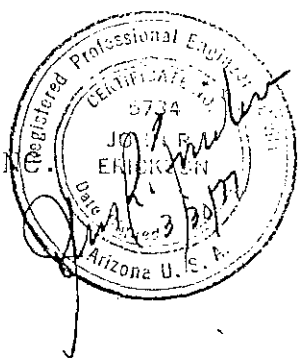
HYDROLOGY
JEMEZ MOUNTAINS, NEW MEXICO

PROJECT OF
UNION GEOTHERMAL DIVISION
UNION OIL COMPANY

WATER RESOURCES ASSOCIATES, INC.
3009 North 67th Place
Scottsdale, Arizona
March 1977



C O N T E N T S

Appendix

Synopsis

Hydrologic data collected since October 1975 have been compiled and analyzed. Because of unavoidable circumstances, streamflow records are broken and of poor quality. Subsequent investigation has shown that stream flow analysis within the Caldera is not needed in the hydrologic solution being sought. Valuable data collected by the State of New Mexico at the springs and wells of the area and by Union Geothermal Division have been utilized in this evaluation.

The hydrology of the area strongly supports the evidence of some discharge of deep Caldera reservoir water into the Jemez River. It is assumed that the hydrologic system is in dynamic equilibrium and that there is recharge into the reservoir of an equal amount. The investigation shows that:

1. Fluid levels in the Caldera reservoir are 800 to 1200 feet below regional groundwater levels.
2. Water surface profiles support evidence deduced from the water chemistry of the region that little opportunity exists for movement of water out of the Caldera reservoir, except through faults and sediments of low permeability to the south-southwest along the Jemez River.
3. Chemical characteristics of the Caldera reservoir water, when compared to that of springs and base River flow, suggest dilution by fresher meteoric waters.
4. Discharge of waters with high concentrations of dissolved solids has persisted down the Jemez River and along the San Diego Canyon for a long period of time. Quantities now moving in that direction are calculated in the magnitude of 150 to 200 gallons per minute.
5. It is believed that the early drainage was of very poor quality water which could have been deposited

in part in the rocks of the canyon and which may still be contributing to the low grade quality of the general Jemez Valley system.

6. Groundwater hydraulics of the region, based on knowledge of the formations and the fundamental hydrology of the area around the Caldera, suggest that the lowering of water levels in the Caldera reservoir due to production of steam, might be felt in extremely small quantities almost from the beginning of the operation. Preliminary computations indicate that stream diminution in 50 years might be in the amount of 30 gallons per minute.

Recommendations

It is recommended that

1. The stream gaging program be discontinued.
2. The program of sampling and measuring the springs and wells of the area be reduced to once or twice a year.
3. A refinement of some of the areas of calculations suggested by this report might be undertaken.

All of the above recommendations would be contingent upon, at least, tacit approval by the State Engineer.

Introduction

In early August 1975, the Project Coordinator, Geothermal Division of Union Oil Company, contacted Water Resources Associates, Inc. (WRAI) regarding evaluation of the hydrology of the region surrounding the Valles Caldera, an area of geothermal potential located in north central New Mexico in the Jemez Mountains, about 40 miles northwest of Santa Fe.

The primary reason for retaining outside consulting assistance was to evaluate the effects of geothermal energy production on the hydrology of the Rio Grande system. The consulting firm would also provide (1) assistance in establishing and operating a hydrologic monitoring program, (2) professional personnel familiar with the State and the Jemez Mountains region, and with the legal and administrative procedures and problems within the State, and (3) professional expertise available in the event of legal action.

For the pilot project, Union Oil drilled eleven geothermal test wells in Redondo Canyon. Several other geothermal wells have been drilled in the Sulphur Creek drainage. A recent interference and re-injection test was done in the Redondo Canyon area.

Water Resources, by letter of September 5, 1975, proposed to the Project Coordinator, a hydrologic monitoring program which might aid in the necessary evaluation of possible hydrologic effects of the geothermal project. It was recognized at the outset that effects of the interference test might not be apparent in a short period of time, and possibly might never be detected.

The monitoring program laid out at that time consisted of surface water measuring stations on East Fork of the Jemez, Redondo Creek, Sulphur Creek and San Antonio Creek. East Fork of the Jemez and San Antonio Creek are the major sources of water being measured by the U.S.G.S. at the Jemez River station near the town of Jemez. Measurement of the discharge of the thermal springs in the area was recommended, together with a regular program of chemical analysis of the water, both surface and undergound.

WRAI was then asked to make suggestions about the installation of gaging stations to measure the surface flows and to provide basic instruction to Union Oil personnel to carry out the surface water measuring program. The State of New Mexico undertook the measuring and water sample collecting program at the thermal springs. The New Mexico District office of the U. S. Geological Survey cooperated by loaning equipment until it could be replaced by Union Oil, in order that the measuring program could be expedited.

After the program was initiated, one field trip was made by WRAI personnel to review the installations and make further suggestions. After the field trip of October 23, 1975, no further assistance was asked of WRAI until late October 1976. At that time WRAI was asked to work up the surface water records from data that had been collected since early October 1975 at the four new gaging stations. After the initial request, further information was supplied to WRAI by Union Oil concerning the geology and fluid levels in the Caldera, quality of the geothermal waters, and other data pertinent to the hydrology and geohydrology of the area.

In preparing the initial recommendation for the monitoring program, WRAI gathered all the information that could be found on the area in the U.S. Geological Survey technical bulletins and water supply papers, the New Mexico Geological Society Guidebooks, and from the Los Alamos Scientific Laboratory. These data sources and reports have been relied on, in part, in the preparation of this report.

The purpose of this report is to present the results of the monitoring program and to evaluate regional and local groundwater conditions and water quality, in their relation to the hydrologic problems. A preliminary evaluation of the effects of the steam production in the Valles Caldera on the hydrology of the Rio Grande Basin is presented. Recommendations as to the monitoring and evaluation program are included.

Monitoring Program

Surface Water Measurements

The program initiated in October 1975 was designed to measure possible changes in surface water flows in Redondo and Sulphur Creeks. Also, through records at the gaging stations on San Antonio Creek and East Fork of the Jemez, changes could possibly be detected, in base flow periods, between the upper gaging stations on Redondo and Sulphur Creeks and the established long term station on the Jemez River below the mouth of the East Fork. It was intended that there would be continuing sampling of the quality of those waters to assist in evaluating the separation of the several water sources.

The program was started before there was time to do a great deal with the general hydrology of the area. Considerable reliance was placed on the existing reports of the U.S. Geological Survey and on the ideas of staff members of the Survey and of the State Engineer Office, some of whom have been studying the problems of the area for a number of years.

The surface water measurement program, together with the sampling and analysis of hot springs, was intended to isolate and segregate, as much as possible, the area above the long term gaging station on the Jemez River.

New Gaging Stations

Approval to implement the program that was recommended was given in late September 1975. A field trip was made to estimate the range of flows that might be measured in the two smaller streams, Redondo Creek and Sulphur Creek, where Parshall flumes would be used. Gaging station sites were selected on San Antonio Creek and East Fork of the Jemez. At that time arrangements were made for flumes, recorders and other necessary equipment to carry out the stream gaging program.

Arrangements were made with the U.S.G.S to borrow flumes for the two small stations on a replacement basis. That agency also

provided recorders until replacements could be purchased. A current meter was loaned by this office until one could be purchased.

After assessing the discharges, which were at low stage in September 1975, it was decided to install a one foot Parshall flume for the measurement of Redondo Creek. This flume will measure flows ranging from 10 gallons per minute (0.02 cfs) to about 100 gallons per minute (0.22 cfs). A six inch Parshall flume was selected for use on Sulphur Creek where the measurements would be approximately one-half of those on Redondo Creek, ranging from 5 to 50 gpm.

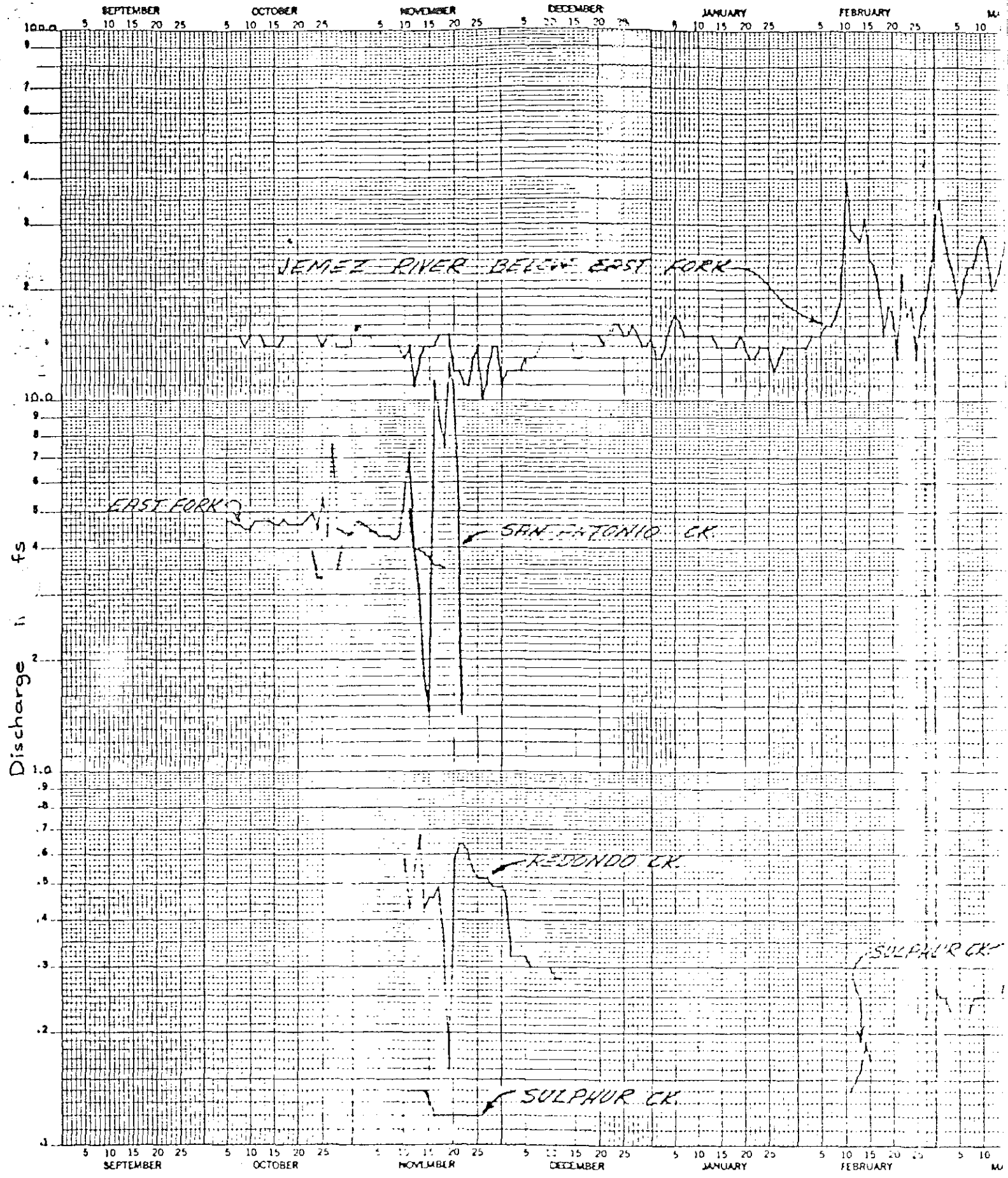
Plans for standard gaging station installations on the other two streams were submitted to the Project Engineer. Verbal instructions were given as to how the stations could be installed and pertinent installation literature and references were provided.

Due to unforeseeable circumstances, the records could not be obtained as originally planned. All of the data collected at the gaging stations have been converted to discharges and are compiled in Tables I-1 through I-4 in Appendix I and are shown as hydrographs on Figure 1. Initially, it had been felt that the flow periods could be analyzed to establish trends of groundwater discharge in the stream system. This base flow can be analyzed to establish the effects of groundwater use on surface flow, if those effects occur within a reasonable time frame.

In order to analyze the effects of groundwater use, the water quality records must be examined in relation to the surface water flows. That portion of the study is discussed in the section on hydrochemistry.

Conclusion Regarding The Stream Gaging Stations

Analyses in later sections of the report support the conclusion that the operation of the four gaging stations should not be continued. It will be shown that the waters of East Fork of the Jemez and San Antonio Creek are, to a very large degree,


SEPTEMBER
OCTOBER
NOVEMBER
DECEMBER
JANUARY
FEBRUARY
Discharge in cfs
JEMEZ RIVER BELOW EAST FORK
EAST FORK
SAN CATONIO CR.
REDONDO CR.
SULPHUR CR.
SULPHUR CR.

1975


FEBRUARY
MARCH
APRIL
MAY
JUNE
JULY
AUGUST
EAST
SAN
REDONDO CR.
SULPHUR CR.
SULPHUR CR.
REDONDO
SULPHUR CR.

1976

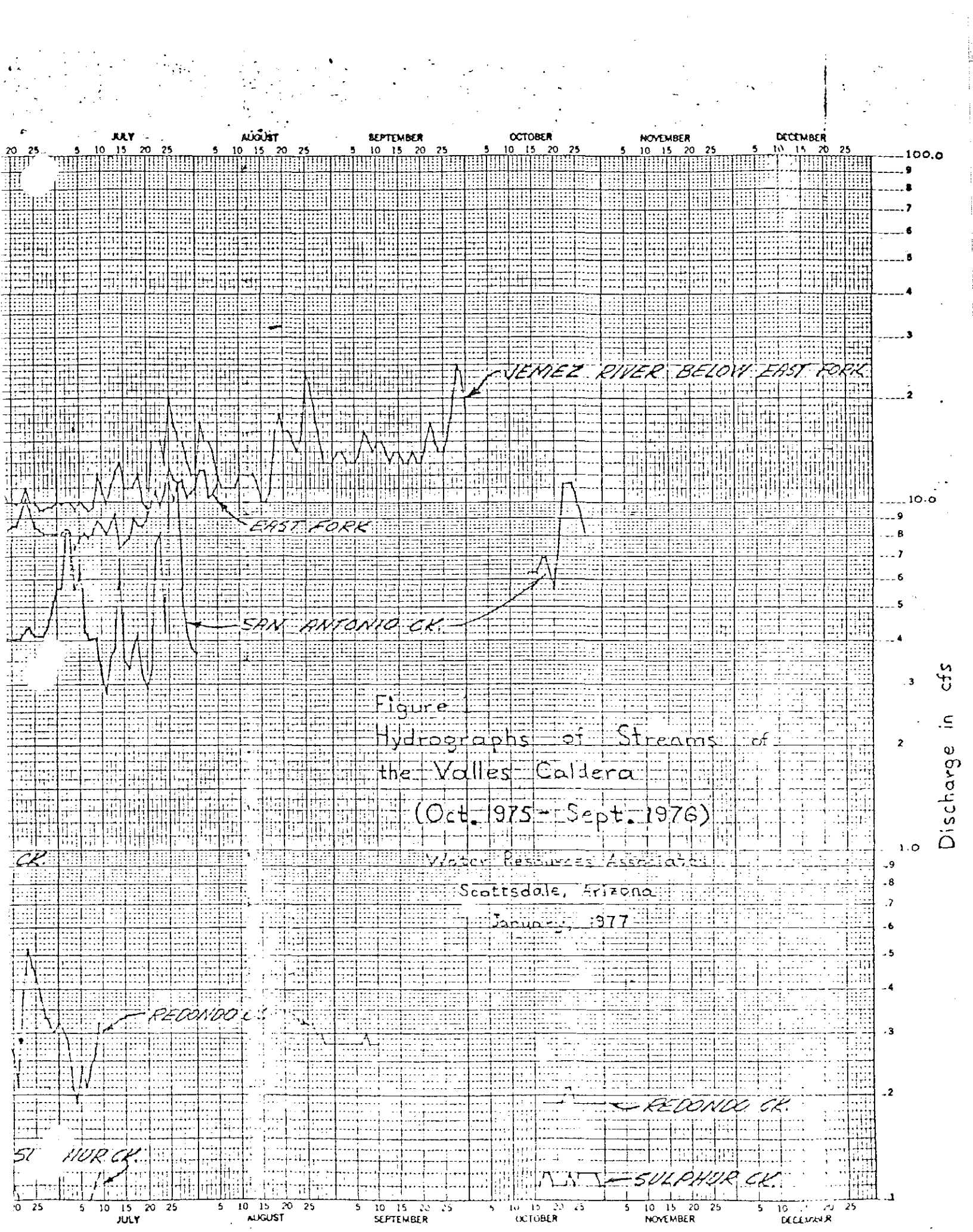


Figure 1
Hydrographs of Streams of
the Valles Caldera
(Oct. 1975 - Sept. 1976)

Water Resources Associates
Scottsdale, Arizona
January, 1977

good quality waters which have little or no significance in the determination of potential diminution of geothermal waters into the Rio Grande hydrologic system.

It is also apparent that the geothermal hydrologic system has no connection with the waters of Redondo Creek. Sulphur Springs is a solfatara area, where hydrothermal alternation has taken place. The Springs contribute no direct flow to the stream. However, a somewhat higher level of dissolved solids than is found in other streams of the locality suggests a contribution of subsurface flows. Tritium levels indicate that the base flows are from shallow groundwaters.

It has been concluded from the studies that the stream gaging program can be eliminated.

Monitoring of Thermal Springs and Wells

Data on thermal springs and selected wells in the region have been collected on a regular basis by R. L. Borton of the New Mexico State Engineer Office since August 1975. Water levels were observed in fifteen wells (including four observations holes drilled by LASL), discharge and water temperatures were taken at seven flowing wells, and samples were collected for water quality determinations at six of the flowing wells. Discharge and temperature readings were made at San Antonio Hot Springs, Spence Springs, and at McCauley and Soda Dam Springs (all thermal springs).

These data are all listed in Part 2, Appendix II of this report.

Hydrologic Setting

Valles Caldera and its associated peaks and rim constitutes the highest area of the Jemez Mountains.

The Caldera is drained by San Antonio Creek, Redondo Creek, Sulphur Creek, and East Fork of the Jemez River. The East Fork of the Jemez and the main stem of the Jemez River flow through breaches in the rim of the Caldera at its southwestern extremity. Redondo Creek flows into Sulphur Creek, which then joins the San

Antonio, inside the rim of the Caldera near the head of San Diego Canyon, to form the Jemez River.

The Jemez River, which is the principal surface water feature of the entire area, flows southward, through San Diego Canyon, from the junction of the two streams to the town of San Ysidro and then southeasterly to join the Rio Grande some 20 miles north of Albuquerque. Settlements along the River are at Jemez Springs, the town of Jemez in the Jemez Pueblo Grant, San Ysidro, Zia Pueblo, and Santa Ana Pueblo.

To the west of the Caldera, the Jemez Mountains are drained by the Rio Cebolla and Rio de Las Vacas which join northwest of the town of Jemez Springs, to form the Guadalupe River. The Guadalupe then flows southward to join the Jemez River near the town of Jemez. The western divide of the Jemez River Basin is formed by the Sierra Nacimiento, which is also a geologic barrier between the Jemez and San Juan River Basins.

The northern portion of the Jemez Mountains drains from the northern rim of the Caldera to the Chama River in the general vicinity of Abiquiu. Cañones, Frijoles and Abiquiu Creeks are the principal streams draining the north slope. These streams and their upper tributaries are sustained by the groundwater moving northward from the rim of the Caldera.

To the east the Sierra de Las Valles, which borders the east side of the Caldera, slopes into the Pajarito Plateau which borders the Rio Grande. Except for Santa Clara Creek, which is a live stream, these slopes are bisected by canyons which have little or no streamflow. These canyons form what are locally called finger mesas, along the entire Pajarito Plateau.

On the southern flank of the Jemez range, the region is characterized by rugged topography for about half the distance to the Rio Grande. It then breaks into more uniform slopes intersected by canyons which are larger than the ones to the north, and with fewer finger mesas.

Between the southeasterly slopes and the Jemez Canyon, lies Paliza Canyon. This drainage originates outside of the Caldera on the south slopes of the rim and trends southwestward into the

valley of the Jemez River. Vallecitos Creek flows through Paliza Canyon and is fed by groundwaters of the region.

The Chama River and the Rio Grande completely surround the Jemez Mountains on the north, northeast, east, and southeast. The drainage of the Jemez Basin completes the circle.

One other area has been included in the scope of this investigation. The Rio Salado, a tributary which joins the Jemez near San Ysidro, drains the southwestern flank of the Sierra Nacimiento. There is evidence of geothermal acitivity near the mouth of Rio Salado.

Numerous springs occur throughout the region. Most of these are cold water springs. Thermal springs of varying temperature are found in the Valle San Antonio and in the upper reaches of San Diego Canyon. A few thermal springs also occur near the town of San Ysidro in the Rio Salado drainage.

The entire region is spotted with wells from which valuable chemical and water level data have been obtained.

A breakdown of the drainage areas, and the locations of all data collection sites, can be found on Plate I, which serves as a location and a water level map.

Geology

The geology of the Jemez Mountains region has been a matter of interest for many years. Detailed mapping of the area by the U.S.G.S. was commenced in 1946. A number of reports are available, dealing with the geology, geochemistry, geohydrology, and geothermal aspects of the region (see References). An evaluation of the geothermal reservoir has been made by employees of Union Geothermal Division. New geologic information has been developed from the Company drilling program, and the geology of the Caldera is described in a report prepared by Union geologists, and details are not included in this report.

Of importance to this study is the fact that the top of the drainage, flowing away from the Caldera on all sides, is the rim of the depression formed when the roof and sides of the volcanic

gma chamber collapsed. The chamber afterward was filled with ıe various local materials which were heated and metamorphosed. The U.S. Geological Survey is of the opinion that the present cover of the Caldera is esentially impermeable, having been sealed by migration of fine sediments into the fractures and cemented from below by chemical deposition of materials left as the hot mineral fluids were cooled or evaporated. Around the edges of the Caldera, in the ring fractures and radial faults, the sealing may be incomplete.

Other geologic conditions which could have an effect on the hydrology of the region are (1) the deep fault system within the region of the Caldera, and the lateral faults mainly trending southward into San Diego Canyon and beyond, (2) the presence of the Santa Fe formation in the vicinity of the Caldera and beneath the Los Alamos area, (3) the presence of granitic rock near the surface west of Rio San Antonio, and at the surface west of Rio de las Vacas, and (4) the obscure possibility of the Santa Fe ormation draining from the Caldera to the north, and the fault ystem extending north-northeast to the vicinity of Cañones.

Also of significance is the geology in the vicinity of the Jemez River, where a greater probability of discharge from the Caldera reservoir may exist. Exposed in the valley of the Jemez are Paleozoic and Mesozoic rocks which include limestone of the Magdalena group, while sandstone, siltstone and shale of Permian and Triassic age are also exposed in the area. From Battleship Rock north-northeastward, these rocks are overlain by Tertiary valley-fill deposits and by lavas and tuffs.

Since the geology of the area is complex, the conditions stated above are somewhat of a simplification of the total picture. They are indicative of the possible problems associated with an analysis of the effects of withdrawing geothermal waters from the Caldera.

A pragmatic approach to the elements of surface and groundter hydrology, and to geochemical evaluations, was used in form-g preliminary conclusions in answer to questions surrounding

he possibility of interconnections between the Caldera and the Rio Grande system.

Water Bearing Characteristics of Geologic Formations

Moderate to low permeability characterizes most of the rocks of the area. Layers and bedding of the sedimentary rocks accentuate the differences in permeability which greatly influence the movement of groundwater.

Low discharge rates of the springs of the area are indicative of low permeabilities of the formation.

Water level profiles to the north, east and south (Figures 2, 3, and 4) through Caldera and beyond are indicative of the difference in permeability of the rocks of the region. A shallow circulatory system of fairly high permeability is indicated by the relatively flat gradient of the near-surface system in Valles Caldera. Down the slopes of the Jemez Mountains, outside the Valles, extremely steep water level gradients suggest very low permeabilities associated with moderately deep to very deep circulation systems.

Springs either occur along the contacts of the formations, or in the fault zones. Many of the springs flow only a few gallons per minute. The largest discharge is reported by Trainer[14] to be 300 gpm at Soda Dam Springs. Only 59 to 75 gpm can be measured directly at Soda Dam Springs, but a study of the streamflow suggests the larger flow. The next largest discharge is from Jemez Springs where Trainer[14] estimates 200 gpm.

