6.2	0	57.3	1.4	40.3
142	200	7.74	16.6	4.8	36.8	5.1	0	173.3	1.4	3.8
143	136	6.88	15.8	2.9	13.8	3.5	0	37.8	0.7	52.8
144	132	7.00	8.2	1.7	15.2	2.7	0	22.0	1.4	40.3
145	160	8.80	2.4	0.5	54.7	0.4	0	137.9	4.2	16.3
146	212	8.11	27.6	3.2	16.3	3.1	0	124.4	1.0	13.4
147	164	7.94	29.4	1.7	11.5	2.3	0	117.1	0.1	5.7
148	168	8.06	21.2	0.7	12.9	1.5	0	98.8	0.1	9.1
149	320	8.15	16.4	0.6	65.3	1.2	0	173.3	4.2	32.7

TABLE 2 (continued)

mg/l										
sample	Ca	Mg	Na	K	Total Cations	CO ₃	HCO ₃	Cl	SO ₄	Total Anions
132	.38	.12	6.23	.15	6.88	0	3.84	.78	1.95	6.57
133	1.40	.22	9.40	.30	11.32	0	5.16	1.34	4.66	11.16
134	5.86	1.54	4.29	.26	11.95	0	3.58	3.29	3.78	10.65
135	.51	.15	6.93	.04	7.63	0	4.94	.93	2.17	8.04
136	.78	.11	10.20	.14	11.23	0	6.56	1.43	3.22	11.21
137	1.10	.60	1.20	.05	2.95	0	2.42	.10	.14	2.66
138	2.01	.40	.66	.05	3.12	0	2.56	.07	.09	2.72
139	1.30	.18	.92	.03	2.43	0	1.80	.08	.09	1.97
140	1.05	.26	.27	.12	1.70	0	1.08	.02	.70	1.80
141	.89	.27	.30	.16	1.62	0	.94	.04	.84	1.82
142	.83	.40	1.60	.13	2.96	0	2.84	.04	.08	2.96
143	.79	.24	.60	.09	1.72	0	.62	.02	1.10	1.74
144	.41	.14	.66	.07	1.28	0	.36	.04	.84	1.24
145	.12	.04	2.38	.01	2.55	0	2.26	.12	.34	2.72
146	1.38	.26	.71	.08	2.43	0	2.04	.03	.28	2.35
147	1.47	.14	.50	.06	2.17	0	1.92	.003	.12	2.04
148	1.06	.06	.56	.04	1.72	0	1.62	.003	.19	1.81
149	.82	.05	2.84	.03	3.74	0	2.84	.12	.68	3.64

TABLE 2 (continued)

<u>sample</u>	<u>Cd</u>	<u>Co</u>	<u>Cr</u>	ppm <u>Cu</u>	<u>Hg</u>	ppm <u>H₂S</u>	ppm <u>Li</u>	<u>Mn</u>	<u>Mo</u>	<u>NH₄</u>
132	<.02	<.14	<.1		<.0002	<.1	.14	<.05	<.5	<.05
133	<.02	<.14	<.1	<.10	<.0002	<.1	.31	<.05	<.5	<.05
134	<.02	<.14	<.1	<.10	.0002	<.1	.09	<.05	<.5	<.05
135	<.02	<.14	<.1	<.10	<.0002	<.1	.13	<.05	<.5	<.05
136	<.02	<.14	<.1	<.10	<.0002	<.1	.23	<.05	<.5	<.05
137	<.02	<.14	<.1	<.10	.0002	<.1	.03	<.05	<.5	<.05
138	<.02	<.14	<.1	.69	<.0002	<.1	<.02	<.05	<.5	<.05
139	<.02	<.14	<.1	<.10	<.0002	<.1	.02	<.05	<.5	<.05
140	<.02	<.14	<.1	<.10	<.0002	<.1	<.02	<.05	<.5	<.05
141	<.02	<.14	<.1	.11	<.0002	<.1	<.02	<.05	<.5	<.05
142	<.02	<.14	<.1	<.10	<.0002	<.1	.02	<.05	<.5	<.05
143	<.02	<.14	<.1	<.10	<.0002	<.1	<.02	<.05	<.5	<.05
144	<.02	<.14	<.1	<.10	<.0002	.10	<.02	<.05	<.5	<.05
145	<.02	<.14	<.1	<.10	.0004	<.1	<.02	<.05	<.5	<.05
146	<.02	<.14	<.1	<.10	.0006	.13	<.02	<.05	<.5	<.05
147	<.02	<.14	<.1	<.10	.0004	<.1	<.02	<.05	<.5	<.05
148	<.02	<.14	<.1	<.10	.0009	<.1	.02	<.05	<.5	<.05
149	<.02	<.14	<.1	<.10	.0004	<.1	.11	<.05	<.5	<.05