Groundwater Movement Jemez Mountains Region

Data from wells and springs in the Jemez Mountains region form the basis for preparing a groundwater contour map (Plate I). Basic data pertaining to this portion of the study is compiled in Part 2 of Appendix II.

Data have been compiled in Part 2 of Appendix II for 248 observation points. These data are arranged in the Table in sequence according to Township, Range, Section and subdivision of section, commencing in Township 12 North, Range 2 East, N.M.P.M., and Section 14. The sequence is carried through Township 23 North, Range 5 East, Section 15.

If the location of the data point has been corrected during editing, or other corrections have been made, the change is footnoted in the Table.

Groundwater elevations are at their highest levels in the rim of the Valles Caldera on all sides except for the points where the Jemez River and East Fork of the Jemez penetrate the Caldera rim. From the high contours around the rim, groundwater levels indicate flow paths generally into the Valles of the Caldera and away from the Caldera on all sides, except to the southwest, where the pattern moves down the Canyons of the Jemez and East Fork, from the Valles through the breaches, to the lower elevations of San Diego Canyon, with indications of groundwater moving into the valleys of the Guadalupe and Jemez Rivers and Vallecito Creek.

Water level data for some of the Baca geothermal wells, obtained from well pressure surveys made by Union Geothermal Division, show levels to be 800 to 1200 feet below the upper groundwater levels. The data are summarized in Table 1. Field data are included in Appendix II as Part 1. These deeper water levels are shown as an area of red on Plate I.

TABLE 1

ELEVATION OF TOP OF WATER
IN BACA GEOTHERMAL WELLS WITH WELL HEAD PRESSURE ZERO

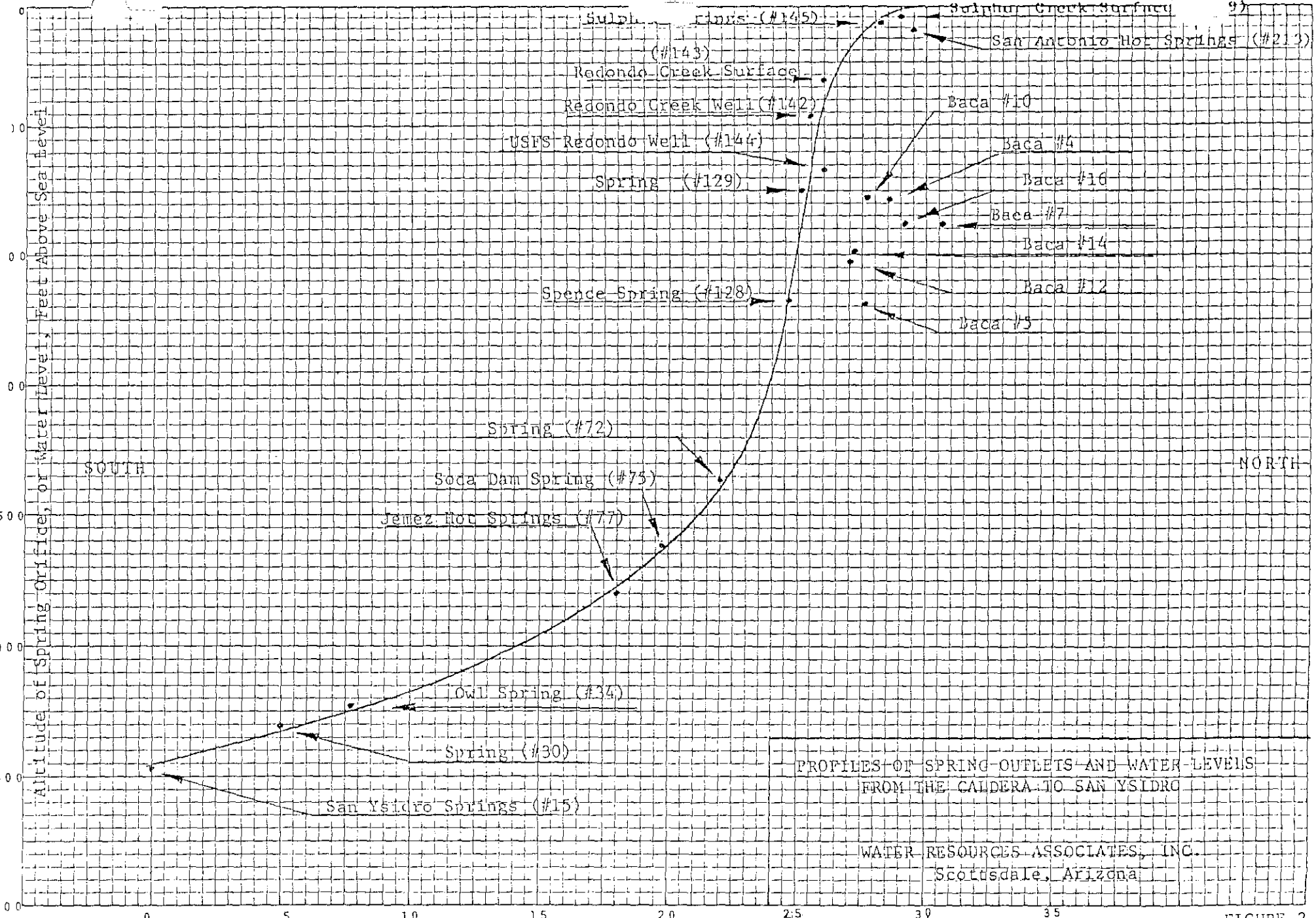
Well No.	Survey Date	Depth To Water (feet)	Well Head Elevation (feet)	Elevation Of Water Surface (feet)
Baca 4	5/28/73	1600	9318	7718
Baca 5	5/29/73	2000	9320	7320
Baca 7	7/31/74	1100	8720	7620
Baca 10	10/18/76 4/14/76	1000	8735	7735
Baca 12	8/24/76	950	8430	7480
Baca 14	2/9/75	1100	8605	7505
Baca 16	9/16/75	2000	9622	7622

To better illustrate the relations in and around the Valles Caldera, three water level profiles have been prepared, utilizing Plate I and data from Appendix II.

The first profile (Figure 2) is plotted from San Ysidro Springs to Sulphur Springs, a distance of about 29 miles, with a rise in elevation of 3000 feet. Water levels in the Baca wells are offset in their proper positions and distances in relation to the profile.

From the vicinity of Sulphur Springs to Soda Dam, the gradient of the water table is in the magnitude of 250 feet per mile (4.7%). Gradients in the Valles are approximately the same as the surface of the valley floors (0.5 to 1.0%). Below Soda Dam the gradient gradually flattens, ranging from 65 to 25 feet per mile.

The steep slopes above Soda Dam are indicative of the low permeabilities of the limestone and sandstone formations present in that area.



PROFILES OF SPRING OUTLETS AND WATER LEVELS FROM THE CALDERA TO SAN YSIDRO

WATER RESOURCES ASSOCIATES, INC.
Scottsdale, Arizona

FIGURE 2

Of considerable importance is the position of the water evels in the Baca wells. It is at once evident that water from the deep Caldera reservoir cannot discharge at Sulphur Springs or San Antonio Hot Springs. The nature of Sulphur Springs has been discussed earlier (page 5). San Antonio Springs is evidence that thermal springs can be the result of water in a relatively shallow circulation system, becoming warmed by hot rocks below, then discharging at spring openings.

Chemical interpretation suggests that a very small quantity of water from the Caldera reservoir could be discharging at Spence and McCauley Springs. Figure 2 indicates that there is a gradient, and with the possibility of connnection, probably by way of faults, small quantities of water from the deep reservoir could move to those springs.

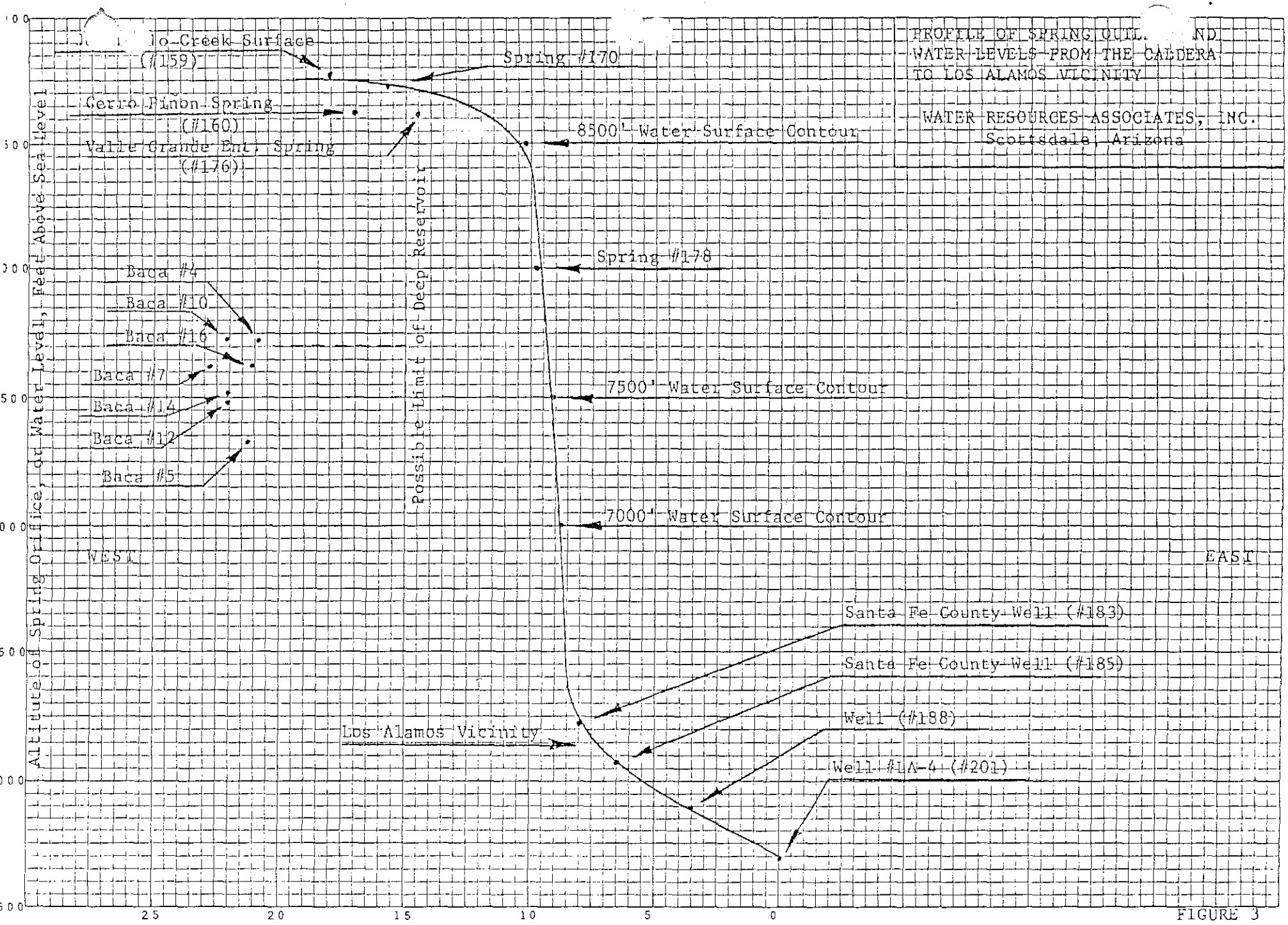
Warm springs at Soda Dam are fault controlled and issue from fractured rock. The water is moderately mineralized, and is high in both sodium chloride and calcium bicarbonate. This suggests iat deep Caldera reservoir water may be present, but is highly iluted with shallower circulation water, and that the combination has dissolved the calcium and bicarbonate from the limestone formation.

A low ridge of travertine ($CaHCO_3$) across the floor of San Diego Canyon forms the Soda Dam and was built by the waters of the warm springs. The flow of the springs has been diverted by highway construction and building of the dam has practically ceased.

Thermal springs along the Jemez River have a generally increasing temperature gradient downstream from McCauley and Spence Springs to the Jemez Hot Springs, with lower temperatures at Indian Springs and in the San Ysidro vicinity.

Figure 3 is a water level profile extending from the Los Alamos well field to within two or three miles of the Baca well field. Position of the water level measurements in the Baca well is shown.

Probable eastern limit of the deep reservoir as suggested by geologists of Union Geothermal Division is approximately


PROFILE OF SPRING OUTL[illegible]ND WATER LEVELS FROM THE CALDERA TO LOS ALAMOS VICINITY
WATER RESOURCES ASSOCIATES, INC.
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[illegible]lo Creek Surface (#159)
Spring #170
Cerro Pinon Spring (#160)
Valle Grande Ent. Spring (#176)
8500' Water Surface Contour
Spring #178
Baca #4
Baca #10
Baca #16
Baca #7
Baca #14
Baca #12
Baca #5
Possible Limit of Deep Reservoir
7500' Water Surface Contour
7000' Water Surface Contour
WEST
EAST
Santa Fe County Well (#183)
Santa Fe County Well (#185)
Well (#188)
Well #LA-4 (#201)
Los Alamos Vicinity
Altitude of Spring Orifice, or Water Level, Feet Above Sea Level
500
000
500
000
500
000
500
000
500
25
20
15
10
5
0
Miles From Well LA-4

FIGURE 3

miles east of Redondo Canyon near the west flank of Cerro del Medio. It has been suggested that geologic conditions in the vicinity of Cerro del Medio probably inhibits flow eastward from the deep reservoir.

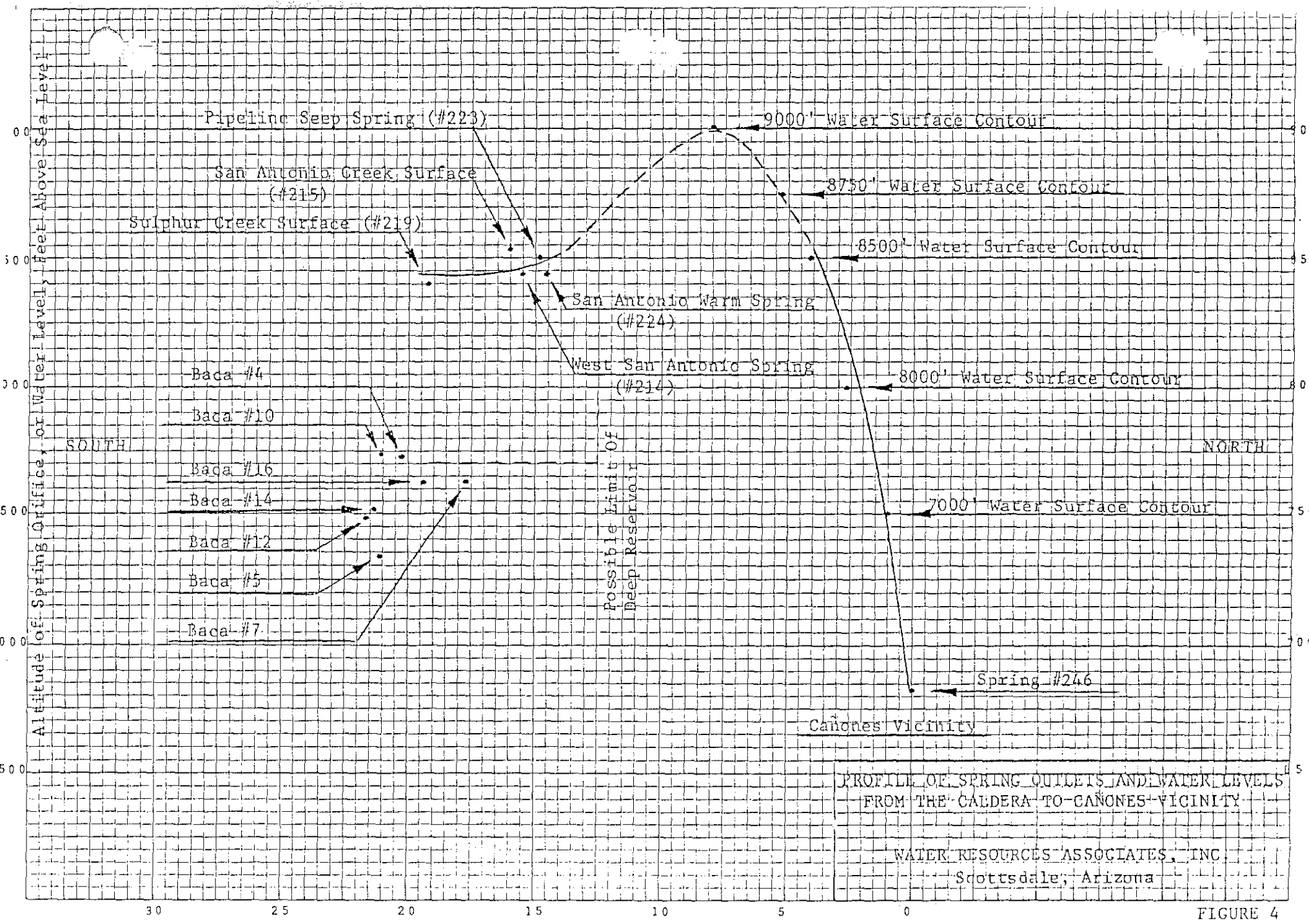
This profile supports conclusions by Conover and others[1] and Purtymun and Cooper[4], that the Valle Grande is the recharge area for the Los Alamos well field. It also supports the conclusion that deep Caldera reservoir water is not moving eastward either to the Los Alamos area or the Rio Grande.

Figure 4 is a similar profile from the vicinity of Cañones to the Sulphur Creek area. This profile indicates the possibility of a groundwater divide along the northern rim of the Valles Caldera, with none of the shallow circulating water moving out of the Valles in that direction. It also indicates that the possibility of water moving from the deep Caldera reservoir to the north is precluded by the low permeability of the formation making up the north slope and the lack of gradient required, assuming that there would be seepage out of the deep reservoir in that direction.

To the west, a groundwater ridge lies between the San Antonio drainage and that of Rio Cebolla and Rio Guadalupe. There are no geothermal springs nor springs with waters having unusual chemical characteristics in the Rio Guadalupe drainage. Tentatively, it is concluded that westward movement from the Valles Caldera is not possible. Other investigators raise the possibility of very deep circulation from the Caldera reservoir to the areas of geothermal activity in Rio Salado drainage.

The only other area on the southern slopes of the Jemez Mountains, where the contours indicate that groundwater is discharging into and supporting a live stream is along Vallecito Creek, which drains out of the Paliza Canyon area. This tributary heads outside of the Caldera on the south slopes of the Jemez Mountains. Chemical quality indicates a shallow circulation system in this area.

Other than the conditions described in the west and south-southwest portion of the Jemez Mountains, groundwater contours



PROFILE OF SPRING OUTLETS AND WATER LEVELS FROM THE CALDERA TO CAÑONES VICINITY

WATER RESOURCES ASSOCIATES, INC.
Scottsdale, Arizona

FIGURE 4

generally respond to the gradient of the slopes along the flanks of the Jemez range.

Water levels in the vicinity of the Los Alamos well field indicate that there has been a net withdrawal of water from that region which is causing some modification of groundwater contours in that area.

Hydrochemistry

The term hydrochemistry has a somewhat broader implication than the term geochemistry. Natural waters issuing from or flowing on the earth all have chemical constituents. Rain or snow falling on the earth is almost, but not quite, free of chemical constituents. When precipitation reaches the earth, most of it (before flowing into the surface streams) passes through soil or earth to varying degrees. The length of time which the water is in the soil or earth, and the types of formations that it comes in contact with, determine the concentration and type of constituents found in the water when it reaches the surface.

The longer the water is in circulation in the earth, the higher the concentration of dissolved solids is apt to be. Also, the type of formation it is in contact with over extended periods of time influence the chemical character of the water; that is, th relationship of the ions to one another, which determines the character of the water.

Within the Jemez Mountains region there is a wide range of chemical characteristics of the waters. Because of the differences in character, the investigator is provided a tool for evaluating both qualitatively and quantitatively the sources of water, how they mix, and the relations of one to another.

As a means of classification of the mineral content of the springs, wells and surface flows in the area, Stiff diagrams of the chemical composition were prepared for each site (Appendix III). Of the many possible tools for identification of water types[3], this system permits easy appraisal of the balance of the cations and anions in the analyses and enables partial

analysis to be utilized when needed. These diagrams involve plotting of the millequivalent parts of the cations (sodium plus potassium, calcium, and magnesium) on one side, opposite the millequivalent parts of the anions (chloride, bicarbonate plus carbonate, and sulphate) on the other side.

The spread of the diagram is a function of the concentration, but the pattern itself is the actual classification. Although other ions are often present in waters of the region, most chemical analyses include only the above cations and anions which represent more than 95 percent of the constituents.

In the region surrounding the Valles Caldera, several patterns of both the cations and anions occur and are show in Figure 5. The deep, slowly circulating waters are those with high sodium and chloride and/or sulphur ions predominating. The shallow circulating waters are predominately bicarbonate waters with high calcium and/or sodium concentrations.

The above classification does not conflict with other investigators or publications covering the area, as their concern was with the location of the occurrence of the water types rather than the circulation system.

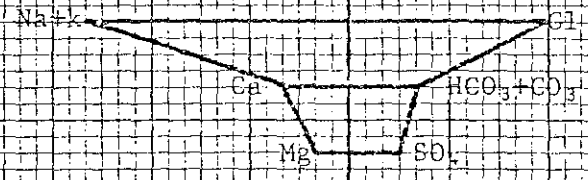
On the assumption that an unknown amount of leakage does occur into the Caldera and that it drains into either the groundwater or streamflow drainage system, the quality of water in the region was examined to determine what changes occur and where the discharge of such water would take place.

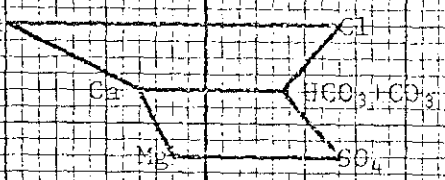
The complex series of rocks in the Caldera suggest a complex mineral water effluent from the region. Examination of the mineral content of water in each geologic formation and in the surface streams shows a wide variation of mineral content and concentration, indicating shallow, intermediate and deep sources of circulation.

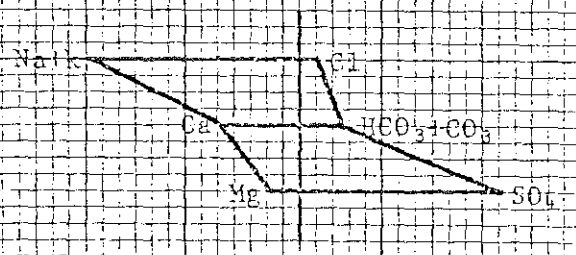
The type of circulation system permits, in general terms, the time for effects to be felt on surface flows by groundwater use. Effects through the shallow system could be within a few years to several tens of years. In the intermediate system, it

TYPES OF WATER IN JEMEZ MOUNTAINS
AS INDICATED BY STIFF DIAGRAMS

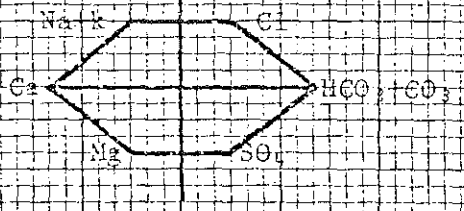
DEEP WATERS

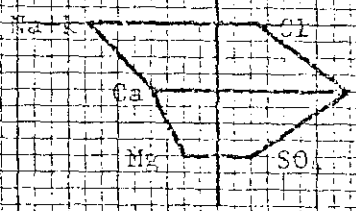






SHALLOW CIRCULATING WATERS





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Scottsdale, Arizona
January 1977

FIGURE 5

may require from a few tens of years to hundreds of years; while in the deep circulation system, it is probably in the order of several hundred to many tens of thousands of years.

The quality evaluation coupled with the groundwater flow pattern provides evidence as to the source and movement of water in the Jemez Mountains region. There are a number of different ways to develop this concept, only a few of which have been used in this study. The parameters that have been used are the total dissolved solids, the sodium ion, and one trace element, arsenic. General patterns, as shown on Figure 5, in the relationship to shallow, intermediate and deep circulation systems and particularly to geothermal waters, have been studied.