TABLE 2 (continued)

<u>Sample</u>	ppm	ppm		
	<u>Zn</u>	<u>Sr</u>	<u>Se</u>	<u>NO₃</u>
132	<.02	.03	.005	4.48
133	<.02	.15	.009	.19
134	.21	.46	.016	42.65
135	.33	.07	.008	15.30
136	.05	.04	.010	15.02
137	.13	.06	<.002	4.93
138	2.68	.03	<.002	7.12
139	1.22	.02	<.002	22.75
140	<.02	.02	.002	9.77
141	.20	.03	.002	1.47
142	.44	<.02	<.002	2.15
143	.04	.03	<.002	0
144	.03	<.02	<.002	3.70
145	.17	<.02	.003	3.59
146	.73	.03	<.002	4.88
147	.21	.02	<.002	7.97
148	.63	.03	<.002	1.28
149	.17	.03	.002	7.53

TABLE 2 (continued)

<u>ample</u>	<u>Fe</u>	<u>F</u>	<u>B</u>	<u>P</u>	<u>SiO₂</u>	<u>Ag</u>	<u>Al</u>	<u>As</u>	<u>Ba</u>	<u>Br</u>
132	<.15	3.66	.46	0	33.52	<.06	<1.0	.012	<.20	.53
133	<.15	6.90	.46	.01	39.64	<.06	<1.0	.017	<.20	.67
134	<.15	.44	.32	.01	43.36	<.06	<1.0	.008	<.20	1.52
135	.37	2.67	.50	.01	32.30	<.06	<1.0	.018	<.20	.56
136	<.15	7.11	.64	.01	47.15	<.06	<1.0	.017	<.20	.99
137	.62	.30	.12	.01	38.08	<.06	<1.0	.003	<.20	0
138	4.70	.16	.12	.02	47.62	<.06	<1.0	.003	<.20	.28
139	6.39	1.34	.06	.01	45.23	<.06	<1.0	.005	<.20	.32
140	<.15	.12	.04	.14	47.62	<.06	<1.0	.003	<.20	0
141	.56	.11	.04	.01	39.28	<.06	<1.0	.002	<.20	0
142	5.77	1.12	.12	.01	52.37	<.06	<1.0	.006	<.20	.35
143	<.15	.18	.06	.01	35.68	<.06	<1.0	.003	<.20	.12
144	<.15	.14	.06	.01	39.28	<.06	<1.0	.017	<.20	.16
145	.56	.31	.10	.01	14.23	<.06	<1.0	.004	<.20	.41
146	1.49	.42	.08	.01	47.62	<.06	<1.0	.003	<.20	.23
147	.22	.22	.08	.01	41.65	<.06	<1.0	.003	<.20	.25
148	1.91	.16	.08	0	44.03	<.06	<1.0	.031	<.20	.23
149	.78	2.26	.12	0	42.85	<.06	<1.0	.007	<.20	.41

TABLE 2 (continued)

<u>Sample</u>	<u>Ni</u>	<u>Sb</u>	<u>Pb</u>
132	<.16	<.5	.005
133	<.16	<.5	.009
134	<.16	<.5	.006
135	<.16	<.5	.006
136	<.16	<.5	.008
137	<.16	<.5	.001
138	<.16	<.5	.039
139	<.16	<.5	.006
140	<.16	<.5	.001
141	<.16	<.5	.001
142	<.16	<.5	.004
143	<.16	<.5	.001
144	<.16	<.5	.001
145	<.16	<.5	.002
146	<.16	<.5	.002
147	<.16	<.5	.001
148	<.16	3.19	867.5
149	<.16	<.5	.025

TABLE 2 (continued)

Sample	(ppm)-----mg/l-----									
	TDS	pH	Ca	Mg	Na	K	CO ₃	HCO ₃	Cl	SO ₄
JW-1	492	8.12	77.8	38.2	8.3	1.6	0	389.3	2.5	48.0
2	156	9.60	1.2	<.1	62.8	.4	49.2	72.0	.4	19.2
3	992	7.89	49.7	6.8	307.1	15.6	0	129.4	445.3	57.6
4	768	7.95	39.3	7.4	215.6	11.3	0	136.7	294.6	44.2
5	1,280	7.79	54.3	6.9	406.0	18.8	0	107.4	574.3	90.3
6	160	8.00	16.8	7.3	23.2	2.0	0	131.8	1.1	19.2
7	164	7.89	13.0	6.9	27.4	2.7	0	140.3	1.4	15.4

	-----meq/l-----									
	Ca	Mg	Na	K	Total Cations	CO ₃	HCO ₃	Cl	SO ₄	Total Anions
JW-1	3.88	3.14	.36	.04	7.42	0	6.38	.07	1.00	7.45
2	.06	<.01	2.73	.01	2.80	1.64	1.18	.01	.40	3.23
3	2.48	.56	13.36	.40	16.80	0	2.12	12.56	1.20	15.88
4	1.96	.61	9.38	.29	12.24	0	2.24	8.31	.92	11.47
5	2.71	.57	17.66	.48	21.42	0	1.76	16.20	1.88	19.84
6	.84	.60	1.01	.05	2.50	0	2.16	.03	.40	2.59
7	.65	.57	1.19	.07	2.48	0	2.30	.04	.32	2.66

	-----mg/l-----									
	Fc	F	B	P	SiO ₂	Ag	Al	As	Ba	Br
JW-1	<.10	1.05	.04	.02	14.50	<.03	<2.5	.001	<.7	.54
2	<.10	.72	.03	.02	45.35	<.03	<2.5	.007	<.7	.31
3	<.10	1.43	.28	.02	75.18	<.03	<2.5	.018	<.7	.56
4	<.10	1.49	.22	.01	64.80	<.03	<2.5	.014	<.7	.43
5	<.10	1.80	.38	.01	90.94	<.03	<2.5	.021	<.7	.56
6	<.10	.51	.02	.02	26.33	<.03	<2.5	.002	<.7	.22
7	<.10	.62	.04	.01	29.31	<.03	<2.5	.002	<.7	.27

	(ppm)-----mg/l-----									
	Cd	Co	Cr	Cu	Hg	H ₂ S	Li	Mn	Mo	NH ₄
JW-1	<.01	<.15	<.1	<.10	.0012	<.1	.02	<.07	<.5	.30
2	<.01	<.15	<.1	<.10	.0011	<.1	.01	<.07	<.5	.90
3	<.01	<.15	<.1	<.10	.0012	<.1	.48	<.07	<.5	.13
4	<.01	<.15	<.1	<.10	.0012	<.1	.34	<.07	<.5	1.24
5	<.01	<.15	<.1	<.10	.0008	<.1	.65	<.07	<.5	1.35
6	<.01	<.15	<.1	<.10	.0011	<.1	.04	<.07	<.5	1.16
7	<.01	<.15	<.1	<.10	.0006	<.1	.03	<.07	<.5	.69

TABLE 2 (continued)

Sample	mg/l						
	<u>NO₃ + NO₂</u>	<u>Ni</u>	<u>Pb</u>	<u>Sb</u>	<u>Se</u>	<u>Sr</u>	<u>Zn</u>
JW-1	5.23	<.03	.027	<.5	.003	.12	.17
2	.60	<.03	.006	<.5	<.002	<.04	.14
3	.96	<.03	.021	<.5	.006	.33	.14
4	1.05	<.03	.018	<.5	.005	.28	.15
5	.96	<.03	.042	<.5	.007	.43	.12
6	2.12	<.03	.004	<.5	<.002	.03	.14
7	1.88	<.03	.005	<.5	.020	.04	.12

TABLE 2 (continued)

<u>Sample</u>	(ppm)	mg/l								
	<u>TDS</u>	<u>pH</u>	<u>Ca</u>	<u>Mg</u>	<u>Na</u>	<u>K</u>	<u>CO₃</u>	<u>HCO₃</u>	<u>Cl</u>	<u>SO₄</u>
B1	592	8.18	101.2	27.6	65.1	7.4	12.0	361.2	26.6	147.9
B2	3,532	8.16	118.6	15.2	1135.9	167.0	13.2	378.3	1593.6	263.2
B3	872	8.26	87.0	14.1	189.0	14.1	0	203.8	227.3	159.5
B4	2,236	7.66	404.2	29.9	214.0	11.7	0	41.5	14.2	1604.2
B5	1,240	8.23	47.1	15.8	323.9	18.8	0	366.1	151.0	376.6
B6	1,228	8.62	47.1	16.0	340.0	19.2	22.8	311.2	153.2	374.6
B7	252	8.18	39.5	10.5	34.3	4.7	0	185.5	.4	63.4
B8	2,784	8.03	153.9	17.9	806.7	10.6	0	289.2	828.5	647.5
B9	2,608	7.79	143.9	18.0	817.5	61.4	0	164.7	1285.2	196.0
B10	2,688	7.80	143.9	17.9	791.5	63.0	0	162.3	1353.6	169.1
B11	2,640	7.88	136.5	17.1	764.6	62.6	0	136.7	1370.3	115.3
B12	1,392	7.90	110.4	9.5	387.4	21.5	0	211.1	602.7	138.3
B13	284	8.48	17.2	4.3	56.1	3.1	0	162.3	10.3	50.0
B14	348	8.33	16.4	4.3	68.5	3.1	0	181.8	12.1	69.2
B15	420	8.14	49.5	4.5	78.4	3.9	0	175.7	80.5	67.2
B16	352	7.79	53.3	7.1	25.7	2.7	0	146.4	15.6	76.8
B17	468	8.24	34.9	1.3	125.5	5.1	0	131.8	104.2	96.1
B18	544	7.91	42.3	1.7	143.5	6.6	0	137.9	132.2	107.6
B19	2,708	7.98	164.1	18.7	785.6	62.6	0	224.5	1314.2	107.0