Evaluation of Water Quality

Separation of that water in the shallow circulation system which flows in the active hydrologic cycle (precipitation, temporary groundwater storage, and runoff to stream flow) and that in the deep, slowly circulating system is based on the mineral constituents of the water. Water from geothermal regions and deep mines contain minerals from the host rocks in varying amounts.

Waters circulating in Precambrian granite contain large amounts of sodium with minor quantities of calcium and magnesium as cations, and considerable amounts of chloride and/or sulphate with small quantities of bicarbonate as anions. Other trace elements, their number depending on the mineralization of the host, are contained in the water. Concentrations of these trace elements will range from a few parts per million to a few parts per billion.

In the Jemez Mountains, the water quality fits these patterns, except that there is considerable mixing of calcium bicarbonate components with other types in certain areas. In other words, there are three types of water, a shallow circulation system of calcium bicarbonate water, an intermediate zone of mixed water, and a deep zone of very low circulation which are predominately sodium-chloride/sulphate waters.

Few uncontaminated waters from deep sources have been analyzed for identification of the pattern. In this determination, most weight has been given to deep sample analysis of LASL Hole A at a depth of 2,410 feet, and the fluid production of the Baca steam wells. Groundwater having this pattern also occurs in deep wells 30 to 50 miles west of the Caldera in the Rio Puerco drainage basin, and their overflow may occur in the Rio Salado.

Special attention has been given in all aspects of the chemistry, to the area in the vicinity of San Ysidro where Rio Salado joins the Jemez River. The reason for this consideration is that V. C. Renick[9] suggested that that particular area was a discharge point for waters originating in the Valles Caldera. More recently, investigators, including Trainer,[14] are keeping the possibility open that geothermal activity in the Rio Salado and near San Ysidro may be associated with the deep Caldera reservoir.

Dissolved Solids Measured by Conductivity

The electric conductivity (EC) of water is frequently used s a measure of the total dissolved constituents. It is roughly 1.5 times the dissolved solids in parts per million. All data points where electric conductivity has been reported were plotted on the location map and is presented as Plate II.

Water with EC of less than 1,000, for the most part, are fairly representative of shallow groundwater in the northern New Mexico area from which a substantial portion of the potable supplies are derived. On Plate II, areas where groundwaters have less than 1,000 EC have been left unshaded. The area where the conductivities range generally from 1,000 to 5,000 have been shaded green. Concentrations of dissolved solids resulting in conductivities of greater than 5,000 have been shaded red.

The red areas in the vicinity of the Valles Caldera are for the deep Caldera reservoir (Baca wells) and the LASL test holes. In the vicinity of San Ysidro, the high concentration waters are found in wells and springs of the area. The analyses from the Shell deep test may not be representative of formation waters and

it is presumed that the TDS at that location and depth may be ...ewhat higher than reported.

Surface flows are highly diluted by good quality water from the Valles and are not represented by Plate II.

Plate II supports the conclusions drawn from Plate I, Groundwater Contours, in that it shows that waters of higher concentration do not move out of the Caldera except along the Jemez River Valley. It shows that the highest concentrations are in the deep wells in Redondo Canyon and Sulphur Creek and to the west in the deep wells of LASL. The only other areas having waters of that high concentration are in the vicinity of San Ysidro and to the southeast of San Ysidro in a deep well drilled by Shell Oil Company.

Plate II also supports preliminary conclusions that the water along the Jemez Valley in San Diego Canyon and below, are highly dilute mixtures of deep, slowly circulating Caldera waters with more rapidly circulating waters of the upper formation.

There are evidences that over a long period of time the ...ldera has been gradually sealing. Evidence of prehistoric springs in the San Ysidro area support that, together with the fact that the mineral springs in that area have gradually been drying up in recent years. It is possible that the sealing process may be well advanced in the Caldera area, and the mixing process evident in the Jemez Valley is a combination of leaching of formerly deposited salts from earlier drainage of the Caldera, together with remaining leakage from the Caldera.

Waters of Shallow and Deep Circulation

In order to illustrate the occurrence of moderate to deep circulation systems described above, waters which are predominately sodium have been plotted on Plate III. It shows that the high concentrations of sodium chloride, which are characteristic of deep Caldera reservoir waters, occur only in wells mostly of considerable depth, or at springs along the Jemez River. There is ... evidence of water of this character at the surface. It occurs ... the Baca well field, in the Sulphur Springs wells, and at

three other wells (LASL tests) on the perimeter of the Caldera. Otherwise it is found at the springs or in wells nearby the springs, or in deep wells, such as the Shell Oil test.

The only exception of surface water occurrence is at stream gaging stations which have been maintained at the mouth of the Jemez River. All the rest of the waters for which there are analyses in the area fall within the classification of shallow groundwater circulation systems. The springs display evidence of being in the intermediate system where mixing occurs in varying degrees.

Mixed Waters

The preceding presentation has shown that probably most of the waters in the Jemez Valley are mixed waters. The deep water is coming either through contact zones of the sediments or faults. Trainer[14] has suggested that the mixture of the deep and shallow waters at springs in the Jemez region might vary in the ratio of 10 to as much as 60 at the springs. If this is the case, the mixing ratio in the surface supply at measuring points in the Jemez Valley would be many times greater. This means that the quantity of water coming from the Caldera into the stream system is probably very small. Two questions would have to be answered. One, how much is draining from the Caldera at the present time, and, two, how much may be redissolved in the circulation of the shallow water from formerly deposited salts?

Trace Elements and Determination of Water Sources

Many elements are found in the ground and surface waters in the region surrounding the Caldera. Most occur in concentrations from a few parts to many tens of parts per billion, and seem to be related to the mineralization of the entire Rocky Mountain Range. Radioactivity in the form of Alpha and Beta activity as well as dissolved uranium occurs in minute amounts throughout northern New Mexico.

Dissolved uranium in parts per billion is highest in Sulphur Creek (0.7), lowest in Redondo Creek (0.1) and intermediate in

n Antonio Creek above Sulphur Creek (0.4). However, radioactivity and dissolved uranium cannot be used as tracers of groundwater movement or indicators of sources of groundwater in that highest radioactivity is associated with hot systems dominated by calcium carbonate or bicarbonate, and much lower activity associated with siliceous and tuffaceous rocks. Fast movement of water in rocks of greater permeability have lower activity than slow moving flows in rocks of low permeability.

Dissolved Silica

Concentrations of SiO_2 in groundwater is more representative of temperature in the host rock, than an ingredient of magmatic or deep seated water sources. Assuming the silica content of the groundwater is derived entirely from quartz, and not decreased by dilution nor concentrated through boiling or escape of steam, a water containing 100 mg/L of SiO_2 would have originated in a host rock having a temperature of about 220°F.

Few springs or water supply wells in the region have silica concentrations exceeding 100 mg/L and therefore most are assumed to be derived from or possibly diluted in shallow circulation systems. Three springs at the resort of Jemez Springs report silica content from 146 to 324 ppm and, using the silica geothermometer, the host rock may have had a temperature as high as 380°F.

However, fluid production from the Baca steam wells have SiO_2 concentrations ranging from 160 to 963 mg/L indicating a hotter host and possibly a deeper circulation system. Least concentrations occur at Baca No. 4 and strongest at Baca No. 13.

Silica has not been used as an indicator of the deep circulation system in this investigation.

Arsenic

The occurrence of arsenic in the waters of the region was investigated because of its wide distribution as a minor element, its stability in ionic exchange and its association essentially with Precambrian rocks. Plate IV shows the concentration of

arsenic, where known, as numbers (parts per billion). Except for the area in the Jemez River Canyon, and the San Ysidro Spring area, the concentrations are low. Waters containing fairly high concentrations of arsenic are also found in the Rio Salado and Rio Puerco drainages.

The occurrence of trace amounts of arsenic is not unusual. Although it is not always tested for in water samples, there are enough analyses to indicate how minor it is in most areas. Included with the basic data in Appendix II, Part 4, are reported occurrences of Arsenic and Chloride in areas of New Mexico where geothermal anamolies exist. The data are shown on a map produced by the New Mexico State Bureau of Mines and Mineral Resources (compiled by W. K. Summers, January 1972), and reproduced as Plate V of this report. These data are in mg/L.

It shows the wide spread occurrence of Arsenic, mostly in the valley of the Rio Grande and the Mimbres and Upper Gila River basins. Except in the Jemez area, concentrations range from less than 10 to about 40 parts per billion, as compared with the 4,000 to 4,500 ppb in the Baca wells.

Because of the very high concentrations of arsenic in the deep Caldera reservoir, its relative stability and available analyses at the springs of the Jemez, mixing ratios have been computed and applied to spring discharge quantities to provide an estimate of possible discharge from the deep reservoirs to the Jemez valley.

Table 2 presents a preliminary computation of discharge from the deep reservoir to the surface waters of Jemez River.

TABLE 2

	Arsenic (ppb)		Deep Source (gpm)
Baca wells	4,000		
Jemez Springs 200 gpm	780		
Ratio		.195	39
Soda Dam 300 gpm	1,100	.275	82
McCauley Springs 500 gpm	17	.00425	2
Spence Springs 56 gpm	.70	.0175	1
Estimated from other sources			40
			164
Base Flow Of Jemez River Near Jemez	50		
Q = 27 cfs			
= 12,150 gpm		.0125	152

For the purposes of computing effects on the River of withdrawals from the deep reservoir, 164 gpm was taken as deep Caldera reservoir water reaching the Jemez River.

Groundwater Hydraulics

To arrive at a preliminary estimate of the effect of withdrawals of hot water from the deep Caldera reservoir, a mathematical model was set up, based on a flow net of idealized boundaries and conditions.

Derivation of the model is not presented. The result is as follows:

$$\tfrac{1}{2}Q = T\left[\Sigma\left(\frac{rg}{\sin\theta} - rg\right)\left(\frac{\tan\theta(\Delta\theta)}{(\pi-\theta)}\right)\right]$$

For θ in radians

or in words

$$\tfrac{1}{2}Q = T\left[\Sigma\left(\frac{\Delta \text{ head}}{\text{streamline length}}\right)(\Delta \text{ arc length})\right]$$

start with initial elevation of water table at Caldera rim.

Where:

- T = Transmissivity in ft^2/day
- r = Radius of Caldera
- g = Gradient of stream channel
- θ = Angle measured from a line perpendicular to the direction of flow of the stream source.

Using T = 14 ft^2/day

θ → 33° to 89.5° →	1117.702
θ → 76° to 89.5° →	82.115
Σ →	1199.82 cfd
=	6.23 gpm

$$T = 14 \times \frac{163}{6.23} = 366.103 \text{ ft}^2/\text{day}$$

Results of the computation, based on net withdrawal of water to supply one 55 megawatt unit are as follows:

Year	Δrg	Discharge From Caldera (gpm)	Depletion (gpm)
0	0	164	0
71	10	132.75	-31.25
143	20	115.92	-48.08
214	30	107.10	-55.90

Figure 6 presents the results of the above computations.

No account was made in this computation for induced recharge to the Caldera because of this depletion.

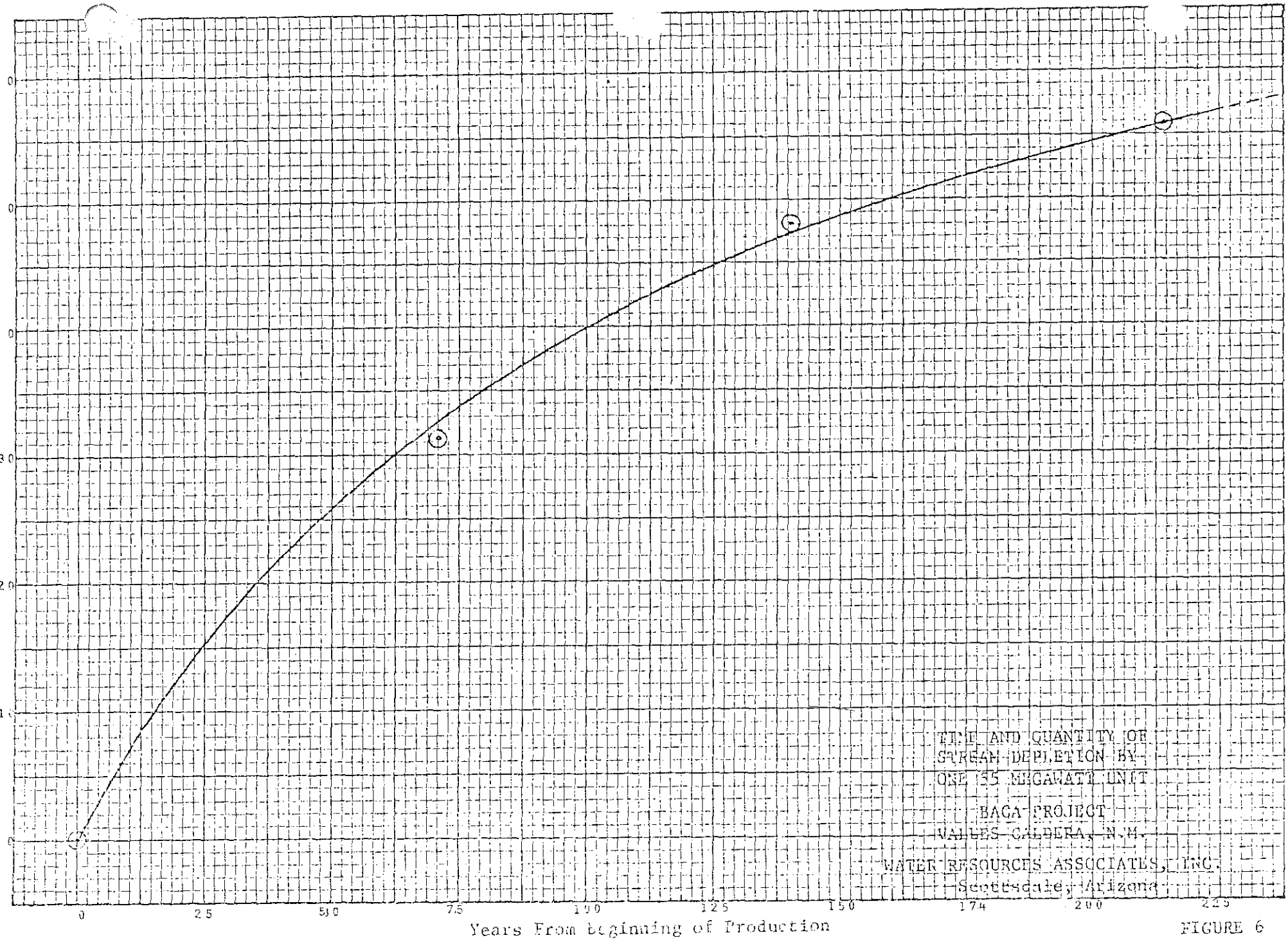
The above computation should be considered as a first approximation to the problem. However, it is felt to be of the right dimension, as is the magnitude of deep Caldera water reaching the stream system.

Utilizing Figure 6, it appears that stream depletion in 25 years by one 55 megawatt unit might be about 15 gpm (24 af/yr) and by 50 years would be approximately 26 gpm, or 42 acre feet per year. On that basis, it might be necessary to retire approximately 19 acres of irrigated land in 25 years and 38 acres in 50 years.

Heavy industries, particularly mining companies, in New Mexico, are purchasing irrigated lands and banking them, for later transfer of water. That procedure is permissible and desirable.

APPENDIX I

Streamflow Data


0
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75
100
125
150
174
200
225
Years From Beginning of Production
TIME AND QUANTITY OF
STREAM DEPLETION BY
ONE 55 MEGAWATT UNIT
BACA PROJECT
VALLES CALDERA, N.M.
WATER RESOURCES ASSOCIATES, INC.
Scottsdale, Arizona

FIGURE 6

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TABLE I-1. San Antonio Creek, Near Mouth — UOC Station

	Oct. '75		Nov. '75		Dec. '75		Jan. '76		Feb. '76		Mar. '76	
Days	depth	cfs	depth	cfs	depth	cfs	depth	cfs	depth	cfs	depth	cfs
1												
2												
3					1.33	16.94						
4					1.34	17.56						
5					1.35	18.19						
6			Clock stopped		1.16	6.27						
7					0.93	2.22						
8					0.90	1.97						
9					0.87	1.72						
10					0.78	1.06						
11			1.14	5.02	0.64	0.42						
12			1.12	4.27	0.34	0.01						
13			1.02	3.12	0.07	0						
14			0.88	1.80	0.01	0						
15			0.84	1.46	0.0	0						
16			1.25	11.92	0.01	0					Frozen	
17			1.20	8.78	0.04	0	Frozen		Frozen			
18			1.18	7.53	0.12	0.01						
19			1.26	12.54	0.18	0.01						
20			1.23	10.66	0.20	0.01						
21			1.14	5.02								
22			0.76	0.77								
23	1.09	3.92	0.42	0.02	Clock stopped							
24	1.04	3.34	0.48	0.08								
25	1.04	3.34	0.58	0.26								
26	F		0.83	1.38								
27	F		0.82	1.32								
28	1.06	3.57										
29	1.10	4.04	Frozen		Frozen							
30	Clock stopped											
31												

TABLE I-1 (cont.) San Antonio Creek, Near Mouth — UOC Station

	Apr. '76		May '76		June '76		July '76		Aug. '76		Sept. '76	
Day	depth	cfs	depth	cfs	depth	cfs	depth	cfs	depth	cfs	depth	cfs
1			1.26	12.54	1.08	3.80	1.15	5.64	1.41	21.95*		
2			1.24	11.29		(3.95)	1.19	8.15	1.39	20.70		
3			1.22	10.04		(3.75)	1.19	8.15	1.24	11.29		
4			1.22	10.04		(3.65)	1.15	5.64	1.17	6.90		
5			1.22	10.04		(3.7)	1.16	6.27	1.12	4.27		
6			1.29	14.43		(3.9)	1.12	4.27				
7	Frozen		1.82	47.67		(4.1)	1.10	4.04				
8			1.90	52.70		(4.7)	1.10	4.04				
9			1.68	38.89		(5.0)	1.10	4.04				
10				(29.5)		(4.9)	1.03	3.22				
11				(24.0)		(4.5)	0.99	2.82				
12	1.27	13.17		(19.0)	Clock stopped	(4.2)	1.06	3.57				
13	1.33	16.94		(16.8)		(4.1)	1.08	3.80				
14	1.32	16.31		(14.0)		(4.1)	1.17	6.90				
15	1.37	19.44		(12.5)		(4.0)	1.06	3.57				
16	1.49	26.97		(11.4)		(4.0)	1.04	3.34				
17	1.43	23.21		(11.4)		(4.0)	1.08	3.80				
18	1.44	23.84		(11.8)		(4.0)	1.11	4.16				
19	1.73	42.03	Clock stopped	(12.3)	1.10	4.04	1.03	3.22				
20	1.57	31.99		(13.2)	1.10	4.04	1.00	2.92				
21	1.46	25.09		(14.0)	1.10	4.04	1.04	3.34				
22	1.39	20.70		(11.6)	1.10	4.04	1.18	7.53				
23	1.35	18.19		(9.9)	1.12	4.27	1.19	8.15				
24	1.32	16.31		(8.0)	1.13	4.39	1.12	4.27				
25	1.29	14.43		(7.8)	1.11	4.16	1.24	11.29				
26	1.27	13.17	1.18	7.53	1.11	4.16	1.22	10.04				
27	1.26	12.54	1.15	5.64	1.11	4.16	1.24	11.29				
28	1.25	11.92	1.13	4.39	1.13	4.39	1.16	6.27				
29	1.25	11.92	1.10	4.04	1.14	5.02	1.12	4.27				
30	1.28	13.80	1.06	3.57	1.15	5.64	1.08	3.80				
31			1.03	3.22			1.07	3.69				
Total				463.23		126.7		165.5				
Mean				14.94		4.22		5.34				
				919		251		328				

TABLE I-1 (cont.) San Antonio Creek, Near Mouth UOC Station

Oct. '76

Day	Depth	cfs
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14	1.16	6.27
15	1.16	6.27
16	1.16	6.27
17	1.17	6.90
18	1.17	6.90
19	1.16	6.27
20	1.15	5.65
21	1.18	7.53
22	1.24	11.29
23	1.24	11.29
24	1.24	11.29
25	1.22	10.04
26	1.21	9.41
27	1.19	8.15
28		
29		
30		
31		

TABLE I-2. Redondo Creek, Near Mouth — UOC Station

12 Inch Parshall Flume

	Nov. '75		Dec. '75		Jan. '76		Feb. '76		Mar. '76		Apr. '76	
Day	depth	cfs	depth	cfs	depth	cfs	depth	cfs	depth	cfs	depth	cfs
1			0.24	0.46							0.26	0.52
2			0.18	0.32							0.26	0.52
3			0.18	0.32							0.28	0.58
4			0.18	0.32							0.27	0.55
5			0.18	0.32							0.27	0.55
6			0.17	0.30							0.26	0.52
7			0.17	0.30							0.28	0.58
8			F								0.27	0.55
9			0.17	0.30							0.28	0.58
10	0.28	0.58	0.17	0.30							0.28	0.58
11	0.23	0.43	0.16	0.28							0.28	0.58
12	0.27	0.55	0.16	0.28							0.29	0.61
13	0.31	0.67									0.29	0.61
14	0.23	0.43									0.28	0.58
15	0.24	0.46									0.29	0.61
16	0.24	0.46									0.30	0.64
17	0.25	0.49									0.27	0.55
18	0.20	0.35							clock stopped		0.30	0.64
19	0.09	0.16									0.40	0.99
20	0.28	0.58					Frozen				0.36	0.84
21	0.30	0.64									0.35	0.80
22	0.30	0.64									0.33	0.74
23	0.29	0.61			Frozen				0.26	0.52	0.31	0.67
24	0.27	0.55							0.27	0.55	0.31	0.67
25	0.26	0.52	Frozen						0.27	0.55	0.32	0.70
26	0.26	0.52							0.26	0.52	0.31	0.67
27	0.26	0.52							0.27	0.55	0.30	0.70
28	0.25	0.49							0.27	0.55	0.29	0.61
29	0.25	0.49							0.25	0.49	0.30	0.64
30	0.25	0.49							0.25	0.49	0.31	0.78
31									0.24	0.46		

TABLE 1-2 (cont.) Redondo Creek, Near Mouth — USGS Station

	May '76		June '76		July '76		Aug. '76		Sept. '76		Oct. '76	
Day	depth	cfs	depth	cfs	depth	cfs	depth	cfs	depth	cfs	depth	cfs
1	0.32	0.70			0.17	0.30			0.16	0.28		
2	0.32	0.70			0.16	0.28			0.16	0.28		
3	0.35	0.80			0.12	0.21			0.16	0.28		
4	0.35	0.80			0.11	0.19			0.16	0.28		
5	0.35	0.80			0.14	0.24			0.16	0.28		
6	0.37	0.88			0.12	0.21			0.16	0.28		
7	0.50	1.39			0.14	0.24			0.17	0.30		
8	0.40	0.99			0.15	0.26			0.16	0.28		
9	0.38	0.91			0.18	0.32			0.16	0.28		
10	0.38	0.91							0.16	0.28		
11	0.37	0.88	Clock stopped									
12	0.33	0.74									Frozen	
13	0.34	0.77										
14	0.35	0.80										
15	0.37	0.88										
16	0.38	0.91										
17	0.39	0.95									0.11	0.19
18			0.20	0.35			Clock stopped				0.11	0.19
19			0.16	0.28							0.11	0.19
20			0.14	0.24					Frozen		0.11	0.19
21			0.12	0.21							0.11	0.19
22			0.21	0.38	Clock stopped						0.12	0.21
23			0.26	0.52							0.12	0.21
24			0.24	0.46							0.11	0.19
25	Clock stopped		0.23	0.43							0.11	0.19
26			0.21	0.38			0.18	0.32			0.11	0.19
27			0.19	0.33			0.17	0.30	0.17	0.30	0.11	0.19
28			0.18	0.32			0.17	0.30	0.17	0.30	0.11	0.19
29			0.17	0.30			0.16	0.28			0.11	0.19
30			0.18	0.32			0.16	0.28	Frozen		0.11	0.19
31							0.16	0.28			0.11	0.19