TABLE 2 (continued)

<u>Sample</u>	meq/l									
	<u>Ca</u>	<u>Mg</u>	<u>Na</u>	<u>K</u>	<u>Total Cations</u>	<u>CO₃</u>	<u>HCO₃</u>	<u>Cl</u>	<u>SO₄</u>	<u>Total Anions</u>
B1	5.05	2.27	2.83	.19	10.34	.40	5.92	.75	3.08	10.15
B2	5.92	1.25	49.41	4.27	60.85	.44	6.20	44.95	5.48	57.07
B3	4.34	1.16	8.22	.36	14.08	0	3.34	6.41	3.32	13.07
B4	20.17	2.46	9.31	.30	32.24	0	.68	.40	33.40	34.48
B5	2.35	1.30	14.09	.48	18.22	0	6.00	4.26	7.84	18.10
B6	2.35	1.32	14.79	.49	18.95	.76	5.10	4.32	7.80	17.98
B7	1.97	.86	1.49	.12	4.44	0	3.04	.01	1.32	4.37
B8	7.68	1.47	35.09	.27	44.51	0	4.74	23.37	13.48	41.59
B9	7.18	1.48	35.56	1.57	45.79	0	2.70	36.25	4.08	43.03
B10	7.18	1.47	34.43	1.61	44.69	0	2.66	38.18	3.52	44.36
B11	6.81	1.41	33.26	1.60	43.08	0	2.24	38.65	2.40	43.29
B12	5.51	.78	16.85	.55	23.69	0	3.46	17.00	2.88	23.34
B13	.86	.35	2.44	.08	3.73	0	2.66	.29	1.04	3.99
B14	.82	.35	2.98	.08	4.23	0	2.98	.34	1.44	4.76
B15	2.47	.37	3.41	.10	6.35	0	2.88	2.27	1.40	6.55
B16	2.66	.58	1.12	.07	4.43	0	2.40	.44	1.60	4.44
B17	1.74	.11	5.46	.13	7.44	0	2.16	2.94	2.00	7.10
B18	2.11	.14	6.24	.17	8.66	0	2.26	3.73	2.24	8.23
B19	8.19	1.54	34.17	1.60	45.50	0	3.68	37.07	2.24	42.99

TABLE 2 (continued)

----- mg/l -----										
<u>Sample</u>	<u>Fe</u>	<u>F</u>	<u>B</u>	<u>P</u>	<u>SiO₂</u>	<u>Ag</u>	<u>Al</u>	<u>As</u>	<u>Ba</u>	<u>Br</u>
B1	.12	.67	.12	.01	46.2	<.03	<.25	.004	<.7	.65
2	.49	4.44	.86	.02	69.9	<.03	<.25	.075	<.7	1.54
3	.49	.57	.22	.01	35.4					
4	.53	.45	.23	.03	63.9					
5	<.10	5.90	.34	.01	31.3	<.03	<.25	.012	<.7	.94
6	<.10	5.90	.37	.02	32.3	<.03	<.25	.011	<.7	.85
7	<.10	1.48	.08	.02	28.9					
8	1.25	.64	.69	.03	44.3					
9	.38	1.49	.38	.01	44.3	<.03	<.25	.020	<.7	.77
10	<.10	3.10	.35	.01	44.3	<.03	<.25	.019	<.7	.77
11	<.10	3.10	.35	.01	44.3	<.03	<.25	.018	<.7	.75
12	<.10	2.46	.20	.05	37.3	<.03	<.25	.013	<.7	.78
13	<.10	2.02	.09	.02	25.3	<.03	<.25	.041	<.7	.28
14	<.10	.69	.09	.02	21.3	<.03	<.25	.037	<.7	.37
15	.12	1.73	.08	.01	32.1					
16	.36	.27	.07	.06	44.3					
17	<.10	3.10	.09	.01	35.3	<.03	<.25	.012	<.7	.23
18	<.10	2.86	.10	.01	34.2	<.03	<.25	.011	<.7	.30
19	<.10	3.20	.38	.01	31.3	<.03	<.25	.039	<.7	.82

TABLE 2 (continued)

<u>Sample</u>	<u>mg/l</u>									
	<u>Cd</u>	<u>Co</u>	<u>Cr</u>	<u>Cu</u>	<u>Hg</u>	<u>H₂S</u>	<u>Li</u>	<u>Mn</u>	<u>Mo</u>	<u>MH₄</u>
B1	<.01	<.15	<.1	<.10	.0006	<.1	.03	<.07	<.5	0
.2	<.01	<.15	<.1	<.10	.0008		1.18	<.07	<.5	0
5	<.01	<.15	<.1	<.10	.0148	<.1	.36	<.07	<.5	0
6	<.01	<.15	<.1	<.10	.0011	<.1	.35	<.07	<.5	.08
9	<.01	<.15	<.1	<.10	.0009	<.1	1.21	<.07	<.5	0
10	<.01	<.15	<.1	<.10	.0003	<.1	1.23	<.07	<.5	0
11	<.01	<.15	<.1	<.10	.0004	<.1	1.24	<.07	<.5	2.01
12	<.01	<.15	<.1	<.10	.0005	<.1	.42	<.07	<.5	1.84
13	<.01	<.15	<.1	<.10	.0005	<.1	.06	<.07	<.5	.38
14	<.01	<.15	<.1	<.10	<.0002	<.1	.08	<.07	<.5	.30
17	<.01	<.15	<.1	<.10	.0003	<.1	.11	<.07	<.5	.30
18	<.01	<.15	<.1	<.10	.0003	<.1	.13	<.07	<.5	0
19	<.01	<.15	<.1	<.10	.0005	<.1	1.20	<.07	<.5	0

	<u>mg/l</u>						
	<u>NO₃+NO₂</u>	<u>Ni</u>	<u>Pb</u>	<u>Sb</u>	<u>Sc</u>	<u>Sr</u>	<u>Zn</u>
1	5.57	<.03	.070	<.5	.005	1.28	.64
2	.47	<.03	.844	<.5	.038	2.49	.10
5	.08	<.03	.090	<.5	.006	.86	.09
6	1.00	<.03	.139	<.5	.009	.83	.06
9	2.12	<.03	.202	<.5	.018	4.10	.05
10	1.88	<.03	.200	<.5	.017	4.12	.07
11	2.01	<.03	.105	<.5	.015	4.19	.09
12	11.14	<.03	.623	<.5	.009	2.21	.12
13	1.63	<.03	.025	<.5	.003	.35	.16
14	1.82	<.03	.033	<.5	.004	.39	3.58
17	.84	<.03	.008	<.5	.004	.28	.09
18	.40	<.03	.005	<.5	.004	.38	.09
19	1.40	<.03	.257	<.5	.029	4.08	.10

TABLE 2 (continued)

Sample	-----mg/l-----									
	<u>TDS</u>	<u>pH</u>	<u>Ca</u>	<u>Mg</u>	<u>Na</u>	<u>K</u>	<u>CO₃</u>	<u>HCO₃</u>	<u>Cl</u>	<u>SO₄</u>
19	744	8.05	47.0	36.0	149.7	9.7	0	154.9	101.8	299.5
20	2652	8.18	65.8	44.1	706.5	10.5	0	181.8	269.4	1372.8
21	5208	7.99	599.2	273.1	363.1	37.8	0	143.9	232.2	3129.6
22	2152	7.90	420.2	97.5	51.5	4.7	0	134.2	27.7	1296.0
23	2500	8.10	441.2	156.6	66.0	7.0	0	184.2	47.5	1478.4
24	516	8.10	44.2	1.7	137.7	5.5	0	124.4	150.1	107.5
25	104	7.90	12.8	2.4	10.5	1.6	0	36.6	0.1	44.2
26	104	7.81	12.8	2.2	10.8	1.6	0	31.7	0.7	40.3
27	192	7.84	23.4	1.7	24.1	.8	0	108.5	1.4	26.4
28	364	8.10	46.8	7.9	17.4	3.9	0	207.4	1.1	21.6
29	492	7.74	35.6	7.6	90.8	8.2	0	283.0	14.2	72.0
30	456	7.63	25.8	9.6	90.8	2.3	0	256.2	20.8	64.2
31	320	8.97	2.4	<.006	91.7	1.2	20.4	67.1	14.5	84.0
32	408	8.19	10.6	0.1	123.0	3.1	0	108.6	99.4	69.6
33	416	8.15	10.4	0.2	129.7	3.1	0	115.9	100.1	67.2
34	548	7.92	15.4	0.1	151.5	3.5	0	131.1	104.3	118.0
35	516	8.08	18.4	0.8	141.9	2.7	0	125.0	115.7	93.6
36	320	8.15	31.6	13.0	28.9	3.5	0	227.5	1.4	24.0
37	344	7.84	32.0	18.1	24.8	4.3	0	213.5	17.0	16.2
38	428	7.82	39.8	13.2	47.1	5.1	0	236.6	8.5	50.4