TABLE I-3. Sulphur Creek, Near Mouth — UOC Station

6 Inch Flume

	Nov. '75		Dec. '75		Jan. '76		Feb. '76		Mar. '76		Apr. '76	
Day	depth	cfs	depth	cfs	depth	cfs	depth	cfs	depth	cfs	depth	cfs
1									0.26	0.25	0.35	0.39
2									0.26	0.25	0.34	0.37
3									0.25	0.23	0.32	0.34
4									Frozen		0.32	0.34
5											0.30	0.31
6							Frozen				0.29	0.29
7									0.25	0.23	0.28	0.28
8									0.26	0.25	0.28	0.28
9									0.26	0.25	0.27	0.26
10									0.26	0.25	0.26	0.25
11	0.08	0.04					0.08	0.04			0.25	0.23
12	0.08	0.04					0.10	0.05	Frozen		0.25	0.23
13	0.07	0.04					0.11	0.06			0.27	0.26
14	0.07	0.04					0.14	0.09	0.27	0.26	0.26	0.25
15	0.06	0.03					0.12	0.07	0.29	0.29	0.34	0.37
16	0.05	0.02		Frozen					0.29	0.29	0.37	0.43
17	0.05	0.02							0.33	0.36	0.38	0.44
18	0.04	0.02							0.37	0.43	0.42	0.52
19	0.05	0.02							0.46	0.60	0.43	0.54
20	0.05	0.02	Frozen						0.44	0.56	0.46	0.60
21	0.05	0.02							0.46	0.60	0.44	0.56
22	0.05	0.02							0.49	0.67	0.40	0.48
23	0.05	0.02							0.51	0.71	0.38	0.44
24	0.05	0.02					Frozen		0.49	0.69	0.37	0.43
25	0.05	0.02							0.50	0.69	0.36	0.41
26	0.05	0.02							0.48	0.65	0.38	0.44
27									0.43	0.54	0.38	0.44
28	Frozen								0.37	0.43	0.39	0.46
29							0.27	0.26	0.35	0.39	0.40	0.48
30									0.33	0.36	0.40	0.48
31									0.35	0.39		

TABLE I-3 (cont.) Sulphur Creek, Near Mouth — UOC Station

	May '76		June '76		July '76		Aug. '76		Sept. '76		Oct. '76	
Day	depth	cfs	depth	cfs	depth	cfs	depth	cfs	depth	cfs	depth	cfs
1	0.39	0.46			0.01	0						
2	0.39	0.46			0.01	0						
3	0.40	0.48			0	0						
4	0.40	0.48			0	0						
5	0.45	0.58			0	0						
6	0.52	0.73			0	0						
7	0.53	0.76			0.01	0					clock stopped	
8					0.02	0.01						
9					0.03	0.02						
10												
11												
12			No record									
13												
14												
15											0.02	0.01
16											0.02	0.01
17									clock stopped		0.03	0.02
18											0.03	0.02
19			0.01	0							0.02	0.01
20			0.02	0.01							0.02	0.01
21			0.01	0			clock stopped				0.02	0.01
22			0.01	0							0.02	0.01
23	No record		0.01	0	Clock stopped						0.03	0.02
24			0	0							0.02	0.01
25			0	0							0.03	0.02
26			0	0							0.03	0.02
27			0	0							0.03	0.02
28			0	0							0.03	0.02
29			0	0							0.03	0.02
30			0.01	0							0.02	0.01
31											0.02	0.01

TABLE I-4. East Fork of Jemex River — UOC Station

4 Miles Above Mouth (1500' Above N.M. State Highway 4)

	Oct. '75		Nov. '75		Dec. '75		Jan. '76		Feb. '76		Mar. '76	
Day	depth	cfs	depth	cfs	depth	cfs	depth	cfs	depth	cfs	depth	cfs
1			1.40	4.74								
2			1.39	4.63								
3			1.38	4.52								
4			1.37	4.42								
5	1.40	4.74	1.36	4.31								
6	1.40	4.74	1.36	4.31								
7	1.39	4.63	1.36	4.31								
8	1.39	4.63	1.35	4.20								
9	1.38	4.52	1.36	4.31								
10	1.38	4.52	1.44	5.58								
11	1.40	4.74	1.52	7.25							Clock stopped	
12	1.40	4.74	1.33	3.98								
13	1.40	4.74	1.33	3.98								
14	1.40	4.74	1.32	3.88								
15	1.39	4.63	1.31	3.77								
16	1.39	4.63	1.29	3.59								
17	1.40	4.74	1.29	3.59					Clock stopped			
18	1.39	4.63	1.28	3.52								
19	1.39	4.63									1.12	2.46
20	1.39	4.63					Frozen				1.18	2.83
21	1.39	4.63									0.52	0.40
22	1.40	4.74									0.54	0.40
23	1.41	4.98									1.48	6.65
24	1.38	4.52			Frozen						1.79	14.03
25	1.43	5.45									1.73	12.60
26	1.36	4.31	Frozen								1.82	14.75
27	1.52	7.60										
28	1.38	4.52									Clock stopped	
29	1.37	4.42										
30	1.36	4.31										
31	1.37	4.42										

TABLE I-4 (cont.) East Fork of Jemez River — UOC Station

4 Miles Above Mouth (1500' Above N.M. State Highway 4)

	Apr. '76		May '76		June '76		July '76		Aug. '76		Sept. '76	
Day	depth	cfs	depth	cfs	depth	cfs	depth	cfs	depth	cfs	depth	cfs
1			1.67	11.17	1.59	9.27	1.54	8.08	1.71	12.13		
2			1.64	10.46	1.57	8.79	1.55	8.31	1.71	12.13		
3			1.62	9.98	1.56	8.55	1.54	8.08	1.63	10.22		
4			1.63	10.22	1.55	8.31	1.51	7.36	1.64	10.46		
5			1.74	12.84	1.55	8.31	1.53	7.84	1.67	11.17		
6			2.97	42.15	1.54	8.08	1.54	8.08				
7			3.01	43.10	1.55	8.31	1.53	7.84				
8			2.40	28.57	1.63	10.22	1.54	8.08				
9			2.19	23.56	1.62	9.98	1.57	8.79				
10			2.01	19.27	1.58	9.03	1.56	8.55				
11				(17.0)	1.58	9.03	1.54	8.08				
12	1.78	13.79	Clock stopped	(14.7)	1.56	8.55	1.56	8.55	clock stopped			
13	1.83	14.98		(13.2)	1.56	8.55	1.59	9.27				
14	1.89	16.41		(12.5)	1.55	8.31	1.51	7.36				
15	1.87	15.94		(11.9)		(8.3)	1.52	7.60				
16	1.98	18.56		(11.8)	clock stopped	(8.3)	1.53	7.84				
17	2.00	19.04	1.70	11.89		(8.3)	1.58	9.03				
18	2.36	27.61	1.71	12.13		(8.3)	1.56	8.55				
19	2.22	24.28	1.76	13.32	1.55	8.31	1.56	8.55				
20	2.07	20.70	1.84	15.22	1.56	8.55	1.58	9.03				
21	1.92	17.13	1.84	15.22	1.56	8.55	1.62	9.98				
22	1.86	15.70	1.75	13.08	1.59	9.27	1.65	10.70				
23	1.80	14.27	1.68	11.41	1.63	10.22	1.61	9.74				
24	1.76	13.32	1.65	10.70	1.60	9.50	1.65	10.70				
25	1.75	13.08	1.65	10.70	1.56	8.55	1.73	12.60				
26	1.74	12.84	1.65	10.70	1.55	8.31	1.69	11.65				
27	1.72	12.36	1.65	10.70	1.54	8.08	1.67	11.17				
28	1.72	12.36	1.65	10.70	1.54	8.08	1.68	11.41				
29	1.73	12.60	1.63	10.22	1.54	8.08	1.63	10.22				
30	1.72	12.36	1.60	9.50	1.54	8.08	1.64	10.46				
31			1.59	9.27			1.66	10.93				
Total				467.18		260.07		284.43				
Mean				15.07		8.67		9.18				
						516		564				

APPENDIX II

Basic Data

APPENDIX II

Part 1

Pressure Survey Data
Union Geothermal Division

6)

GEOTHERMAL DIVISION

R. O. ENGEBRETSEN

B4-56PT

SUBSURFACE PRESSURE SURVEY

FEB 25 1977

COPY

OWNER Union Oil Co of Calif. FIELD _____ WELL NAME Baca No. 4

CASING _____ ELEV. _____ DATE Mar 23, 1977

LINER DESCRIPTION: _____ ZERO POINT _____

_____ DEPTH _____

HOLE DESCRIPTION: _____

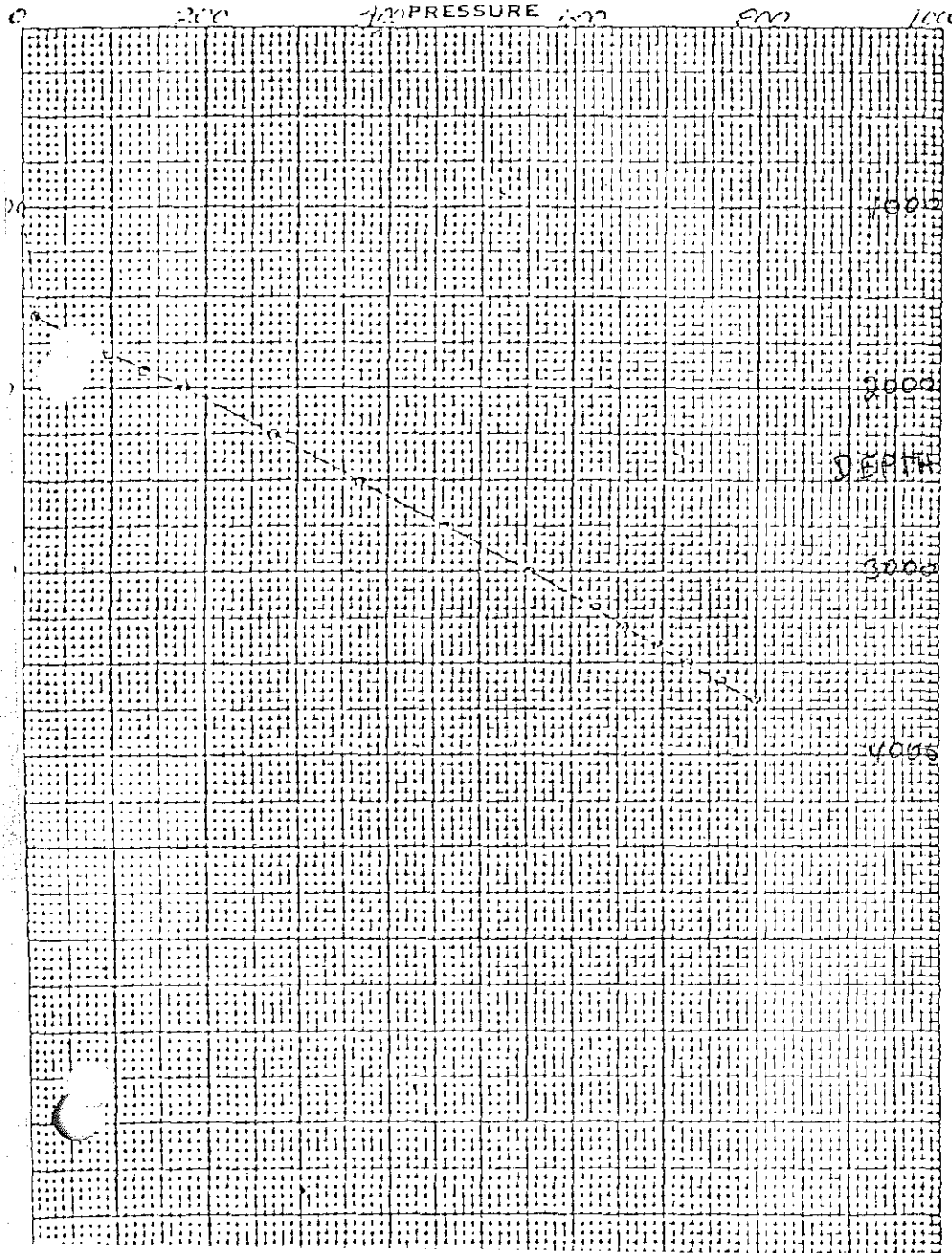
_____ INSTRUMENT 0-2000

_____ SERIAL NO 6602N

PURPOSE _____ MAX TEMP _____ °F @

REMARKS: _____

STABLIZATION PERIOD _____



PRESSURES	GAUGE	BOMB
CASING PSI		

DEPTH	PRESSURE	GRADIENT
1000	Nil	
1100	15.92	0.159
1200	57.55	0.416
1300	96.73	0.392
1400	137.14	0.404
1500	178.69	0.416
1600	220.91	0.422
1700	262.69	0.378
1750	284.90	0.423
1800	305.87	0.314
1850	327.85	0.341
1900	344.33	0.310
1950	370.05	0.357
2000	392.34	0.223
2050	414.90	0.315
2100	430.00	0.331

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GEOTHERMAL DIVISION

B5-59PT

SUBSURFACE PRESSURE SURVEY

O. ENGEBRETSEN

FEB 25 1977

OWNER Union Oil Co of Calif. FIELD _____ WELL NAME Bacn No. 5

CASING _____ ELEV. _____ DATE May 29, 1973

LINER DESCRIPTION: _____ ZERO POINT _____

_____ DEPTH 6400

HOLE DESCRIPTION: _____

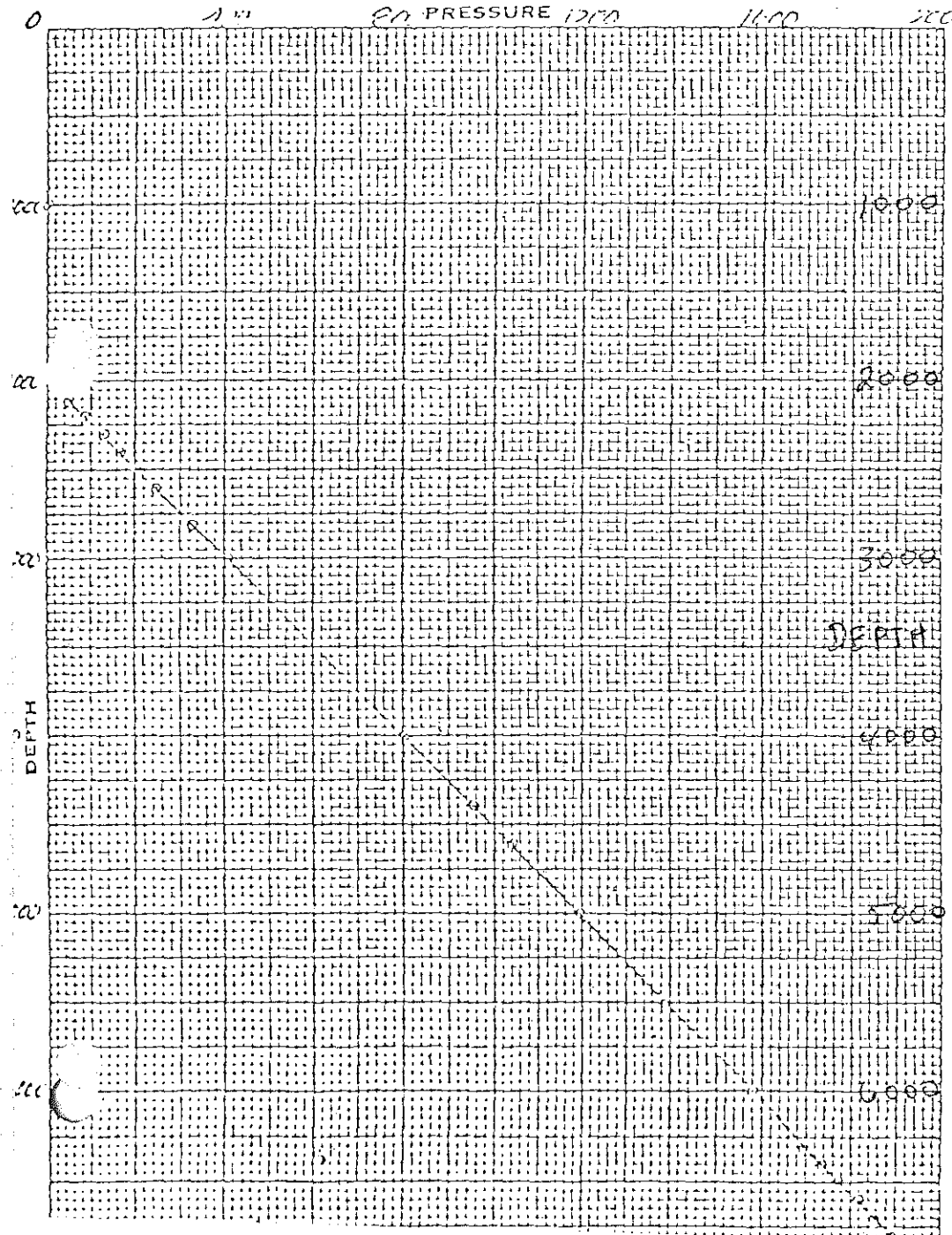
_____ INSTRUMENT 0-2400

_____ SERIAL NO 66041

PURPOSE _____ MAX TEMP _____ °F @ _____

REMARKS: _____

STABILIZATION PERIOD _____



PRESSURES	GAUGE	BOM
CASING, PSI		

DEPTH	PRESSURE	GRADIE
1000	2.15	0.002
2000	9.50	0.007
2100	51.13	0.716
2200	89.16	0.381
2300	129.50	0.404
2400	171.43	0.419
2500	209.39	0.359
2600	247.35	0.359
2700	325.35	0.780
3000	405.64	0.767
4000	801.19	0.395
4400	956.19	0.388
4900	1161.04	0.409
5000	1197.61	0.391
5500	1391.24	0.387
6000	1581.00	0.380
6300	1696.50	0.385
6400	1733.00	0.365
6500	1770.00	0.370
6600	1811.63	0.416
6700	1853.64	0.420
6800	1891.41	0.377
6900	1929.27	0.378

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GEOTHERMAL DIVISION

SUBSURFACE PRESSURE SURVEY

R. G. HANSEN & ASSOC.

FEB 25 1977

OWNER UNION OIL CO OF CALIF. FIELD VALLE GRANDE WELL NAME BACA #7

CASING 13 3/8" TO 504, 9 5/8" - 2902 ELEV. 9000 ± DATE 7/31/74

LINER DESCRIPTION: 7" - 2677' - 5515' ZERO POINT @ GL +8'

SLOT INTERVALS - 3209' - 5515' (TOKEN CUT) DEPTH 5445

HOLE DESCRIPTION:

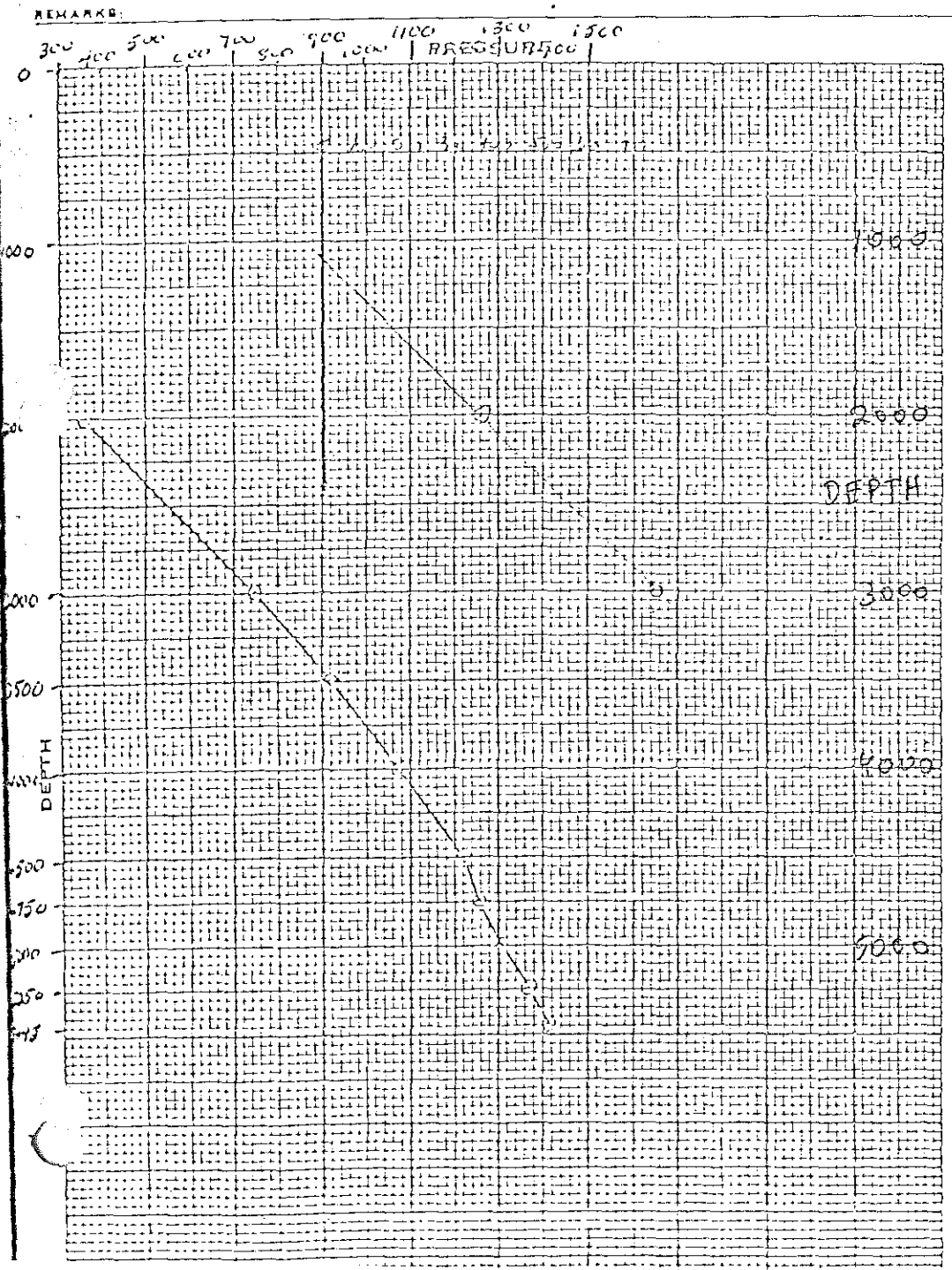
INSTRUMENT 0 - 4250 PSI

SERIAL NO 7198

PURPOSE REQUESTED BY GEOLOGISTS. MAX TEMP 463.5 °F @

REMARKS:

STABLIZATION PERIOD



PRESSURES	GAUGE	BOMB
CASING, PSI	0	0

DEPTH	PRESSURE	GRADIENT
2000	359.7	0
3000	742.6	.383
3500	911.7	.338
4000	1069.9	.305
4500	1215.2	.297
4750	1288.5	.194
5000	1307.2	.194
5250	1364.4	.229
5445	1411.0	.239

(6)

R. O. ENGEBRETSEN

FEB 25 1977

GEOTHERMAL DIVISION

SUBSURFACE SURVEY

Field Work Sheet

BHO-SHS-P/T.

OWNER UNION OIL CO. CALIF FIELD VALLE CALDERA WELL NAME BACA 10

CASING 20"@655'; 13 3/8"@2791' ELEV. 5734 DATE 10-13-76

LINER DESCRIPTION: 9 5/8"@4118 ZERO POINT GL+10'

7"@4275'-5859' DEPTH 5859'

LOGGING DETAIL:

PURPOSE

REMARKS:

P-O-M-650 PSIG. 9222 12hr 15

CEMENT T-100-792F SERIAL NO. 10088 CLOCK 12hr 15 TURN STABILIZATION PERIOD

ENGAGE STYLUS P-1130 T-1132 DISENGAGE STYLUS P-1530-T-1535

WELL HEAD 6.

PICKUP @ 5859' TIME ON BOTTOM 1442-1500 MAX. T 5430 5500'

WELL STATUS SHUT IN.