TABLE 2 (continued)

----- mg/l -----										
<u>Sample</u>	<u>Ca</u>	<u>Mg</u>	<u>Na</u>	<u>K</u>	<u>Total</u> <u>Cations</u>	<u>CO₃</u>	<u>HCO₃</u>	<u>Cl</u>	<u>SO₄</u>	<u>Total</u> <u>Anions</u>
19	2.35	3.00	6.51	.25	12.11	0	2.54	2.87	6.24	11.65
20	3.29	4.51	30.72	.27	38.79	0	2.98	7.59	28.60	39.17
21	29.96	22.76	15.79	.97	69.48	0	2.36	6.54	65.20	74.10
22	21.01	8.13	2.24	.12	31.50	0	2.20	.78	27.00	29.98
23	22.06	13.05	2.87	.18	36.16	0	3.02	1.34	30.80	35.16
24	2.21	.14	5.99	.14	8.48	0	2.04	4.23	2.24	8.50
25	.64	.20	.46	.04	1.34	0	.60	.003	.92	1.52
26	.64	.18	.47	.04	1.33	0	.52	.02	.84	1.38
27	1.17	.14	1.05	.02	2.38	0	1.78	.04	.55	2.37
28	2.34	.66	.76	.10	3.86	0	3.40	.03	.45	3.88
29	1.78	.60	3.95	.21	6.54	0	4.64	.40	1.50	6.54
30	1.29	.80	3.95	.06	6.10	0	4.20	.52	1.35	6.07
31	.12	<.0005	3.99	.03	4.14	.68	1.10	.41	1.75	3.94
32	.53	.01	5.35	.08	5.97	0	1.78	2.80	1.45	6.03
33	.52	.02	5.64	.08	6.25	0	1.90	2.82	1.40	6.12
34	.77	.01	6.59	.09	7.46	0	2.15	2.94	2.25	7.34
35	.92	.07	6.17	.07	7.23	0	2.05	3.26	1.45	7.26
36	1.58	1.08	1.26	.09	4.01	0	3.73	.04	.50	4.27
37	1.60	1.51	1.08	.11	4.30	0	3.50	.48	.35	4.33
38	1.99	1.10	2.05	.13	5.27	0	3.88	.24	1.05	5.17

TABLE 2 (continued)

<u>Sample</u>	ppm	ppm		
	<u>Zn</u>	<u>Sr</u>	<u>Se</u>	<u>NO₃</u>
150	<.02		<.002	.72
151	.03		.003	.15
152	<.02		.003	.06
153	.14		.003	6.72
154	<.02		.003	.17
155	.03		.004	2.00
156	.22		.003	.59
157	.04		.006	0
159	<.02		.003	.89
160	.07	.03	.006	1.47

TABLE 2 (continued)

<u>Sample</u>	<u>ppm</u>				
	<u>Fe</u>	<u>F</u>	<u>B</u>	<u>P</u>	<u>SiO₂</u>
19	.16	2.70	.30	0	26.87
20	.14	4.10	2.22	0	8.99
21	1.28	2.50	1.96	.02	16.04
22	.32	1.10	.18	0	29.07
23	<.10	1.20	.09	0	26.87
24	.22	.25	.02	0	23.58
25	<.10	.11	0	.01	36.80
26	<.10	.11	0	.01	36.80
27	1.15	2.70	0	0	50.12
28	<.10	.53	0	0	42.06
29	.12	6.10	.01	.01	45.16
30	.25	3.10	.02	0	41.03
31	<.10	16.00	0	0	55.56
32	<.10	8.70	.03	0	72.27
33	<.10	8.70	.02	0	73.31
34	.22	9.50	.07	0	85.89
35	1.25	8.70	.11	.01	85.89
36	.29	.61	.01	0	59.73
37	3.11	.66	.01	0	60.78
38	<.11	3.00	.01	0	54.53

TABLE 2 (continued)

<u>Sample</u>	<u>NO₃+NO₂</u>	<u>Ni</u>	<u>Pb</u>	<u>Sb</u>	<u>Sc</u>	<u>Sr</u>	<u>Zn</u>
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29	0	<.13	.014	<.6	.004	.10	<.028
30							
31	0	<.13	.051	<.6	.004	<.02	<.028
32	.29	<.13	.024	<.6	.005	.02	.06
33	.19	<.13	.021	<.6	.005	.02	.06
34	.19	<.13	.021	<.6	.006	.03	<.028
35	0	<.13	.021	<.6	.006	.02	.05
36							
37							
38							

TABLE 2 (continued)

-----ppm-----															
<u>Sample</u>	<u>Cd</u>	<u>Co</u>	<u>Cr</u>	<u>Cu</u>	<u>Hg</u>	<u>H₂S</u>	<u>Li</u>	<u>Mn</u>	<u>Mo</u>	<u>NH₄</u>	<u>Ag</u>	<u>Al</u>	<u>As</u>	<u>Bs</u>	<u>Br</u>
19															
20															
21															
22															
23															
24															
25															
26															
27															
28															
29	<.02	<.18	<.10	<.12	.0006		.16	<.063	<.45	<.05	<.07	<1.10	.009	<.20	<.00
30															
31	<.02	<.18	<.10	<.12	.0006		.11	<.063	<.45	<.05	<.07	<1.10	.006	<.20	<.00
32	<.02	<.18	<.10	<.12	.0033		.26	<.063	<.45	<.05	<.07	<1.10	.007	<.20	<.00
33	<.02	<.18	<.10	<.12	.0007		.26	<.063	<.45	<.05	<.07	<1.10	.008	<.20	<.00
34	<.02	<.18	<.10	<.12	.0005		.43	<.063	<.45	<.05	<.07	<1.10	.006	<.20	<.00
35	<.02	<.18	<.10	<.12	.0006		.31	<.063	<.45	<.05	<.07	3.10	.009	<.20	<.00
36															
37															
38															

TABLE 2 (continued)

-----mg/l-----										
Sample	TDS	pH	Ca	Mg	Na	K	CO ₃	HCO ₃	Cl	SO ₄
150	236	8.66	6.8	1.6	61.1	1.5	0	94.0	4.2	64.8
151	200	8.33	10.6	3.5	48.7	2.0	0	103.7	3.9	43.7
152	260	9.10	2.8	<0.1	69.2	1.2	20.4	40.3	5.0	75.9
153	292	8.53	10.4	0.6	77.9	1.5	0	75.7	25.9	99.4
154	332	8.13	18.4	1.3	92.4	1.5	0	234.3	6.4	49.0
155	400	8.04	8.2	0.8	118.4	2.0	0	244.1	13.1	55.2
156	444	7.64	36.1	6.9	79.3	1.2	0	290.4	10.6	45.1
157	472	8.79	2.4	0.1	146.7	0.8	13.2	175.7	33.0	107.1
158	272	9.36	1.0	<0.1	87.6	0.4	46.8	125.7	2.8	13.4
159	544	8.00	87.0	16.5	34.9	7.8	0	390.5	18.8	35.0
160	672	7.98	10.0	1.3	190.6	2.7	0	336.8	18.8	142.6

TABLE 2 (continued)

mg/l

<u>Sample</u>	<u>Ca</u>	<u>Mg</u>	<u>Na</u>	<u>K</u>	<u>Total Cations</u>	<u>CO₃</u>	<u>HCO₃</u>	<u>Cl</u>	<u>SO₄</u>	<u>Total Anions</u>
150	.34	.13	2.66	.04	3.17	0	1.54	.12	1.35	3.01
151	.53	.29	2.12	.05	2.99	0	1.70	.11	.91	2.72
152	.14	.006	3.01	.03	3.18	.68	.66	.14	1.58	3.06
153	.52	.05	3.39	.04	4.00	0	1.24	.73	2.07	4.04
154	.92	.11	4.02	.04	5.09	0	3.84	.18	1.02	5.04
155	.41	.07	5.15	.05	5.68	0	4.00	.37	1.15	5.52
156	1.80	.57	3.45	.03	5.85	0	4.76	.30	.94	6.00
157	.12	.01	6.38	.02	6.53	.44	2.88	.93	2.23	6.48
158	.05	<.006	3.81	.01	3.93	1.56	2.06	.08	.28	3.98
159	4.34	1.36	1.52	.20	7.42	0	6.40	.53	.73	7.66
160	.50	.11	8.29	.07	8.97	0	5.52	.53	2.97	9.02