SHUT IN: ON PRODUCTION:

DATE

	PRESSURE					TEMPERATURE										
DEPTH	DEFL.	P-P	GRAD.	CORR	TIME	DEPTH	DEFL.	T-T	GRAD.	/D	TIME	DEPTH	DEFL.	P-T	GRAD.	/D
100	.103	8		-	1213	100	0	0								
1000	.185	14		-	1227	1000	.285	218								
2000	.50	380		-.001	1239	2000	.655	418								
3000	.511	736		-	1251	3000	1.126	507								
3250	.539	825		-	1302	3250	1.141	513								
3500	.576	913		-	1313	3500	1.151	515								
3750	.612	998		-	1324	3750	1.136	510								
4000	.719	1085		-	1335	4000	1.121	506								
4250	.755	1169		-	1344	4250	1.120	505								
4500	.822	1256		-	1357	4500	1.128	507								
4750	.859	1343		-	1408	4750	1.141	512								
5000	.895	1427		-	1419	5000	1.155	516								
5250	1.52	1514		-	1430	5250	1.210	534								
5500	1.570	1603		-	1441	5500	1.237	543								
5859	.732	1718		+.001	1500	5859	1.182	525								

COMMENTS:

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UNION

R. O. ENGEBRETSEN

GEOTHERMAL DIVISION

FEB 25 1977

SUBSURFACE SURVEY

Field Work Sheet

310 544 PIT

OWNER UNION OIL COMPANY FIELD VALLE CALIENTE WELL NAME JACK #16

CASING 20" AT 365'; 13⅜ - 2794 ELEV. 8754 DATE 2/24/77

LINER DESCRIPTION: 9⅝ AT 4413' ZERO POINT G.L. + 12'

7" AT 4275 DEPTH 5959

TUBING DETAIL: PERFORATIONS - 3500 - ?

PURPOSE

REMARKS:

EQUIPMENT 0-4000 PSI SN 7198 CLOCK - 12 HR 15 TURN

ELEMENT 80°-646°F SERIAL NO. 10052 CLOCK 12 HR 15 TURN STABILIZATION PERIOD

ENGAGE STYLUS P 1037 T 1003 DISENGAGE STYLUS P 1750 T 1732

WELL HEAD 1

PICKUP @ 5959 TIME ON BOTTOM 1627-1657 MAX. °F 502

WELL STATUS

SHUT IN: 2/21/77 ON PRODUCTION:

RATE

	PRESSURE				TEMPERATURE										
DEPTH	DEFL.	P-T	GRAD.	ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID	TIME	DEPTH	DEFL.	P-T	GRAD.	ID
	–	–		–	1452	100	.343	187								
0	.003	4.5		0	1505	1000	.469	226								
1000	.177	401		-.003	1517	2000	1.095	410								
3000	.342	757		-.003	1529	3000	1.437	504								
4000	.549	1111		T.001	1541	4000	1.425	501								
5000	.775	1457		T.004	1553	5000	1.445	506								
5500	.760	1637		+.005	1555	5500	1.542	532								
5500	.760	1637		+.005	1610	5500	1.542	532								
5500	.760	1637		+.005	1625	5500	1.542	532								
5959	.831	1786		+.009	1627	5959	1.408	496								
5959	.831	1786		+.009	1642	5959	1.408	496								
5959	.831	1786		+.009	1657	5959	1.408	496								

COMMENTS: RUN SURVEY AFTER SPERRY - SUN pulled ¼" tubing

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GEOTHERMAL DIVISION

R. O. ENGEBRETSEN

SUBSURFACE PRESSURE SURVEY

FEB 25 1977

G12 S29 P

OWNER UNION OIL COMPANY FIELD VALLE GRANDE WELL NAME BADA #12

CASING ELEV. 8430 DATE: 8/24/76

LINER DESCRIPTION: ZERO POINT Gr. Lvl

DEPTH 9211

HOLE DESCRIPTION:

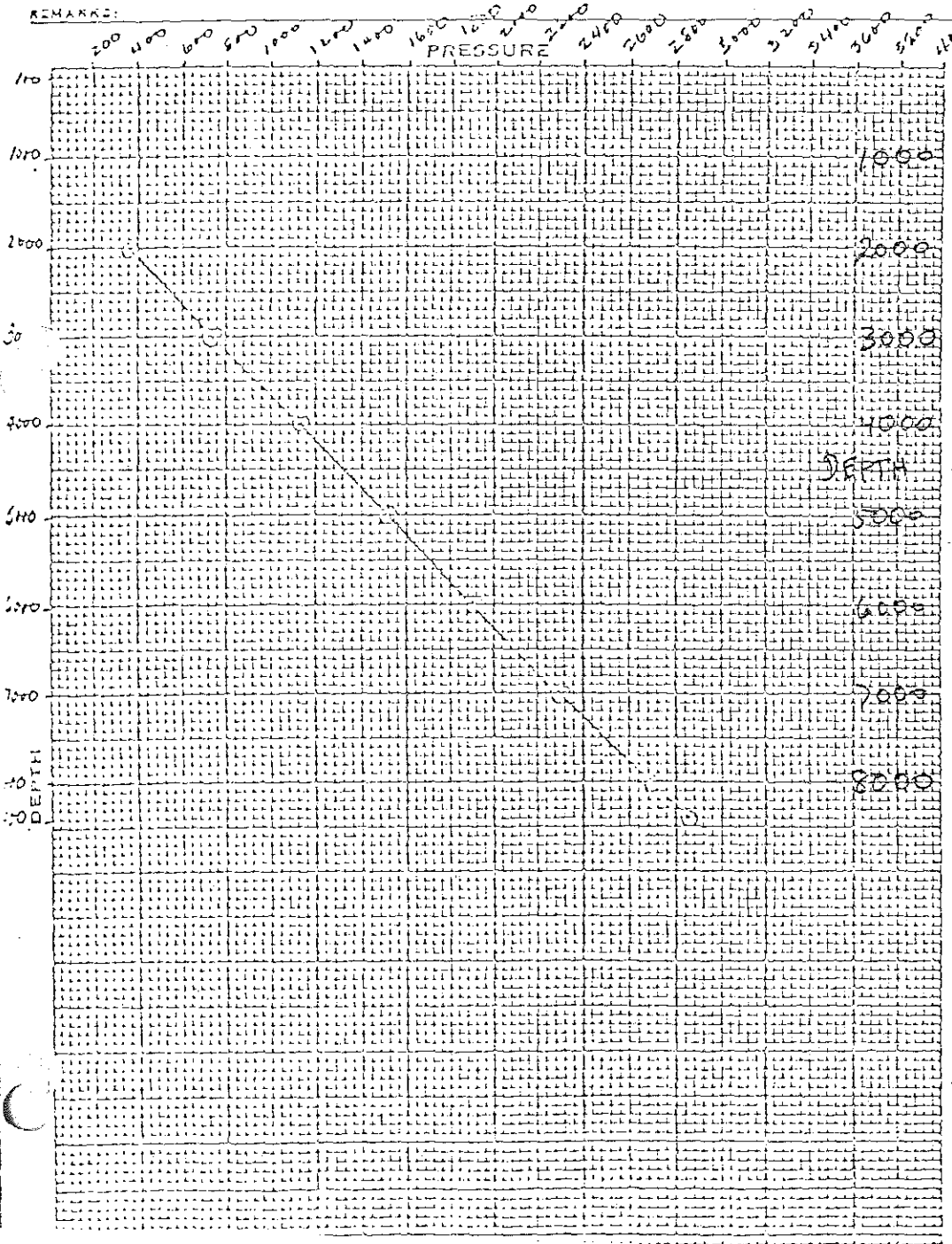
INSTRUMENT 0 - 4700 PSI

SERIAL NO. 15012

PURPOSE MAX. TEMP 579 °F @ 9400

REMARKS:

STABILIZATION PERIOD



PRESSURED	GAUGE	BOND
CASING, PSI		

DEPTH	PRESSURE	GRADIENT
0	0	
100	0	
1000	0	
2000	365	
3000	751	
4000	1154	
5000	1521	
6000	1911	
7000	2293	
8000	2655	
8460	2847	

R. O. EN ESPECIAL

FEB 25 1977

GEOTHERMAL DIVISION

SUBSURFACE PRESSURE SURVEY

B14-53-PIT

OWNER UNION OIL CO. OF CALIF. FIELD VALLE GRANDE WELL NAME BRADY #14

CASING 20" @ 193', 13 3/8" @ 1452' ELEV. 8604.8' DATE: 2/9/75

LINER DESCRIPTION: 9 5/8" HUNG - 1115'-3074' OPEN HOLE - 3074'-6532' ZERO POINT R.T.

DEPTH 6524'

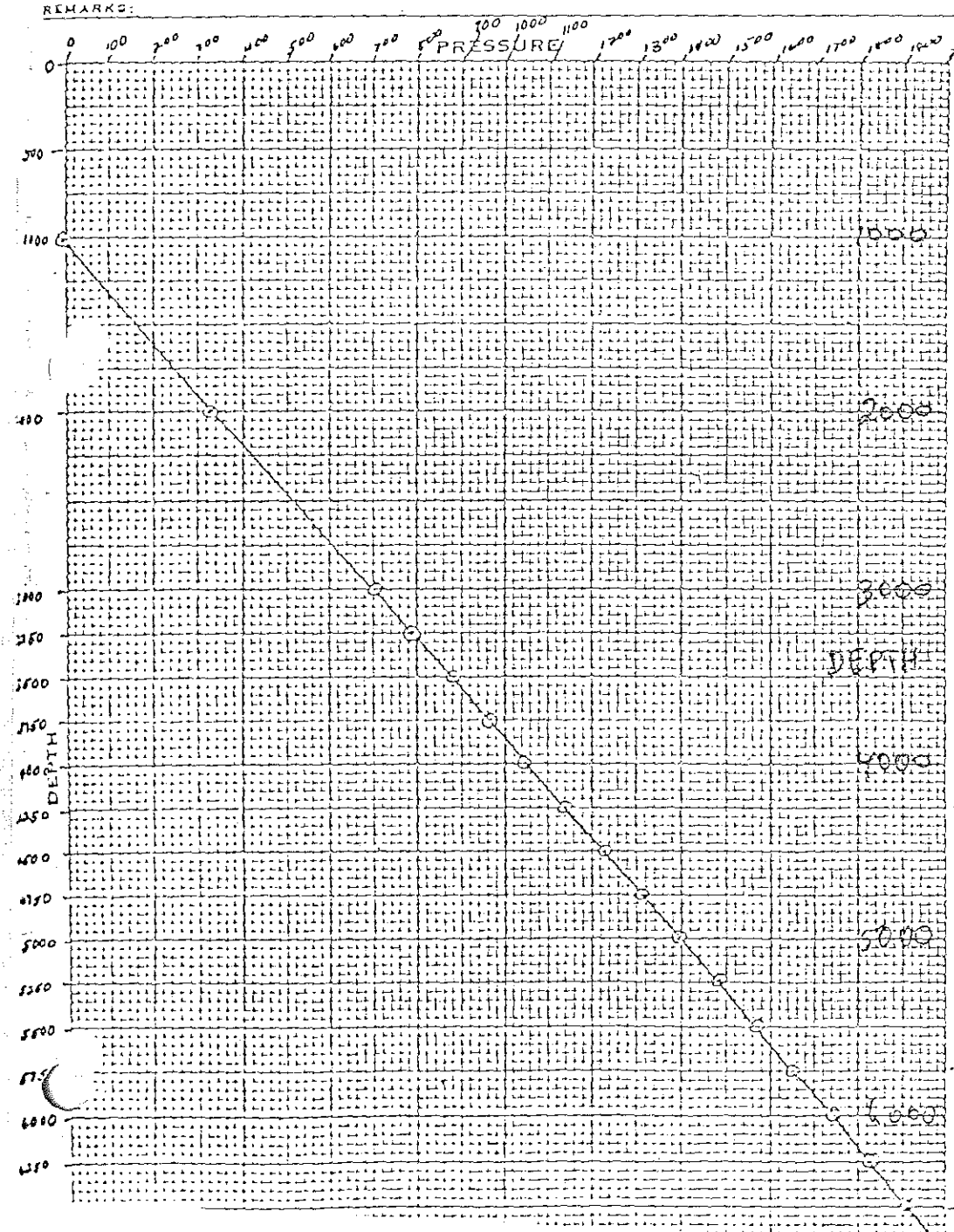
HOLE DESCRIPTION: -

INSTRUMENT 0-1125 PSI

SERIAL NO. 7198

PURPOSE RIG SURVEY. MAX TEMP 528.6 °F @ 6524'

REMARKS:



PRESSURES.	GAUGE	BOTTOM
CASING. PSI	0	0

DEPTH	PRESSURE	GRADIENT
1000	0	0
2000	331	0
3000	701.3	.370
3250	790.3	.356
3500	881.4	.364
3750	976.1	.339
4000	1050.4	.337
4250	1140.5	.362
4500	1229	.353
4750	1315	.344
5000	1399.2	.337
5250	1480.1	.327
5500	1570	.356
5750	1652.5	.330
6000	1746	.374
6250	1824.2	.313
6500	1911	.347
6750	2002	.364
6524	2030	.378

16

GEOTHERMAL DIVISION

SUBSURFACE PRESSURE SURVEY FEB 25 1977

B-16 S13 P

OWNER UNION OIL COMPANY FIELD VALLE GRANDE WELL NAME FEDA #16

CASING 9 5/8 AT 2905' ELEV. 9622' DATE: 9/16/75

LINER DESCRIPTION: 2905 - TD = OPEN HOLE ZERO POINT G.L. +10'

DEPTH 6950'

HOLE DESCRIPTION:

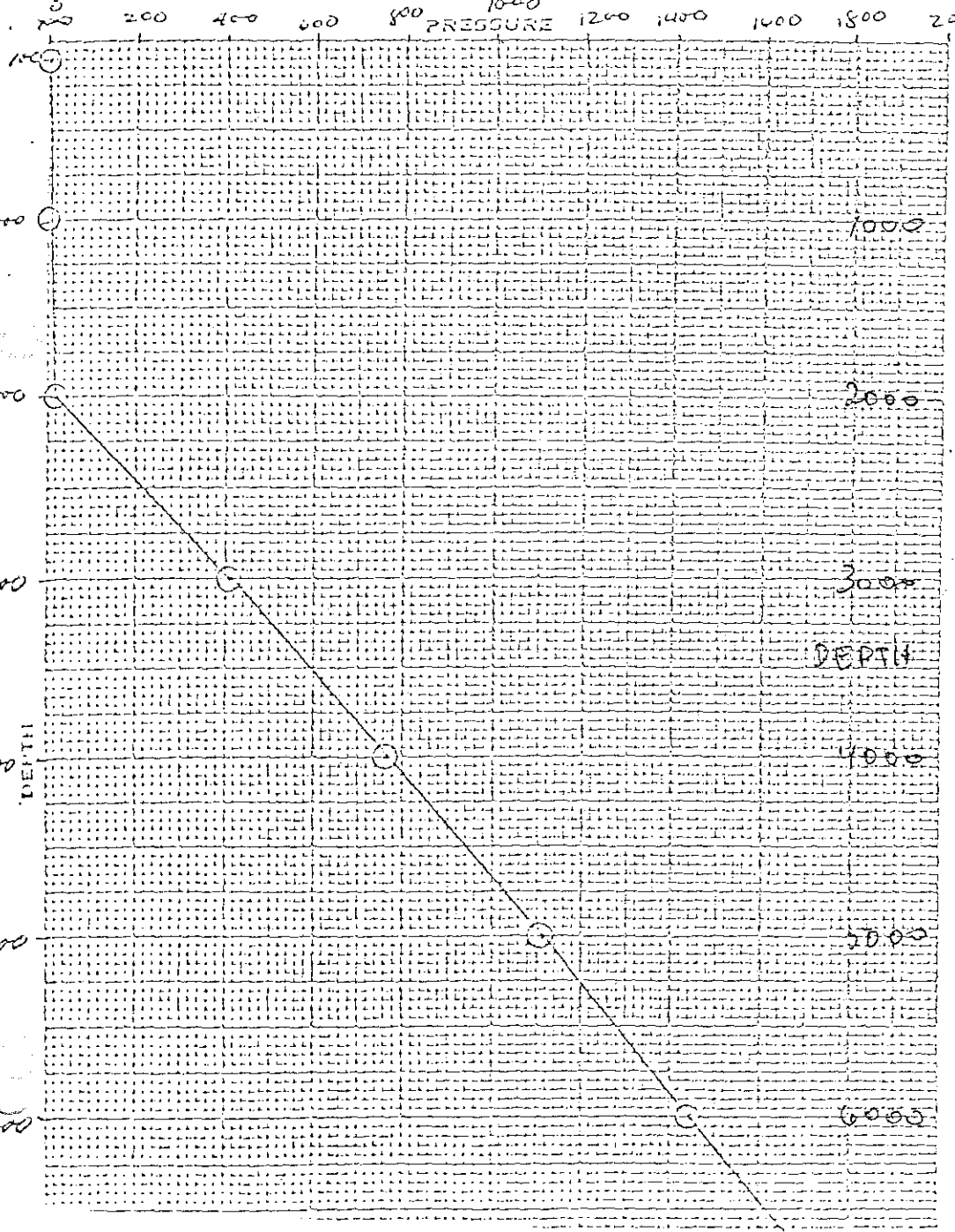
INSTRUMENT 0-4250

SERIAL NO 7199

PURPOSE MAX. TEMP ? °F @

REMARKS:

STABILIZATION PERIOD



PRESSURE	GAUGE	
CASING PSI		

DEPTH	PRESSURE	GRADIENT
100	13.4	
1000	16.8	
2000	20.2	
3000	409.9	
4000	769.1	
5000	1115.5	
6000	1445.3	
6950	1735.2	
6950	1743.6	
6950	1743.6	

APPENDIX II

Part 2

Selected Wells, Springs and Surface Water Gaging Stations

Depth To Water (ft)	Altitude of Water Level (ft)	Depth of Well (ft)	Source of Formation For Water	Temp. °F	Date Sampled	Total Dissolved Solids ppm	Electric Conductivity µmhos	pH	Rate of Flow (gpm)
637	4965		Santa Fe	67	12/12/74	265	367	--	1,000
373	4997		Santa Fe	55	12/12/74	267	352	7.4	650
		350	Santa Fe		4/27/65	343	501	7.8	
420	4936		Santa Fe	61	12/12/74	255	348	7.5	1,000
		96	Santa Fe		2/26/65	598	878	7.5	
		--	Santa Fe		1/21/65	457	666	7.5	
			Santa Fe	81	9/25/74	421	642	--	
		10,000		90	8/26/72	2,460	3,140	9.5	
			Santa Fe	78	9/25/74	548	749	6.6	
			Santa Fe	67	9/25/74	780	1,050	--	
			Santa Fe	71	9/25/74	1,420	1,880	6.4	
		98	Santa Fe		2/4/65	(691)	1,020	7.5	
			Wingate-Chinle	86	9/15/24	10,960	(16,800)	--	
			Penn Rocks	95	8/30/62	3,470	5,680	8.0	
			Chinle	64	10/18/74	--	20,000	--	
			Chinle	68	9/15/24	7,320	11,200	--	
			Chinle	63	5/2/73	6,650	9,950	6.5	
		335	Santa Fe		2/27/65	330	519	7.6	
			Santa Fe	63	4/4/74	332	490	7.9	
		82	Santa Fe		1/21/65	(872)	1,190	7.3	
			Chinle	70	6/5/73	7,760	10,100	8.5	2
			Chinle	126	6/5/73	11,100	15,700	6.8	85
			Chinle	79	10/2/73	599	960	7.9	
				129	3/16/64	11,000	15,300	7.3	
		550		115	9/29/24	11,120	--	--	2,450
				70	9/14/24	7,510	(11,500)	--	
			Pre-cambrian		5/23/73	310	487	7.6	
			Abo		5/23/73	418	651	7.6	
			Chinle		8/5/73	1,840	2,440	6.4	2
			Alluvial	66	9/5/73	2,350	3,190	7.0	
			Chinle	59	5/24/73	4,150	6,420	6.4	
			Abo	66	5/24/73	674	1,070	7.0	
			Penn Rocks		5/1/53		1,270		32
			Madera	61	5/24/73	482	788	7.3	
		81	Alluvial		1/19/65	589	946	7.6	

Data For Selected Wells, Springs and
Related Data at Surface Water Gaging Stations
Jemez Mountains Area, New Mexico

Data Number	Name	Type	Township & Range	Section	Latitude	Longitude	Land Surface Altitude (ft)
1	Rio Grande At Albuquerque	Surface			35°05'21"	106°40'48"	
2		Well	12N2E	14.433	35°15'46"	106°42'05"	5602
3		Well	12N2E	25.421	35°14'22"	106°40'42"	5370
4		Well	21N3E	31.134			5200
5		Well	12N3E	30.121	35°14'46"	106°40'06"	5356
6		Well	12N3E	24.423			5030
7		Well	12N4E	6.200			5050
8		Well	12N4E	5.214			5040
9		Well	13N3E	18.31			5733
10	Jemez River Below Jemez Canyon Dam	Surface	13N4E	5.1	35°23'24"	106°32'03"	
11	"	Surface			35°23'10"	106°31'45"	5100
12		Well	13N4E	1.234			5580
13		Well	13N4E	1.412			5100
13A		Well	13N4E	1.421			5100
14		Well	14N5E	19.221			5150
15	San Ysidro Group	Spring	15N1E	8.32			5540
16	Indian Springs	Spring	16N2E	29.142*			5580
17		Well	15N1E	16.233			5530
18	San Ysidro Group	Spring	15N1E	10.14			5530
18A		Spring	15N1E	10.310			5530
19		Well	15N2E	22.400			5500
20		Well	15N2E	12.431			5750
21		Well	15N5E	13.330			5170
22		Spring	16N1W	29.230			5830
23		Spring	16N1W	1.421			6020
24		Spring	16N1E	6.321			6360
25	Hot Well	Well	16N1W	1.243			6021
26	Kaseman Well	Well			35°37'04"	106°52'54"	5900
27	Penasco Spring	Spring	16N1E	20.32			6000
28	Log Spring	Spring	16N1E	5.244			7175
29		Spring	16N1E	3.441			7000
30		Spring	16N1E	25.244			5700
31		Spring	16N2E	30.313			5600
32		Spring	16N2E	20.332			5540
33		Spring	16N2E	18.214			5860
34	Owl Spring	Spring	16N2E	7.441			5780
34A		Spring	16N2E	7.432			5850
		Well	16N2E	16.411			5580

*Corrected location. Not corrected on Plates I thru IV

Land Surface Altitude (ft)	Depth to Water (ft)	Altitude of Water Level (ft)	Depth of Well (ft)	Source Formation For Water	Temp. °F	Date Sampled	Total Dissolved Solids ppm	Electric Conductivity µmhos	pH	Rate of Flow (gpm)
5490				Alluvial	73	8/30/73	3,780	5,694	8.0	
5600			82			1967		980		
5540				Alluvial	68	8/30/73	628	1,014	8.0	
5720				Chinle	77	5/24/73	1,570	2,550	7.6	
5750				Chinle	57	5/25/73	324	527	7.7	
6175				Santa Fe		6/8/73	245	367	7.5	
6300				Dakota S.S. Alluvial	60	9/22/24				
6250				Dakota S.S.	60	9/22/24	396	--	--	
69[illegible]				Abo	57	8/31/73	335	549	8.0	
6[illegible]						11/14/74	164	254	7.9	
6050			200	Pre-cambrian	55	11/2/73	284	390	8.0	
6040				Madera	66	8/21/73	638	984	8.0	
6000				Perm Rocks		8/21/73	638	100	7.6	
6800				Pre-cambrian	55	11/2/73	292	472	8.2	
5640						11/14/74	350	584	7.4	
5760				Abo	61	10/20/73	1,960	3,200	8.4	
5760				Alluvial	82	10/5/73	647	1,090	7.5	
5850			128	Permian	61	10/26/73	1,964	2,320	8.4	
5850	6.5	5843		Alluvial	59	6/8/73	692	1,000	7.6	
5920				Chinle	64	6/6/73	364	571	7.4	
6800					59	10/2/73	205	241	7.2	
6620						6/8/73	350	370		
7000				Alluvial	65	6/8/73	104	190	7.8	
7750					54	9/18/73	159	182	6.8	
7400					55	8/28/73	155	161	7.6	
8273					59	9/28/73	153	179	6.7	
8500					51	8/28/73	161	194	7.5	
7280				Madera	51	10/30/73	365	636	7.2	
7250			56	Precambrian	52	10/30/73	398	500	7.2	
7080				Bandelier	55	11/30/73	230	383	7.7	
6960				Bandelier	59	11/30/73	172	212	8.2	
6755				Abo	63	9/24/73	2,080	3,290	8.5	
6755				Madera	65	1/17/73	1,520	2,540	6.7	
6[illegible]5				Madera	65	5/17/73	814	1,360	6.9	
6720							135	164	7.2	
7560				Limest. & sandst.	70	5/8/73	188	135	7.4	

ata For Selected Wells, Springs and
elated Data at Surface Water Gaging Stations
: Mountains Area, New Mexico

Data Number	Name	Type	Township & Range	Section	Latitude	Longitude	Land Surface Altitude (ft)	Depth to Water (ft)	Altitude of (f
36		Spring	16N2E	29.142			5490		
37	Jemez Pueblo Well	Well	16N2E	16.444			5600		
38		Spring	16N2E	16.411			5540		
39									
40		Spring	16N2E	10.424			5720		
41		Spring	16N2E	11.234			5750		
42	Ojo Chamisa Spring	Spring	16N3E	29.344			6175		
43	Rio Grande Below Cochiti Dam	Surface	16N6E	17.13	35°37'04"	106°19'26"			
44	Ojo del Esperito Santo	Spring			35°41'55"	106°55'46"	6300		
45		Spring	17N1W	15.34			6250		
[illegible]		Spring	17N1E	23.223			6960		
[illegible]	Rio Guadalupe	Surface			35°43'52"	106°45'44"	6040		
48	U.S.G.S. Testhole	Well			35°43'45"	106°45'44"	6050		
49		Spring	17N2E	29.311			6040		
50	Jemez School Spring	Spring			35°40'20"	106°45'29"	6000		
51		Spring	17N2E	6.221			6800		
52	Jemez River	Surface			35°39'42"	106°44'34"	5640		
53		Spring			35°41'13"	106°44'10"	5760		
54		Spring	17N2E	21.144			5760		
55	Abandoned Well	Well			35°42'50"	106°43'10"	5850		
55A	Redwood Grove	Well			35°42'50"	106°43'10"	5850	6.5	5
56		Spring	17N2E	36.433			5920		
57		Spring	17N3E	16.244			6800		
58	Vallecitos Creek	Surface	17N3E	16.333			6620		
59	Paliza Spring	Spring	17N3E	16.220			7000		
60		Spring	17N3E	24.113			7750		
61		Spring	17N4E	29.133			7400		
62		Spring	17N4E	6.443			8273		
63		Spring	17N4E	8.444			8500		
64		Spring	18N1E	1.321			7280		
65	U.S.G.S. Testhole	Well			35°49'23"	106°47'31"	7250		
66		Spring	18N1E	13.234			7080		
67		Spring	18N1E	24.443			6960		
68		Spring	19N3E	32.331			6755		
68A		Spring			35°49'46"	106°38'42"	6755		
[illegible]		Spring			35°49'46"	106°38'42"	6755		
	Jemez River below East Fork	Surface			35°49'39"	106°38'51"	6720		
70	Sino Springs	Spring			35°49'16"	106°40'11"	7560		

Depth to Water (ft)	Altitude of Water Level (ft)	Depth of Well (ft)	Source Formation For Water	Temp. °F	Date Sampled	Total Dissolved Solids (ppm)	Electric Conductivity µmhos	pH	Rate of Flow (gpm)
					Many	(a)	(b)		
			Penn Rocks		4/20/50	1,480	2,276		
			Tuff	48	3/19/73		1,140		16
			Penn Rocks	48	3/19/73	984	1,280	7.4	16
			Limest.&Sandst.	59	5/8/73	178	130	7.8	
			Magdalena	115	9/23/75	2,400	5,500	6.1	36
			Magdalena	110	10/20/76	4,200	6,500	7.5	27
					Many	424	60		
			Penn Rocks Fault	(c)	Many	2,611	3,200	7.5	200
					10/14/54		1,140		
			Alluvial	64	9/27/73	626	1,030	7.5	
		16		64	9/27/73	634	6,000	8.1	
		155	Permian Rocks	63	10/24/73	2,190	2,500	8.2	
			Abo	62	10/26/73	2,170	3,210	7.6	
					1/29/74	480	807	7.8	
			Alluvial		1/25/74				
			Madera	120	5/18/73	2,140	3,550	6.7	
			Alluvial	62	10/14/54	625	925	7.3	
			Madera	136	5/30/74	1,960	3,460	7.1	
			Madera	63	5/28/74	580	1,340	8.0	
			San Andres Glorietta		1/20/65	178	184	7.5	
			Madera	61	6/21/73	856	1,380	8.2	
			Alluvial		6/1/73	402	580	7.6	
			Madera	60	7/13/73	952	1,430	6.6	
			Madera		7/18/74	393	560	7.3	
		52	Penn Rocks	59	10/24/73	2,258	2,500	7.4	
	6780	40	Alluvial		5/8/73	134	140	7.1	
			Valles Rhyolite		1/16/73	149	165	8.0	
			Valles Rhyolite	88	12/13/74	179	255		
			Lava flow & Tuff	89	10/10/76	(a)	162	(d)	(e)
					9/23/72	58	95		
				50	9/18/73	161	187	7.1	
					9/23/72	96	90		
	5971								
	5934								
	5934								

(a) 120 to 180
(b) 140 to 180
(c) 93 to 169
(d) 7.8 to 8.3
(e) 542 to 396

ate For Selected Wells, Springs and
elated Data At Surface Water Gaging Stations
emez Mountains Area, New Mexico

Data Number	Name	Type	Township & Range	Section	Latitude	Longitude	Land Surface Altitude (ft)	Depth to Water (ft)	Altitude of
71	Jemez River	Surface			35°49'45"	106°39'03"	6750		
72		Spring	18N3E	6.1			6640		
73		Spring			35°48'23"	106°40'51"	6640		
73A	Russel Springs	Spring	18N3E	6.2	35°48'	106°40'	6640		
74	Agua Durme Spring	Spring			35°48'29"	106°41'54"	7600		
75	Soda Dam Spring	Spring	18N2E	14/13			6380		
75A	Soda Dam Spring	Spring	18N2E	14/13			6380		
76	Jemez River	Surface			35°46'27"	106°42'00"	6240		
77	Jemez Hot Springs	Spring			35°46'19"	106°40'50"	6200		
78	Bell Well	Well			35°46'10"	106°41'38"	6180		
79		Spring	18N2E	34.232			6040		
80	Morgan Well	Well			35°44±	106°43'±	6020		
81	U.S.G.S. Testhole	Well			35°45'±	106°42'29"	6150		
82		Spring	18N2E	26.334			6200		
83	Jemez River	Surface			35°46'05"	106°41'36.1'	6160		
84	San Diego Canyon	Spring			35°46'18"	106°41'26"			
84A		Spring			35°46'13"	106°41'32"	6160		
85	Via Coeli Well	Well			35°46'41"	106°41'16"	6280		
85A		Well			35°46'14"	106°41'29"	6280		
86		Well	18N2E	24.211	35°46'04"	106°41'36"	6160		
87	Church Canyon Sprg.	Spring	18N3E	18.144			7660		
88		Spring			35°48'08"	106°40'50"	6446		
89	Russel Well	Well			35°48'40"	106°40'17"	6560		
90		Well	18N3E	6.321			6750		
91		Well	18N3E	6.143	35°49'15"	106°39'43"	6640		
92	U.S.G.S. Testhole	Well	18N3E	5.1			6850		
92A	Camp Shaver Well	Well	19N3E	32.34			6800	20	
93		Well	18N3E	4.321			7240		
93A		Well	18N3E	4.321			7240		
94	McCauley Spring	Spring	18N3E	4.144			7550		
95	East Fork	Surface	18N3E	2.122			7950		
96		Spring	18N3E	22.412			8190		
97	East Fork	Surface	18N4E	4.334			8510		
98	Santa Fe County	Well			35°49'26"	106°17'54"	7130		
99	Santa Fe County	Well			35°49'20"	106°17'00"	7000		
100	Santa Fe County	Well			35°48'48"	106°17'00"	6800		
101		Spring			35°48'49"	106°10'53"	5460		
102		Spring			35°48'24"	106°11'00"	5500		

Land Surface Altitude (ft)	Depth To Water (ft)	Altitude of Water Level (ft)	Depth of Well (ft)	Source Formation For Water	°F Temp.	Date Sampled	Total Dissolved Solids (ppm)	Electric Conductivity µmhos	pH	Rate of Flow (gpm)
520						5/11/73				
400										
480				Totavi Puye*						50
480				Puye*		9/28/65	(135)	132	7.3	
380										
660										
800										
710				Bandelier Tuff	55	9/13/73	130	105	7.3	16
800			88	Abiquiu Tuff		10/9/73	164	160	7.0	
674										
790				Bandelier Tuff		8/14/73	143	140	7.8	
750				Upper Madera	66	11/17/73	1,528	2,000	6.9	16
750					58	10/15/71	2,362	2,940	7.0	
960				Madera		3/21/74	728	1,210	6.9	
960				Madera	61	8/15/73	1,130	1,800	6.8	
960			155	Madera	59	10/24/73	2,260	3,250	6.8	
960				Madera	57	5/25/73	2,500	3,660	8.2	
263	161.7	8101	210			10/21/76				
900	60.9	7839	500	Bandelier Abo	48	1/22/73				
760				Alluvial	48	1/23/73	188	120	6.7	
475			3575		212					
690	1750	6940	6346	Sandia Madera	133	3/18/74	2,500	(a)		
685				Madera		4/23/73	16,800	22,900	8.8	
685			3557	Precambrian	169	5/3/74	9,380	18,100	7.7	
685				Precambrian		7/17/74	1,730	2,720	7.2	
640	30	7610	80	Alluvial	48	6/8/73	204	220	7.5	
000				Bandelier	47	5/31/73	151	166	7.9	
600				Abo	63	6/29/73	933	1,470	8.5	
500				Abo	70	7/3/73	1,160	1,780	8.4	
840	43.4	6797				10/20/76				
840	69.4	6771				10/20/76				
840	31.6	6808				10/20/76				
800						11/14/74	144	176	7.7	
800						9/23/72	104	110		
800						9/23/72	206	170		
325				Rhyolite Lava	105	10/20/76	(b)	280	(c)	(d)
750				Cenezoic Volc.	61	4/30/73	210	130	7.4	
960						10/13/71	264	230	8.0	
960						11/23/72	299	230	7.6	

(a) 12,800 to 21,900 (b) 200 to 300 (c) 7.8 to 8.3

*Totavi Puye and Puye are members of the Santa Fe Group.

ata For Selected Wells, Springs and
lated Data At Surface Water Gaging Stations
Mountains Area, New Mexico

Data Number	Name	Type	Township & Range	Section	Latitude	Longitude	Land Surface Altitude (ft)	Depth To Water (ft)	Altitude of Water Level (ft)
103		Spring	18N7E	9.422					
104		Spring			35°48'36"	106°10'35"	5520		
105		Spring			35°46'47"	106°12'17"	5400		
106		Spring	18N7E	20.312			5480		
106A		Spring	18N7E	20.312			5480		
107		Spring			35°46'21"	106°13'13"	5380		
108		Spring			35°46'02"	106°14'15"	5660		
109	Rio del Las Vacas	Surface	19N1E	2.122			7800		
110	Spring Canyon	Spring			35°52'38"	106°44'54"	7710		
111	Testhole Fenton Lake	Well	19N2E	10.322			7800		
112	Fenton Lake	Surface	19N2E	9.444			7674		
113	Lakefork Canyon	Spring			35°51'52"	106°43'10"	7790		
114	Battleship Rock	Spring	19N3E	32.3			6750		
1[illegible]	Shaver Spring	Spring	19N3E	32.344			6750		
		Well	19N3E	32.331			6960		
115A		Well			35°49'46"	106°38'46"	6960		
115B		Well			35°49'49"	106°38'56"	6960		
115C		Well	19N3E	32.324			6960		
116	Forest Service	Well	19N2E	24.213			8263	161.7	810
117	LASL Well D	Well	19N2E	10.422			7900	60.9	783
118	Barley Springs	Spring	19N2E	10.411			7760		
119	GT-1 Well	Well	19N2E	1.444			8475		
120	GT-2 Well	Well	19N2E	12			8690	1750	694
121		Well			35°52'54"	106°40'12"	8685		
121A		Well			35°52'54"	106°40'12"	8685		
121B		Well			35°52'54"	106°40'12"	8685		
122	Hazlett Well	Well	19N3E	20.14			7640	30	761
123		Well	19N3E	20.331			8000		
124		Spring	19N3E	29.342			7600		
124A		Spring	19N3E	29.413			7500		
125	USGS Battleship Rock	Well	19N3E	32.3334			6840	43.4	67
125A	" Upper Fm	Well	19N3E	32.3334			6840	69.4	67
125B	" Lower Fm	Well	19N3E	32.3334			6840	31.6	68
126	Jemez River below Jemez Spring	Surface			35°49'39"	106°38'51.1"	6800		
126A	East Fork	Surface	18N3E	5.1222			6800		
127	San Antonio Creek	Surface	19N3E	32.0			6800		
12[illegible]	Spence Spring	Spring	19N3E	28.312			7325		
		Spring	19N3E	20.1			7750		
130	Horseshoe Springs	Spring	19N3E	18.233			7960		
130A		Spring	19N3E	18.233			7960		

Depth To Water (ft)	Altitude Of	Depth of Well (ft)	Source Formation For Water	Temp. °F	Date Sampled	Total Dissolved Solids (ppm)	Electric Conductivity µmhos	pH	Rate of Flow (gpm)
45.46	7	209			6/21/76				
3.82	7	68			10/21/76				
		95	Alluvial	66	10/21/76	(a)		(b)	40±
485.5	7	590	Abo	88	5/24/73				
			Alluvial		6/8/73	230	180	7.4	
				48	10/15/71	209	180	7.6	
			Battleship Rock	68	8/14/73	599	912	7.5	
103.25	7	180			10/21/76				
			Alluvial		6/5/73	322	380	7.2	
174.6	8	190			10/20/76				
			Mesa Verde	178	7/21/67	4,240	17,300	1.4	
1									
					9/23/72	164	130		
					9/23/72	700	662		
					10/15/71	850	1,165	3.5	
3	80	75	Volcanic Debris		6/5/73	294	320	7.5	
				55	10/15/71	157	176	7.5	
2.9	7								
				97					
.3									
2000	7								
.9	8								
.1									
.7	8								
.8	8								
1100	7								
.8 950	7								
0 2000	7								
.5 1000	7								
1600	7								
.7	8								
				42	10/15/71	131	107	6.3	
						50	67	7.0	
				41	10/15/71	94	67	7.5	
				44	10/15/71	89	88	7.0	
			Alluvial						
+	8	589	Caldera Fill		10/26/49	165	157		

(a) 460 to 500
(b) 7.7 to 8.0

Data For Selected Wells, Springs and
ated Data At Surface Water Gaging Stations
Jemez Mountains Area, New Mexico

Data Number	Name	Type	Township & Range	Section	Latitude	Longitude	Land Surface Altitude (ft)
131	Hofein Fire Prot.	Well	19N3E	17.330a			7800
131A	Hofein Sub Artesian	Well	19N3E	17.330			7800
132	Hofein Artesian	Well	19N3E	17.342			7680
133	LASL Well A	Well	19N3E	18.321			8450
134	LaCueva Spring	Spring	19N3E	17.34			7750
134A	Laudermilk Spring	Spring	19N3E	17.344			7680
134B		Spring	19N3E	17.431			7680
135	Eckert Well	Well	19N3E	17.1134			7800
135A	Brown's Cabin	Well	19N3E	17.11			7800
136	Glass Well	Well	19N3E	4/5			8600
137		Well	19N3E	4.000			8600
138	San Antonio Campground	Well	19N3E	8.33			7750
139	San Antonio Creek	Surface	19N3E	17.0			7670
140	Sulphur Creek	Surface	19N3E	17.44			7680
141	Sulphur Creek	Surface	19N3E	20.2213	35°52'10"	106°38'14"	7640
142	Redondo Creek	Well	19N3E	20.444	35°51'35"	106°36'14"	8050
143	Redondo Creek	Surface			35°51'54"	106°35'55"	8190
144	USFS Redondo Well	Well	19N3E	16.4342			7850
145	Sulphur Springs	Spring			35°54'04"	106°36'	8420
146	Baca #1 Well	Well			35.9168°	106.5350°	8697.
147	Baca #16 Well	Well			35.9037°	106.5688°	9622
148	Baca #11 Well	Well			35.8950°	106.5760°	9064.
149	Baca #15 Well	Well			35.8946°	106.5803°	9117.
150	Baca #6 Well	Well			35.8880°	106.5823°	8725.
151	Baca #9 Well	Well			35.8825°	106.5868°	8604.
151A	Baca #14 Well	Well			35.8825°	106.5865°	8605
152	Baca #12 Well	Well			35.8737°	106.5898°	8429.
153	Baca #5 Well	Well			35.8777°	106.5783°	9320.
154	Baca #10 Well	Well			35.8863°	106.5853°	8734.
155	Baca #4 Well	Well			35.8892°	106.5705°	9318
156	Baca #13 Well	Well			35.8966°	106.5655°	9291.
157	Jaramillo Head Spg.	Spring			35°53'55"	106°33'00"	9320
158	Redondo Head East	Spring			35°53'36"	106°33'58"	9480
159	Jaramillo Creek	Surface			35°54'47"	106°30'22"	8772
160	Cerro Pinon Spring	Spring			35°53'40"	106°29'40"	8630
161	San Antonio Head	Spring	20N4E	14.424			8630
		Well	19N4E	26.222			8491

Depth To Water (ft)	Altitude of Water Level (ft)	Depth of Well (ft)	Source Formation For Water	°F Temp.	Date Sampled	Total Dissolved Solids (ppm)	Electric Conductivity µmhos	pH	Rate of Flow (gpm)
		1184	Caldera Fill	54	10/26/49	165	160		Flows
						90	79	8.5	
						108	132	7.0	
			Tshirege						5
		590	Caldera Fill	63	11/12/49	125	90		Flows
		to	Caldera Fill	61	10/26/49	142	110		Flows
		1184	Caldera Fill	57	10/26/49	142	125		Flows
	8740	1185		64	10/22/76	(a)		(b)	6.6
			Valles Rhyolite		6/20/50	108	84		900
				46	10/15/73	127	104	7.4	
			Valles Rhyolite						5
				40	10/15/71	109	88	7.2	
			Valles Rhyolite		6/20/50				5
				42	10/15/71	111	77	7.7	
+11	8517	595	Caldera Fill		10/26/49	142	126		
+11	8517	595	Caldera Fill		10/26/49	142	109		
+10	8516	1185	Caldera Fill		6/20/50	121	94		
16	8744	634			10/22/76				
				52	10/15/71	94	68	7.7	
					6/20/50	108	85		
			Talus & Alluv.						20
			Talus & Alluv.						25
			Tshirege*						4
			Talus & Alluv.						4
			Tschicoma*						2
			Tshirege*						90
	6208								
			Puye*		9/23/65	(229)	370	7.2	
	6077								
	5886								
	5870								
		815	Totavi Puye*		9/23/65	(123)	194	7.4	
750	5890	2552							
	5907								
850	5865	2300							
740	5780	2499							
	5778								

(a) 118 to 164
(b) 7.7 to 8.1

*Tschicoma Formation is in the Tewa Group
Tshirege is a member of the Bandelier Tuff
Puye and Totavi Puye are members of the Santa Fe Group

a For Selected Wells, Springs and
ated Data At Surface Water Gaging Stations
Mountains Area, New Mexico

Site Number	Name	Type	Township & Range	Section	Latitude	Longitude	Land Surface Altitude (ft)	Depth To Water (ft)	Altitude
63	Valle Grande H-10	Well			35°51'11"	106°28'45"	8490		
64	East Jemez Creek	Surface			35°50'55"	106°29'37"	8475		
~~65~~	~~Wet Weather Creek~~	~~Surface~~			~~35°50'12"~~	~~106°29'32"~~	~~8580~~		
66	American Springs	Spring	19N5E	35.144			8280		
67	Valle Grande H-7	Well			35°51'52"	106°27'29"	8510		
67A	Valle Grande H-2	Well			35°51'52"	106°27'29"	8510		
67B	Valle Grande H-5	Well			35°51'52"	106°27'29"	8510		
68	Valle Grande #7	Well	19N5E	19.134			8740		8
69		Spring	19N5E	18.430			8520		
69A	South Medio Spring	Spring	19N5E	18.443			8523		
70		Spring	19N4E	12.341			8726		
71	S.W. Medio Spring	Spring			35°53'19"	106°28'16"	8726		
72		Spring	19N4E	2.114			8750		
	West Medio Spring	Spring			35°54'27"	106°39'06"	8680		
		Well	19N5E	19.133			8506	+11	8
73A		Well	19N5E	19.134a			8506	+11	8
74		Well	19N5E	19.134			8506	+10	8
75	Valle Grande #12	Well	19N5E	19.424			8760	16	8
76	Valle Grande Ent. Spring	Spring			35°51'14"	106°27'10"	8606		
77	East Fork	Surface			35°54'34"	106°25'15"	8900		
78		Spring	19N5E	12.143			8000		
79		Spring	19N5E	14.431			8660		
80		Spring	19N5E	25.111					
80A		Spring	19N5E	26.221			8240		
81	Armstead Spring	Spring	19N5E	26.332			8216		
82		Spring	19N5E	25.333			8000		
83	Santa Fe County	Well	19N6E	8.233	35°52'45"	106°19'24"	7450		
84		Spring	19N6E	9.441			6960		
85	Santa Fe County	Well	19N6E	9.443	35°53'16"	106°18'16"	7400		
86	Santa Fe County	Well	19N6E	14.223	35°53'02"	106°16'10"	6640		
87	Santa Fe County	Well	19N6E	13.433	35°52'24"	106°15'27"	6640		
87A		Well	19N6E	13.344			6640		
88		Well	19N6E	24.324	35°51'43"	106°15'48"	6640	750	
89		Well	19N6E	23.411	35°51'49"	106°16'28"	7000		
90	PM-2	Well			35°50'11"	106°14'33"	6715	850	
91	PM-1	Well	19N7E	20.331	35°51'34"	106°13'31"	6520	740	
92	Santa Fe County	Well	19N7E	20.221	35°52'12"	106°12'59"	6380		

Altitude of Water Level (ft)	Depth Of Well (ft)	Source Formation For Water	°F Temp.	Date Sampled	Total Dissolved Solids	Electric Conductivity µmhos	pH	Rate of Flow (gpm)
5838	1940	Santa Fe						
5842	1530							
5856	1840	Santa Fe						
5794	1792	Santa Fe						
5709	1519							
5714	1970	Santa Fe						
5693	2000	Santa Fe						
5574	870	Santa Fe						
5597	1750							
5561	870	Santa Fe						
5597	870	Santa Fe						
			63	9/19/51	173	251		
5680	1750	Santa Fe						
5655	1790	Santa Fe						
5690	1965	Santa Fe						
		Basalt	52	9/23/65	(183)	292	7.1	
		Basalt	52	9/23/65	(183)	292	7.1	
5510								
				10/17/73				
		Abo	51	8/5/74	344	580	7.2	
		Bandelier Tuff	54	1/17/73	102	95	7.4	32
		Bandelier Tuff	55	5/22/73	99	105	7.4	
		Bandelier Tuff	57	1/17/73	102	80	7.2	32
		Bandelier Tuff	48	9/23/73	150	105	7.3	
8156	650	Tschicoma Abo	87	5/24/73				
8384	750	Abiquiu Abo	64	1/22/73	138	200	8.6	
		Bandelier Tuff	48	1/17/73	114	90	7.5	
		Lava Flow & Tuff	105	10/27/76	(a)	120	(b)	(c)
		Valles Rhyolite	105	5/16/73	150	122	7.7	
					168	94	8.0	
				10/16/49	105	80		
				10/15/71	152	220	8.5	
7620								
		Caldera Fill		6/13/63	2,970	2,225	8.0	
				10/22/49	1,800	2,270		