TABLE 2 (continued)

<u>Sample</u>	<u>Fe</u>	<u>F</u>	<u>B</u>	<u>P</u>	<u>SiO₂</u>	<u>Ag</u>	<u>Al</u>	<u>As</u>	<u>Ba</u>	<u>Br</u>
150	.31	9.45	.12	.01	67.65	<.06	<1.0	.007	<.20	
151	<.15	7.65	.08	.01	50.00	<.06	<1.0	.004	<.20	
152	<.15	11.85	.12	0	68.91	<.06	<1.0	.006	<.20	
153	.25	10.50	.92	0	21.39	<.06	<1.0	.002	<.20	
154	<.15	5.85	.16	0	34.51	<.06	<1.0	.006	<.20	
155	<.15	7.35	.44	0	47.62	<.06	<1.0	.011	<.20	
156	<.15	3.00	.14	.01	49.40	<.06	<1.0	.006	<.20	
157	<.15	19.05	2.56	.01	63.73	<.06	<1.0	.015	<.20	
158	<.15	1.00	.12	.01	52.95					
159	<.15	.49	.14	.23	57.75	<.06	<1.0	.004	<.20	
160	.49	18.45	.42	.06	48.22	<.06	<1.0	.014	<.20	.15

TABLE 2 (continued)

<u>Sample</u>	<u>Cd</u>	<u>Co</u>	<u>Cr</u>	ppm <u>Cu</u>	<u>Hg</u>	ppm <u>H₂S</u>	ppm <u>Li</u>	<u>Mn</u>	<u>Mo</u>	<u>NH₄</u>
150				<.10	.0004	<.1	.06			<.05
151				<.10	.0003	<.1	.03			<.05
152				<.10	.0004	<.1	.11			<.05
153				<.10	.0006	<.1	.13			<.05
154				<.10	.0006	<.1	.08			<.05
155				<.10	.0006	<.1	.14			<.05
156				<.10	.0006	<.1	.15			<.05
157				<.10	.0006	<.1	.20			<.05
159				<.10	.0006	<.1	.02			<.05
160	<.02	<.14	<.1	<.10	.0006	<.1	.22	.40	<.5	<.05

TABLE 2 (continued)

<u>Sample</u>	----- mg/l -----							
	<u>TDS</u>	<u>pH</u>	<u>Ca</u>	<u>Mg</u>	<u>Na</u>	<u>K</u>	<u>Cl</u>	<u>CO₃</u>
161		8.08	20.4	2.6	40.0	1.6	3.2	0
162		8.07						
163		8.09	16.8	1.6	43.7	1.2	3.9	0
164		8.15	14.8	1.5	37.5	.8	3.2	0
165	340	8.40	38.5	16.5	97.2	7.4	17.0	0
166	784	7.96						

TABLE 2 (continued)

<u>Sample</u>	<u>HCO₃</u>	<u>SO₄</u>	<u>P</u>	<u>B</u>	<u>F</u>	<u>Fe</u>	<u>SiO₂</u>
• 161	145.8	29.8	.20	.05	4.86	.37	51.0
• 162			.16	.02	5.28	.42	56.0
163	139.7	28.3	.09	.07	5.28	<.10	56.5
164	131.2	19.2	.09	0	5.07	<.10	54.0
165	233.1	176.8	.11	.28	.69	.92	72.5
166			.16	.48	1.06	.37	65.0

TABLE 2 (continued)

<u>Sample</u>	<u>Mo</u>	<u>Co</u>	<u>Zn</u>	<u>Mn</u>	<u>Sr</u>	<u>Cd</u>	<u>Bc</u>	<u>Ni</u>	<u>Cu</u>	<u>Ag</u>	<u>Pb</u>	<u>Li</u>
165	<.5	<.15	.26	<.05	.20	<.02	<.4	<.15	<.10	<.06	.004	.05
166	<.5	<.15	2.72	<.05	1.15	<.02	<.4	<.15	<.10	<.06	.006	.08

<u>Sample</u>	<u>As</u>	<u>Se</u>	<u>Sb</u>	<u>Hg</u>	<u>Cr</u>	<u>Br</u>	<u>NO₃</u>	<u>H₂S</u>	<u>NH₄</u>	<u>Al</u>
165	.01	.01	<.5		<.10		7.38	<.1		<1.0
166	.01	.01	<.5		<.10		8.83	<.1		<1.0