(a) 140 to 230 (c) 272-332

Altitude of Water Level (ft)	Depth Of Well (ft)	Source Formation For Water	°F Temp.	Date Sampled	Total Dissolved Solids	Electric Conductivity µmhos	pH	Rate of Flow (gpm)
5838	1940	Santa Fe						
5842	1530							
5856	1840	Santa Fe						
5794	1792	Santa Fe						
5709	1519							
5714	1970	Santa Fe						
5693	2000	Santa Fe						
5574	870	Santa Fe						
5597	1750							
5561	870	Santa Fe						
5597	870	Santa Fe						
			63	9/19/51	173	251		
5680	1750	Santa Fe						
5655	1790	Santa Fe						
5690	1965	Santa Fe						
		Basalt	52	9/23/65	(183)	292	7.1	
		Basalt	52	9/23/65	(183)	292	7.1	
5510								
				10/17/73				
		Abo	51	8/5/74	344	580	7.2	
		Bandelier Tuff	54	1/17/73	102	95	7.4	32
		Bandelier Tuff	55	5/22/73	99	105	7.4	
		Bandelier Tuff	57	1/17/73	102	80	7.2	32
		Bandelier Tuff	48	9/23/73	150	105	7.3	
8156	650	Tschicoma Abo	87	5/24/73				
8384	750	Abiquiu Abo	64	1/22/73	138	200	8.6	
		Bandelier Tuff	48	1/17/73	114	90	7.5	
		Lava Flow & Tuff	105	10/27/76	(a)	120	(b)	(c)
		Valles Rhyolite	105	5/16/73	150	122	7.7	
					168	94	8.0	
				10/16/49	105	80		
				10/15/71	152	220	8.5	
7620								
		Caldera Fill		6/13/63	2,970	2,225	8.0	
				10/22/49	1,800	2,270		

(a) 140 to 230 (c) 272-332

Depth To Water (ft)	Altitude of Water Level (ft)	Depth of Well (ft)	Source Formation For Water	Temp. °F	Date Sampled	Total Dissolved Solids (ppm)	Electric Conductivity μmhos	pH	Rate of Flow (gpm)
			Alluvial	55	10/15/71	197	164	7.5	
				99		(a)		(b)	
				36	10/15/71	113	81	7.0	
					6/20/50	108	86		
			Valles Rhyolite		7/6/49	98	80		800
8	8595	285	Caldera Fill		10/16/49	90	85		
+39		405	Caldera Fill		10/16/49	123	107		
	8680	652		58.5	10/22/76	(c)		(d)	
		650	Caldera Fill	63	10/16/49	124	100		
+20		444	Caldera Fill	54	10/16/49	124	100		
	8750	444		52		(c)		(f)	10.3
		285	Caldera Fill	64	10/16/49	90	85		Flows
+36		652	Caldera Fill	62	7/27/49	143	122		
				53	10/15/71	94		8.2	
			Caldera Fill	63	10/16/49	125	110		
			Caldera Fill	55	10/16/49	111	85		
			Caldera Fill	46	7/6/49	103	80		
			Tshirege						25
			Tshirege						40
			Talas						15
	5920								
	5715								
	5570								
			Alluvial		1/7/65	358	539	8.0	
			Abo	51	6/19/74	332	570	7.1	
			Chinle	52	3/7/74	263	430	7.4	
			Tewa	61	6/19/74	112	120	6.8	
				50	10/15/71	188	147	8.0	
			Tewa	64	3/7/74	124	141	7.8	
			Morrison		3/7/74	2,390	3,190	7.5	

(a) 182 to 253
(b) 7.7 to 7.8
(c) 85 to 106
(d) 7.7 to 8.0
(e) 88 to 158
(f) 7.3 to 8.1

ata For Selected Wells, Springs and
elated Data At Surface Water Gaging Stations
ez Mountains Area, New Mexico

Data Number	Name	Type	Township & Range	Section	Latitude	Longitude	Land Surface Altitude (ft)	Depth To Water (ft)
222	Baca #8 Well	Well			35.9173°	106.5898°	8631.3	
223	Pipeline Seep	Spring			35°58'45"	106°33'52"	8500	
224	San Antonio Warm Spring	Spring	20N4E	18.111	35°58'18"	106°33'44"	8440	
225								
226	Puerto D'Abringo	Spring			35°55'34"	106°27'26"	8820	
227	San Antonio Creek	Surface	20N4E	14.433				
228		Spring	20N4E	14.300			8560	
229		Well	20N4E	14.443			8603	8
230		Well	20N4E	24.213			8643	+39
230A	Valle Toledo #1	Well	20N4E	24.214			8680	
231	Valle Toledo H-6	Well			35°56'45"	106°37'24"	8720	
232		Well	20N5E	19.333			8720	+20
232A	Valle Toledo #6	Well	20N5E	19.333			8750	
	Valle Toledo H-4	Well			35°57'29"	106°29'	8609	
233A		Well	20N4E	24.214			8650	+36
233B	Big Well Toledo	Well			35°57'27"	106°28'45"	8609	
234	Valle Toledo H-3	Well			35°57'25"	106°28'	8650	
235	Valle Toledo H-2	Well			35°57'25"	106°28'	8650	
235A	Valle Toledo H-1	Well			35°57'25"	106°28'	8650	
236		Spring	20N5E	26.113			8850	
237		Spring	20N5E	26.311			8840	
238		Spring	20N5E	35.433			8660	
239	Rio Arriba County	Well	20N7E	17.111	35°58'17"	106°13'37"	6840	
240	Rio Arriba County	Well	20N7E	25.441	35°55'53"	106°08'36"	5800	
241	Rio Arriba County	Well	20N8E	3.324	35°59'32"	106°04'48"	5590	
242		Spring	21N1W	14.421			7400	
243		Well	21N2E	14.433			8800	
244	Rio Chama near Chamita	Surface			36°04'26"	106°06'40"		
245		Well	22N3E	22.111			7400	
246		Spring	22N5E	6.324			6817	
247	Agua Caliente	Spring			36°12'	106°20'	6884	
247A		Well	22N5E	1.322	36°09'57"	106°21'19"	6884	
248	Rio Chama Below Abiquiu Dam	Surface	23N5E	8.44	36°14'12"	106°24'59"		
249		Well	23N5E	15.212			6140	

DATA SOURCES

1. Informal Report LA-5595-MS, Preliminary Study of The Quality Of Water In The Drainage Area of the Jemez River and Rio Guadalupe, Los Alamos Scientific Laboratory, Los Alamos, N.M., April 1974.

   Data Numbers: 16, 34, 37, 48, 50, 55, 55A, 58, 59, 65, 70, 71, 72, 73, 73A, 74, 75, 76, 77, 78, 80, 81, 85, 89, 92, 94, 95, 97, 110, 111, 112, 113, 114, 117, 118, 122, 126, 127, 128, 129, 130, 131, 133, 134, 138, 139, 140, 142, 145, 162, 163, 167, 167A, 167B, 168, 177, 207, 208, 209, 210, 211, 212 213, 215, 219, 224, 227, 228, 230, 231, 233, 234, 235, 235A

2. Water Supply Paper 620, Geology and Ground-Water Resources of Western Sandoval County, New Mexico, U.S. Dept. of Interior, Geological Survey, 1931.

   Data Numbers: 15, 18, 26, 27, 44, 75, 77, 84.

3. Water Resources Data for New Mexico, Part 2, Water Quality Records, U.S. Dept. of the Interior, Geological Survey, 1964-1975.

   Data Numbers: 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 13A, 14, 17, 18A, 19, 20, 21, 22, 23, 24, 28, 29, 30, 31, 32, 33, 34A, 35, 36, 38, 40, 41, 42, 46, 47, 49, 51, 52, 53, 54, 56, 57, 60, 61, 62, 63, 64, 66, 67, 68, 68A, 68B, 69, 79, 82, 83, 84A, 85A, 86, 87, 88, 90, 91, 93, 93A, 96, 106A, 115, 115B, 115C, 121, 121A, 121B, 123, 124, 124A, 134B, 137, 184, 187, 202, 204, 205, 207A, 213A, 242, 243, 244, 245, 246, 247A, 249.

4. Informal Report LA-5780-MS, Geology of Geothermal Test Hole TI-2, Fenton Hill Site, July 1974, Los Alamos Scientific Laboratory, Los Alamos, N.M., Nov. 1974.

   Data Numbers: 75, 114.

5. Water Supply Paper 1753, Geology and Ground-Water Resources of The Los Alamos Area, New Mexico, U.S. Dept. of Interior, Geological Survey, 1964

   Data Number: 169A, 193, 195, 196, 197, 198, 199, 199B, 199C, 200A, 201, 227, 232, 233A.

Data Sources (cont.)

6. Results of Laboratory Analysis Done For Union Oil Co. by Smith-Emergy Lab.

   Data Numbers: 31, 75, 77, 94, 114A, 128, 130, 134A, 141, 143, 157, 158, 159, 160, 165, 169A, 171, 172A, 176, 213, 214, 216, 223, 226, 233B.

7. Results of Laboratory Analysis Done For Union Oil Co. by C.E.P. Lab.

   Data Numbers: 75, 94, 128, 132, 148, 151A, 152, 155, 156, 168, 213, 224, 230A, 232A.

APPENDIX II

Part 3
Water Quality Data

WATER QUALITY DATA
Jemez Basin and Vicinity

Data No.	Date	Ca^{++}	Mg^{++}	Na^{+}	K^{+}	HCO_3^{-}	SO_4^{--}	Cl^{-}	TDS	Ec	pH	Temp °F
1												
2	12/12/74	18.0	3.5	53.0	5.0	127.0	43.0	6.8	265.0	367	--	67
3	12/12/74	28.0	5.0	36.0	7.6	156.0	35.0	7.3	267.0	352.0	7.4	55
4	4/27/65	57.0	10.0	29.0	--	134.0	58.0	51.0	343.0	501.0	7.8	--
5	12/12/74	31.0	5.9	30.0	6.4	142.0	37.0	7.4	255.0	348.0	7.5	61
6	2/26/65	112.0	17.0	60.0	--	357.0	143.0	22.0	598.0	878.0	7.5	--
7	1/21/65	60.0	11.0	69.0	--	248.0	85.0	37.0	457.0	666.0	7.5	--
8	9/25/74	41.0	6.8	79.0	7.9	200.0	40.0	72.0	421.0	642.0	--	81
9*	8/26/72	1.2	0.3	740.0	22.0	334/226	49.0	97.0	2,460.0	3,140.0	9.5	90
10	10/ 9/73	80.0	14.0	330.0	16.0	348.0	290.0	280.0	1,220.0	1,950.0	8.1	54
11	3/10/66	54.0	7.4	175.0	--	274.0	90.0	161.0	662.0	1,110.0	7.6	--
11	6/22/66	79.0	9.5	278.0	15.0	330.0	266.0	228.0	1,070.0	1,720.0	7.5	--
12	9/25/74	65.0	15.0	77.0	11.0	394.0	29.0	35.0	548.0	749.0	6.6	78
13	9/25/74	150.0	22.0	50.0	3.0	193.0	350.0	24.0	780.0	1,050.0	--	67
13A	9/25/74	210.0	51.0	180.0	11.0	514.0	580.0	53.0	1,420.0	1,880.0	6.4	71
14	2/ 4/65	117.0	22.0	88.0	--	388.0	218.0	19.0	(691.0)	1,020.0	7.5	--
15	9/15/24	494.0	91.0	3,310.0	--	1,969.0	3,401.0	2,500.0	10,960	--	--	86
16	8/30/62	100.0	9.0	--	--	1,280.0	286.0	1,140.0	3,470.0	5,680.0	8.0	95
17	10/18/74	--	--	3,900.0	140.0	--	--	2,800.0	--	20,000.0	--	64
18	9/15/24	368.0	85.0	2,219.0	--	1,757.0	1,712.0	1,940.0	7,320.0	--	--	68
18A	5/ 2/73	300.0	68.0	2,000.0	81.0	1,970.0	1,300.0	1,900.0	6,650.0	9,930.0	6.5	63
19	2/27/65	48.0	9.0	46.0	--	158.0	66.0	36.0	330.0	519.0	7.6	--
20	4/ 4/74	49.0	1.5	56.0	5.5	228.0	57.0	4.2	332.0	490.0	7.9	63
21	1/21/65	147.0	25.0	92.0	--	205.0	450.0	22.0	(872.0)	1,190.0	7.3	--
22	6/ 5/73	120.0	9.0	2,400.0	6.6	241.0	4,500.0	580.0	7,760.0	10,100.0	8.5	70
23	6/ 5/73	380.0	61.0	3,500.0	88.0	1,410.0	3,300.0	3,100.0	11,100.0	15,700.0	6.8	126
24	10/ 2/73	77.0	26.0	100.0	5.5	335.0	120.0	82.0	599.0	960.0	7.9	79
25												
26	9/29/26	400.0	73.0	3,450.0	--	1,498.0	3,645.0	2,660.0	11,120.0	--	--	115
27	9/14/24	260.0	70.0	2,400.0	--	1,301.0	1,728.0	2,370.0	7,510.0	--	--	70
28	5/23/73	57.0	13.0	28.0	2.6	217.0	63.0	9.3	310.0	487.0	7.6	60
29	5/23/73	96.0	15.0	24.0	1.7	331.0	72.0	11.0	418.0	651.0	7.6	54
30	9/ 5/73	210.0	37.0	310.0	14.0	171.0	990.0	160.0	1,840.0	2,440.0	6.4	60

( ) estimated

* Deep test; Shell Oil - sample may not be representative of formation water.

Water Quality Data, Jemez Basin and Vicinity

Data No.	Date	Ca^{++}	Mg^{++}	Na^{+}	K^{+}	HCO_3^{-}	SO_4^{--}	Cl^{-}	TDS	Ec	pH	Temp. °F
31	9/ 5/73	270.0	62.0	420.0	26.0	594.0	850.0	410.0	2,350.0	3,190.0	7.0	66
31	10/15/71	292.3	53.5	1,820.0	90.0	1,197.2	1,221.3	1,900.0	6,737.7	9,100.0	6.8	
32	5/24/73	110.0	18.0	1,400.0	63.0	1,320.0	470.0	1,400.0	4,150.0	6,420.0	6.4	59
33	5/24/73	100.0	15.0	120.0	7.3	416.0	91.0	96.0	674.0	1,070.0	7.0	66
34	5/ 1/53	102.0	19.0	144.0	1,220.0	436.0	90.0	133.0	--	1,220.0	--	--
34A	5/24/73	88.0	12.0	69.0	4.1	338.0	55.0	60.0	482.0	788.00	7.3	61
35	1/19/65	68.0	16.0	118.0	--	385.0	49.0	87.0	589.0	946.0	7.6	--
36	8/30/73	110.0	21.0	1,300.0	73.0	1,440.0	270.0	1,200.0	3,780.0	5,694.0	8.0	73
37	1967	59.0	18.0	122.0	--	374.00	44.0	116.0	597.0	980.0	--	--
38	8/30/73	73.0	15.0	120.0	15.0	419.0	40.0	100.0	628.0	1,014.0	8.0	68
40	5/24/73	60.0	11.0	520.0	41.0	788.0	220.0	290.0	1,570.0	2,550.0	7.6	77
41	5/25/73	21.0	4.0	87.0	12.0	281.0	38.0	7.2	324.0	527.0	7.7	57
42	6/ 8/73	31.0	4.0	46.0	3.3	211.0	20.0	3.0	245.0	367.0	7.5	--
44	9/22/24	90.0	12.0	29.0	--	259.0	99.0	4.0	396.0	--	--	60
46	8/31/73	85.0	15.0	11.0	2.0	326.0	26.0	4.4	335.0	549.0	8.0	57
47	11/14/74	40.0	3.4	10.0	2.0	152.0	7.1	2.5	164.0	234.0	7.9	37
48	11/ 2/73	50.0	12.0	37.0	--	216.0	--	10.0	284.0	390.0	8.0	55
49	8/21/73	32.0	5.7	190.0	8.2	366.0	120.0	49.0	638.0	984.0	8.0	66
50	8/21/73	30.0	8.0	185.0	--	296.0	--	48.0	660.0	780.0	7.8	--
51	11/ 2/73	50.0	9.9	38.0	4.9	263.0	25.0	5.9	292.0	472.0	8.2	55
52	11/14/74	48.0	5.1	60.0	9.8	203.0	15.0	71.0	350.0	584.0	7.4	39
53	10/26/73	7.2	2.7	790.0	7.4	1,470.0	97.0	300.0	1,960.0	3,200.0	8.4	61
54	10/ 5/73	78.0	14.0	120.0	16.0	362.0	52.0	130.0	647.0	1,090.0	7.5	82
55	10/26/73	6.0	7.0	600.0	--	1,156.0	--	290.0	1,964.0	2,320.0	8.4	61
55A	6/ 8/73	85.0	18.0	128.0	--	284.0	--	176.0	692.0	1,000.0	7.6	59
56	6/ 6/73	63.0	14.0	37.0	3.7	218.0	87.0	11.0	364.0	571.0	7.4	64
57	10/ 2/73	27.0	5.8	14.0	2.1	129.0	9.8	7.9	205.0	241.0	7.6	59
58	6/ 8/73	48.0	11.0	37.0	--	188.0	--	6.0	350.0	370.0	--	--
59	6/ 8/73	26.0	10.0	12.0	--	108.0	--	6.0	104.0	190.0	7.8	--
60	9/18/73	19.0	5.9	7.3	5.9	91.0	17.0	2.4	159.0	182.0	6.8	54
61	8/28/73	15.0	4.2	13.0	1.8	97.0	4.9	2.5	155.0	161.0	7.6	55
62	9/18/73	18.0	5.1	7.5	7.0	79.0	16.0	3.6	153.0	179.0	6.7	59
63	8/28/73	20.0	5.9	7.0	5.5	88.0	22.0	3.7	161.0	194.0	7.5	51
64	10/30/73	100.0	11.0	14.0	5.8	367.0	21.0	13.0	365.0	636.0	7.2	51
65	10/30/73	101.0	14.0	14.0	--	300.0	--	16.0	398.0	500.0	7.7	52
66	11/30/70	66.0	4.6	9.1	1.6	238.0	6.5	2.4	230.0	383.0	7.7	55

Water Quality Data, Jemez Basin and Vicinity

Data No.	Date	Ca^{++}	Mg^{++}	Na^{+}	K^{+}	HCO_3^{-}	SO_4^{--}	Cl^{-}	TDS	Ec	pH	Temp. °F
67	11/30/73	28.0	3.2	11.0	1.6	116.0	7.3	3.7	172.0	212.0	8.2	59
68	9/24/73	19.0	44.0	720.0	66.0	1,550,0	150.0	120.0	2,080.0	3,290.0	8.5	63
68A	1/17/73	140.0	13.0	390.0	51.0	761.0	32.0	470.0	1,520.0	2,540.0	6.7	66
68B	5/17/73	96.0	8.7	180.0	26.0	490.0	38.0	180.0	814.0	1,360.0	6.9	65
69	5/ 5/65	12.0	2.4	8.3	2.8	48.0	16.0	2.8	104.0	124.0	7.1	--
69	3/ 5/66	16.0	2.4	18.0	--	74.0	21.0	4.4	146.0	185.0	7.0	--
69	6/16/66	17.0	2.3	18.0	2.9	91.0	10.0	7.1	153.0	183.0	7.2	--
70	5/ 8 73	16.0	6.0	12.0	--	88.0	3.0	6.0	188.0	135.0	7.4	70
71	4/ 1/71	16.0	9.0	14.0	--	64.0	--	<1.0	120.0	145.0	--	--
71	11/11/71	16.0	4.0	17.0	--	72.0	--	4.0	158.0	140.0	--	--
71	5/10/71	14.0	6.0	18.0	--	72.0	--	4.0	132.0	155.0	--	--
71	9/23/72	18.0	4.0	17.0	--	76.0	--	6.0	126.0	155.0	--	--
71	10/ 4/72	14.0	6.0	19.0	--	72.0	--	4.0	144.0	150.0	--	--
71	8/ 8/73	19.0	3.0	4.0	--	72.0	--	8.0	176.0	180.0	--	--
71	Avg.	15.0	2.4	16.0	--	73.0	15.0	4.4	137.0	164.0	--	--
71	Max.	20.0	3.0	21.0	--	90.0	36.0	7.8	158.0	207.0	--	--
71	Min.	12.0	1.7	8.3	--	21.0	7.6	0.6	98.0	88.0	--	--
72	4/20/50	313.0	30.0	--	--	872.0	196.0	6.0	1,480	--	--	--
73	3/19/73	174.0	22.0	59.0	--	640.0	--	12.0	922.0	1,140.0	7.5	48
73A	3/19/73	157.0	31.0	105.0	--	752.0	--	140.0	984.0	1,280.0	7.4	39
74	5/ 8/73	18.0	5.0	13.0	--	88.0	3.0	6.0	178.0	130.0	7.8	59
75	10/20/76	193.0	16.5	990.3	182.2	951.0	42.0	--	2,436.0	--	7.0	103
75	6/28/49	327.0	27.0	--	--	1,400.0	51.0	1,080.0	3,060.0	5,160.0	6.8	97
75	6/28/49	344.0	29.0	--	--	1,580.0	42.0	1,500.0	3,880.0	6,520.0	6.9	--
75	1/16/73	299.0	24.0	940.0	--	1,236.0	36.0	1,450.0	3,962.0	5,000.0	6.7	115
75	8/21/24	328.0	23.0	1,000.0	--	1,440.0	70.0	1,320.0	3,458.0	--	--	104
75	3/29/74	320.0	16.0	850.0	--	1,200.0	38.0	1,480.0	4,000.0	5,900.0	--	115
75	10/15/71	328.3	14.6	930.0	180.0	1,158.8	41.2	1,480.0	4,256.2	5,770.0	7.0	110
75	4/ 6/76	159.0	21.1	1,140.0	144.3	966.0	39.9	--	3,580.0	--	7.6	101
75	11/ 6/75	312.6	30.6	991.0	186.2	1,150.0	38.4	--	3,870.0	--	7.5	--
76	9/23/72	43.0	5.0	69.0	--	164.0	--	106.0	424.0	600.0	--	--
77	10/15/71	1,121.0	15.1	650.0	110.0	599.8	51.4	940.0	2,611.8	3,200.0	7.5	157
77	4/15/47	18.0	6.0	12.0	--	94.0	15.0	4.0	1,530.0	1,840.0	--	--
77		47.0	14.0	14.0	--	228.0	15.0	4.0	2,700.0	3,510.0	--	--
77		138.0	7.0	572.0	--	735.0	49.0	795.0	2,150.0	3,560.0	7.2	159
77	4/ 3/56	136.0	10.0	618.0	--	716.0	44.0	870.0	2,190.0	3,860.0	6.7	192

Water Quality Data, Jemez Basin and Vicinity

Data No.	Date	Ca^{++}	Mg^{++}	Na^{+}	K^{+}	HCO_3^{-}	SO_4^{--}	Cl^{-}	TDS	Ec	pH	Temp. °F
77	1/16/73	126.0	7.0	650.0	--	600.0	42.0	900.0	2,364.0	3,000.0	7.2	156
77	8/21/24	166.0	9.0	645.0	--	791.0	42.0	820.0	2,184.0	--	--	125
78	10/14/54	117.0	17.0	--	--	465.0	81.0	106.0	--	1,140.0	--	--
79	9/27/73	75.0	13.0	120.0	19.0	387.0	21.0	120.0	626.0	1,030.0	7.5	64
80	9/27/73	70.0	14.0	92.0	--	308.0	--	116.0	634.0	1,000.0	8.1	64
81	10/24/73	14.0	13.0	600.0	--	1,292.0	--	200.0	2,190.0	2,500.0	8.2	63
82	10/26/73	12.0	10.0	860.0	8.5	1,640.0	250.0	200.0	2,170.0	3,210.0	7.6	62
83	1/29/74	51.0	4.7	98.0	17.0	230.0	17.0	120.0	480.0	807.0	7.9	48
(84)	8/31/24	303.0	33.0	157.0	--	0	6,156.0	54.0	7,887.0	--	--	110
(84)	8/31/24	316.0	51.0	127.0	--	0	3,159.0	1.0	4,344.0	--	--	76
(84)	8/31/24	41.0	16.0	52.0	--	0	2,337.0	20.0	2,562.0	--	--	99
84A	5/18/73	170.0	9.2	550.0	68.0	800.0	49.0	800.0	2,140.0	3,550.0	6.7	120
85	10/14/54	93.0	12.0	--	--	370.0	28.0	129.0	--	995.0	--	63
85A	5/30/74	160.0	6.6	510.0	63.0	773.0	43.0	700.0	1,960.0	3,460.0	7.0	58
86	5/28/74	68.0	9.8	170.0	24.0	--	22.0	220.0	580.0	1,340.0	8.0	63
87	1/20/65	17.0	3.3	18.0	--	91.0	11.0	4.2	178.0	184.0	7.5	--
88	6/21/73	180.0	34.0	75.0	8.9	844.0	71.0	14.0	856.0	1,330.0	7.2	61
89	6/ 1/73	99.0	9.0	23.0	--	292.0	--	14.0	402.0	580.0	7.6	--
90	7/13/73	250.0	23.0	67.0	6.1	937.0	76.0	12.0	952.0	1,430.0	6.6	60
91	7/18/74	38.0	4.4	70.0	5.5	254.0	18.0	40.0	393.0	560.0	7.3	--
92	10/24/73	172.0	53.0	400.0	--	1,156.0	--	300.0	2,258.0	2,500.0	7.4	59
92A	5/ 8/73	22.0	5.0	9.0	--	84.0	11.0	6.0	134.0	140.0	7.1	--
93	1/16/73	8.7	4.7	19.0	0.9	94.0	6.6	3.8	149.0	165.0	8.0	--
93A	12/13/74	12.0	4.8	25.0	1.4	88.0	6.8	28.0	179.0	255.0	--	88
94	10/15/71	8.8	8.3	25.0	0	117.8	0	10.0	179.9	162.0	8.2	83
94	1/16/73	44.0	5.0	22.0	0	92.0	6.0	8.0	180.0	140.0	7.8	86
94	10/20/76	9.6	3.0	20.8	0.8	68.9	6.0	--	121.0	--	8.3	89
94	4/19/76	7.0	1.9	20.0	0.8	66.0	6.2	--	149.0	--	8.2	88
94	11/ 6/75	4.6	4.5	20.0	1.2	68.6	7.2	--	130.0	--	8.3	--
95	9/23/72	13.0	3.0	10.0	--	52.0	--	2.0	58.0	95.0	--	--
96	9/18/73	18.0	4.8	9.6	7.8	98.0	12.0	2.6	161.0	187.0	7.1	50
97	9/23/72	11.0	4.0	11.0	--	48.0	--	4.0	96.0	90.0	--	--
106A	9/28/65	13.0	2.8	10.0	--	72.0	2.6	2.8	(135.0)	132.0	7.3	--
110	9/13/73	11.0	1.0	9.0	--	60.0	--	6.0	130.0	105.0	7.3	55
111	10/9/73	22.0	4.0	11.0	--	84.0	--	8.0	164.0	160.0	7.0	--
112	10/ 9/73	11.0	3.0	8.0	--	52.0	--	4.0	118.0	95.0	--	--

() estimated

Water [illegible]ity Data, Jemez Basin and Vicinity

Data No.	Date	Ca^{++}	Mg^{++}	Na^{+}	K^{+}	HCO_3^{-}	SO_4^{--}	Cl^{-}	TDS	Ec	pH	Temp °F
113	8/14/73	19.0	5.0	7.0	--	68.0	2.0	4.0	148.0	140.0	6.8	52
114	3/29/74	115.0	10.0	210.0	--	464.0	30.0	290.0	1,100.0	1,300.0	--	61
114	1/17/73	130.0	19.0	390.0	--	597.0	27.0	442.0	1,528.0	2,000.0	6.9	--
114A	10/15/71	169.0	14.1	520.0	50.0	661.5	102.9	670.0	2,362.0	2,940.0	7.0	58
115	3/21/74	130.0	25.0	100.0	11.0	662.0	32.0	61.0	728.0	1,210.0	6.9	62
115A	8/15/73	130.0	12.0	250.0	35.0	606.0	32.0	320.0	1,130.0	1,880.0	6.8	61
115B	10/24/73	210.0	59.0	570.0	34.0	1,530.0	290.0	300.0	2,260.0	3,250.0	6.8	59
115C	5/25/73	35.0	46.0	840.0	45.0	1,810.0	280.0	330.0	2,500.0	3,660.0	8.2	57
117	1/22/73	6.0	17.0	70.0	--	140.0	<1.0	60.0	272.0	400.0	8.6	48
118	1/23/73	14.0	4.0	12.0	--	64.0	5.0	6.0	188.0	120.0	6.7	48
120		78.0	42.0	550.0	--	1,230.0	200.0	400.0	2,500.0	2,920.0	--	133
121	4/23/74	1.7	2.1	6,300.00	350.0	6,820.0	2,100.0	3,500.0	16,800.0	22,900.0	8.8	--
121A	5/ 3/74	7.3	13.0	4,800.0	180.0	--	1,600.0	2,600.0	9,380.0	18,100.0	7.7	169
121B	7/17/74	30.0	3.6	580.0	35.0	993.0	160.0	320.0	1,730.0	2,720.0	7.2	
122	6/ 8/73	35.0	5.0	14.0	--	124.0	--	2.0	204.0	220.0	7.5	48
123	5/31/73	16.0	3.7	8.4	6.0	39.0	33.0	3.4	151.0	166.0	7.9	47
124	6/29/73	12.0	4.7	360.0	4.6	905.0	59.0	5.7	933.0	1,470.0	8.5	63
124A	7/ 3/73	9.8	6.2	470.0	4.9	1,150.0	35.0	6.6	1,160.0	1,780.0	8.4	70
126	9/23/72	14.0	6.0	23.0	--	64.0	--	4.0	104.0	110.0	--	--
126		15.0	3.0	17.0	2.8	71.0	13.0	6.4	133.0	176.0	7.7	40
126A		5.6	3.4	8.0	T	55.5	0	0	90.5	79.0	8.5	54
127	9/23/72	19.0	6.0	18.0	--	84.0	--	8.0	206.0	170.0	--	--
128	8/1/47	8.0	2.0	--	--	139.0	17.0	11.0	234.0	293.0	7.3	136
128	1/17/73	8.0	6.0	53.0	--	120.0	17.0	8.0	250.0	240.0	8.1	100
128	10/15/71	6.4	3.4	56.0	2.0	173.3	0	9.0	300.1	263.0	8.4	100
128	10/20/76	6.8	1.1	64.5	0.4	111.0	44.0	--	228.0	--	8.1	105
128	4/19/76	4.8	0.5	57.7	1.2	107.0	15.8	--	215.0	--	8.3	105
128	11/ 6/75	6.6	1.7	52.4	1.6	107.0	18.3	--	200.0	--	8.1	--
129	4/30/73	11.0	3.0	16.0	--	64.0	7.0	4.0	210.0	130.0	7.4	61
130	11/23/72	18.0	1.0	31.0	--	100.0	4.0	6.0	299.0	200.0	7.6	--
130	10/15/71	14.4	4.9	39.0	0	172.1	0	0	264.4	230.0	8.0	44
131	8/14/73	34.0	9.0	162.0	--	480.0	5.0	4.0	652.0	880.0	7.5	68
132	10/26/76	29.9	6.4	121.0	5.0	394.0	7.0	--	461.0	--	7.6	66.5
132	4/ 6/76	29.5	5.7	43.4	3.9	352.0	4.8	--	460.0	--	7.9	64
132	11/ 5/75	29.3	7.5	136.0	12.5	368.0	9.1	--	458	--	7.8	--
133	8/25/72	6.0	1.0	170.0	--	124.0	34.0	176.0	566.0	760.0	7.4	--

Water Quality Data, Jemez Basin and Vicinity

Data No.	Date	Ca^{++}	Mg^{++}	Na^{+}	K^{+}	HCO_3^{-}	SO_4^{--}	Cl^{-}	TDS	Ec	pH	Temp. °F
133	5/24/73	3.0	2.0	167.0	--	356.0	<1.0	22.0	498.0	700.0	9.1	88
134	6/ 8/73	19.0	5.0	20.0	--	68.0	--	<1.0	230.0	180.0	7.4	--
134A	10/15/71	18.4	5.3	10.0	7.5	79.9	32.9	--	209.0	180.0	7.6	48
134B	8/14/73	32.0	9.1	170.0	6.9	604.0	11.0	5.5	599.0	912.0	7.5	68
135A		62.0	7.0	15.0	--	200.0	6.0	13.0	322.0	380.0	7.2	--
137	7/21/67	72.0	18.0	25.0	34.0	0	4,520.0	20.0	4,240.0	17,300.0	1.4	178
138		22.0	5.0	12.0	--	68.0	--	8.0	220.0	170.0	7.3	54
139	9/23/72	16.0	4.0	15.0	--	64.0	--	2.0	164.0	130.0	--	--
140	9/23/72	78.0	15.0	48.0	--	16.0	--	164.0	662.0	700.0	--	--
141	10/15/71	100.1	19.9	45.0	23.0	0	551.4	50.0	850.1	1,165.0	3.5	--
142	6/ 5/73	48.0	11.0	10.0	--	156.0	18.0	14.0	294.0	320.0	7.5	--
143	10/15/71	19.2	0.5	11.0	2.5	94.0	--	--	157.2	176.0	7.5	48
145	8/31/49	168.0	23.0	14.0	--	0	614.0	8.0	967.0	1,270.0	3.1	--
145	8/31/49	185.0	52.0	7.0	--	0	1,570.0	4.0	1,950.0	4,570.9	1.9	160
145	8/31/49	110.0	11.0	24.0	--	0	2,740.0	20.0	2,960.0	8,510	1.6	--
145	8/31/49	101.0	23.0	10.0	--	0	3,280.0	3.0	3,160.0	12,700	1.4	--
145	11/ 4/63	7.0	10.0	24.0	--	0	35,100.0	24.0	--	13,800.0	1.8	189
148		30.0	0.1	1,959.0	456.0	99.0	68.0	3,453.0	6,895.0	--	7.2	--
151A		22.0	0.1	2,123.0	528.0	112.0	107.0	3,828.0	7,533.0	--	7.4	--
152		16.0	0.2	2,152.0	443.0	144.0	93.0	3,627.0	7,203.0	--	7.6	--
155		6.3	0.3	1,473.0	300.0	182.0	42.0	2,495.0	5,100.0	--	6.7	--
156		6.8	0.5	1,733.0	329.0	214.0	164.0	2,783.0	6,477.0	--	7.6	--
157	10/15/71	14.4	2.4	6.0	5.0	79.9	0	0	130.7	107.0	6.3	42
158	10/15/71	3.2	0	8.0	0	31.1	0	0	50.3	67.0	7.0	46
159	10/15/71	7.2	2.9	6.0	1.5	54.9	--	--	93.5	67.0	7.5	41
160	10/15/71	5.6	1.5	8.0	0	45.8	0	0	88.9	88.0	7.0	44
~~160~~		~~8.5~~	~~0.1~~	~~1,721.0~~	~~322.0~~	~~84.0~~	~~30.0~~	~~3,082.0~~	~~6,018~~			
162	10/26/49	13.0	2.4	19.0	--	87.0	9.3	2.0	165.0	157.0	--	--
163	10/26/49	13.0	2.4	--	--	87.0	9.3	2.0	165.0	160.0	--	54
~~165~~	~~10/15/71~~	~~14.4~~	~~2.9~~	~~7.0~~	~~2.0~~	~~25.0~~	~~16.5~~	~~20.0~~	~~107.8~~	~~132.0~~	~~7.0~~	~~46~~
167	10/26/49	6.0	2.2	19.0	--	73.0	2.5	1.0	142.0	126.0	--	--
167	10/12/49	6.0	0.9	--	--	55.0	2.0	1.5	125.0	90.0	--	63
167A	10/26/49	10.0	2.7	--	--	75.0	4.1	2.0	142.0	110.0	--	61
167B	10/26/49	6.0	2.2	--	--	73.0	2.5	1.0	142.0	125.0	--	57
168	10/26/49	10.0	2.7	16.0	--	57.0	4.1	2.0	142.0	109.0	--	--
168	10/22/76	5.2	0.2	12.2	0.4	39.7	3.0	--	129.0	--	8.0	64

Water ity Data, Jemez Basin and Vicinity

Data No.	Date	Ca^{++}	Mg^{++}	Na^{+}	K^{+}	HCO_3^{-}	SO_4^{--}	Cl^{-}	TDS	Ec	pH	Temp. °F
168	4/28/76	4.0	0.1	197.0	0.4	36.2	1.0	--	118.0	--	7.7	65
168	11/ 6/75	5.2	0.5	13.3	0.4	38.0	4.3	--	122.0	--	8.0	--
169A	10/15/71	6.4	2.4	18.0	1.3	81.1	--	--	127.2	104.0	7.4	46
169A	6/20/50	6.0	2.0	11.0	--	48.0	2.1	1.5	108.0	84.0	--	--
171	10/15/71	6.4	2.9	10.0	3.5	66.5	0	0	109.3	88.0	7.2	40
172A	10/15/71	4.0	2.4	7.0	4.0	48.8	0	T	111.2	77.0	7.7	42
176	10/15/71	4.0	1.0	17.0	T	62.2	0	0	94.2	67.5	7.7	52
177	6/20/50	6.0	2.0	--	--	48.0	2.1	1.5	108.0	85.0	--	--
184	9/23/65	24.0	3.2	48.0	13.0	179.0	15.0	14.0	(229.0)	370.0	7.2	--
187	9/23/65	18.0	5.4	13.0	--	104.0	4.4	5.4	(123.0)	194.0	7.4	--
193	6/ 7/51	16.0	2.6	19.0	--	96.0	4.9	4.5	146.0	177.0	--	79
195	4/ 1/52	19.0	4.4	12.0	--	96.0	4.4	4.5	139.0	176.0	--	78
195	5/14/52	10.0	0.5	54.0	--	140.0	6.9	3.0	192.0	254.0	--	62
196	4/ 1/52	13.0	2.1	25.0	--	103.0	4.8	3.0	156.0	172.0	--	82
197	3/29/52	13.0	1.4	54.0	--	166.0	8.2	4.8	220.0	281.0	--	85
198	4/ 4/52	13.0	1.1	25.0	--	97.0	4.9	3.5	163.0	169.0	--	78
199	5/14/52	7.4	1.0	80.0	--	177.0	20.0	18.0	244.0	383.0	--	63
199B	5/14/52	5.8	1.0	84.0	--	185.0	18.0	2.0	251.0	379.0	--	65
199C	5/14/52	16.0	0.5	32.0	--	117.0	7.5	4.0	152.0	200.0	--	58
200A	5/14/52	2.9	0.4	63.0	--	138.0	6.9	4.0	188.0	273.0	--	78
201	5/14/52	9.2	0.3	27.0	--	91.0	3.5	2.5	125.0	151.0	--	73
202	9/23/65	31.0	7.7	13.0	--	104.0	23.0	15.0	(183.0)	292.0	7.1	126
204	10/17/73	34.0	6.2	19.0	2.8	126.0	43.0	6.8	198.0	305.0	8.2	53
205	8/ 5/75	50.0	12.0	65.0	5.2	374.0	9.7	4.8	344.0	580.0	7.2	51
207	1/17/73	11.0	3.0	10.0	--	60.0	3.0	6.0	94.0	95.0	7.4	54
207A	5/22/73	13.0	1.6	8.1	2.2	54.0	10.0	2.1	99.0	109.0	7.4	55
208	1/17/73	6.0	6.0	10.0	--	52.0	3.0	2.0	102.0	80.0	7.2	57
209	9/13/73	11.0	3.0	21.0	--	56.0	--	6.0	150.0	105.0	7.3	48
210	5/24/73	5.0	2.0	101.0	--	92.0	5.0	120.0	406.0	480.0	9.0	88
211	1/22/73	8.0	6.0	40.0	--	68.0	<1.0	32.0	138.0	200.0	8.6	64
212	1/17/73	16.0	2.0	9.0	--	64.0	4.0	2.0	114.0	90.0	7.5	48
213	10/20/76	3.0	0.1	25.0	0.8	42.3	7.0	--	147.0	--	7.9	105
213	4/19/76	10.4	0	22.8	1.2	42.3	7.2	--	145.0	--	7.9	105
213	11/ 5/75	2.8	0.1	23.2	2.0	43.4	8.2	--	160.0	--	8.1	--
213	10/15/71	4.0	1.9	26.0	2.0	90.3	0	2.0	186.2	119.0	8.2	100
213A	5/16/73	4.7	0.3	23.0	2.0	61.0	8.8	2.3	150.0	122.0	7.7	105

() estimated

Water Quality Data, Jemez Basin and Vicinity

Data No.	Date	Ca^{++}	Mg^{++}	Na^{+}	K^{+}	HCO_3^{-}	SO_4^{--}	Cl^{-}	TDS	Ec	pH	Temp. °F
214	10/15/71	6.4	2.4	13.0	3.0	62.9	0	5.0	167.7	94.0	8.0	80
215	10/16/49	8.0	2.0	--	--	45.0	2.9	2.0	105.0	80.0	--	--
216	10/15/71	10.4	3.4	13.0	2.0	43.3	--	25.0	152.1	220.0	8.5	54
218		28.0	1.2	83.0	--	623.0	335.0	121.0	2,970.0	2,225.0	8.0	--
219	10/22/49	164.0	24.0	16.0	--	0	1,160.0	4.0	1,600.0	2,270.0	--	--
223	10/15/71	21.6	6.3	9.0	5.0	129.4	--	--	197.3	164.0	7.5	55
224	10/22/76	5.4	0.2	28.8	3.9	54.3	2.0	--	184.0	--	7.7	99
224	4/22/76	5.0	0.1	27.8	3.1	52.4	12.0	--	187.0	--	7.7	99
224	11/ 6/75	5.4	0.3	28.7	4.3	54.2	15.4	--	182	--	7.8	--
224	7/28/49	4.0	0.3	--	--	59.0	7.0	3.0	149.0	122.0	--	106
213	7/28/49	6.0	0.5	--	--	76.0	14.0	3.0	199.0	164.0	--	81
213	5/24/73	3.0	1.0	22.0	--	58.0	8.0	6.0	202.0	110.0	7.5	72
213	5/28/73	6.0	2.0	16.0	--	52.0	<1.0	6.0	206.0	110.0	7.4	70
226	10/15/71	6.1	2.4	8.0	4.0	58.0	--	7.0	113.5	81.0	7.0	36
227	6/20/50	7.2	0.6	12.0	--	45.0	2.1	1.8	108.0	86.0	--	--
227	10/16/49	10.0	1.6	7.2	--	42.0	3.5	3.0	90.0	85.0	--	--
228	7/ 6/49	6.0	0.9	11.0	--	38.0	2.1	2.0	98.0	80.0	--	--
230	10/16/49	15.0	1.1	16.0	--	49.0	3.3	1.0	123.0	107.0	--	--
230A	10/22/76	6.4	0.2	9.5	0.4	29.3	7.0	--	106.0	--	8.0	58
230A	4/22/76	5.0	0.1	10.1	0.4	28.8	1.0	--	85.0	--	7.8	59
230A	11/ 6/75	6.6	0.3	10.1	0.8	35.1	5.3	--	78.0	--	8.2	--
231		10.0	1.9	--	--	70.0	3.3	2.0	124.0	100.0	--	63
232	10/16/49	10.0	1.9	16.0	--	70.0	3.3	2.0	124.0	100.0	--	--
232A	10/22/76	6.8	0.2	8.9	0.4	33.7	13.0	--	103.0	--	7.7	52
232A	4/22/76	5.8	0.2	10.1	0.4	31.1	1.0	--	110.0	--	8.1	53
232A	11/ 6/75	6.4	0.5	10.1	0.4	31.7	3.4	--	88.0	--	7.3	--
233	10/16/49	10.0	1.6	--	--	42.0	3.5	3.0	90.0	85.0	--	64
233A	7/27/49	11.0	2.5	19.0	--	68.0	13.0	2.0	143.0	122.0	--	62
233B	10/15/71	4.0	0	17.0	0.3	59.3	0	0	93.5	870.0	8.2	53
234	10/16/49	15.0	1.1	--	--	77.0	3.3	1.0	125.0	110.0	--	63
235	10/16/49	8.0	0.9	--	--	48.0	3.7	2.0	111.0	85.0	--	55
235A	7/ 6/49	6.0	0.9	--	--	40.0	2.6	1.5	103.0	80.0	--	50
242	1/ 7/65	54.0	17.0	35.0	--	170.0	131.0	3.7	358.0	539.0	8.0	--
243	6/19/74	88.0	19.0	8.4	2.2	381.0	9.0	2.6	332.0	570.0	7.1	51
244	5/30/73	28.0	5.1	11.0	2.0	96.0	38.0	3.7	175.0	233.0	7.3	50
245	3/ 7/74	30.0	7.7	50.0	6.9	247.0	20.0	2.5	263.0	430.0	7.4	51
246	6/19/74	11.0	3.0	7.7	1.0	60.0	4.1	1.5	112.0	120.0	6.8	61
247A	3/ 7/74	12.0	4.8	9.9	1.1	80.0	2.1	1.9	124.0	141.0	7.8	64
249	3/ 7/74	340.0	70.0	330.0	13.0	362.0	1,100.0	330.0	2,390.0	3,190.0	7.5	--

Supplement To Water Quality Data, Jemez Basin and Vicinity

Data No.	Date	Ca^{++}	Mg^{++}	Na^{+}	K^{+}	HCO_3^{-}	SO_4^{--}	Cl^{-}	TDS	Ec	pH	Temp.
75	9/23/75	297.0	25.9	1050.0	192.0	1369.0	39.9	1470.0	3620.0		7.5	
75	1/29/76	300.0	32.5	1020.0	213.0	1176.0	36.0	1500.0	3603.0		7.4	
94	8/ 8/75	6.5	1.8	19.6	1.0	77.7	2.9	3.5	202.0		7.9	
94	1/29/76	8.6	1.7	19.6	0.9	64.2	1.0	3.7	151.0		8.4	
128	8/ 8/75	4.8	0.4	52.6	1.5	126.0	11.9	8.0	236.0		8.0	
128	1/29/76	5.7	0.4	53.0	1.2	103.0	14.0	7.8	223.0		8.3	
132	8/ 8/75	206.0	4.2	107.0	4.6	392.0	<1.0	4.6	4.9		8.0	
132	1/30/76	27.6	5.6	127.0	5.2	377.0	3.0	4.2	458.0		7.6	
168	9/25/75	4.0	0	12.3	0.4	43.1	<1.0	1.0	164.0		7.7	
168	1/30/76	4.9	0.1	12.5	0.4	36.4	<1.0	0.6	132.0		8.1	
213	9/24/75	2.7	0	22.3	2.0	51.5	2.5	3.1	234.0		7.8	
213	1/29/76	2.5	0	22.1	1.5	40.7	2.0	2.6	146.0		8.3	
230A	8/14/75	5.1	0.1	10.4	0.6	32.6	1.6	1.3	160.0		7.7	
232A	8/14/75	5.2	0.1	10.0	0.4	30.0	<1.0	1.2	158.0		7.5	
233B	8/14/75	6.3	0.1	8.5	0.5	32.2	<1.0	1.8	178.0		7.4	

Source of Supplement to Water Quality Data: CEP, Santa Fe, New Mexico for Union Oil Co.

APPENDIX II

Part 4
Trace Elements

TRACE ELEMENT ANALYSES
(Concentration In ppb)

Data No.	Date	Arsenic	Boron	Iron	Lithium	Manganese
2	12/12/74	20	150	110	100	0
3	12/12/74	7	80	80	100	0
9	8/26/72	110	2,200	800	---	--
13	9/25/74	4	210	3,000	200	70
17	10/18/74	190	8,200	---	7,100	--
18	5/ 2/73	210	20	800	---	740
20	4/ 4/74	4	110	1,700	60	0
22	6/ 5/73	0	1,800	30	1,200	20
23	6/ 5/73	360	7,500	1,400	---	90
24	10/ 2/73	2	290	0	210	13
28	5/23/73	3	50	60	---	20
29	5/23/73	0	20	30	---	0
30	9/ 5/73	2	--	15,000	640	260
31	9/ 5/73	5	1,200	80	1,100	630
32	5/24/73	86	5,800	1,500	>2,800	340
33	5/24/73	8	320	400	---	210
34	5/24/73	0	170	40	---	0
35	8/30/73	17	990	540	890	750
36	8/30/73	69	8,200	50	6,700	1,300
40	5/24/73	20	3,300	30	---	70
41	5/25/73	43	670	90	---	80
42	6/ 8/73	15	50	20	---	0
46	8/31/73	0	40	--	50	--
49	8/21/73	67	380	140	---	80
51	11/ 2/73	0	210	60	140	250
52	1/29/74	50	1,000	30	960	120
54	10/ 5/73	68	1,300	90	1,500	80
56	6/ 6/73	1	60	450	---	380
57	10/ 2/73	5	20	20	10	8
61	8/28/73	1	10	10	10	0
64	10/30/73	0	60	10	60	10
66	10/30/73	2	10	20	20	0
67	10/30/73	0	10	80	30	0
69	6/ 7/73	6	2,200	--	--	--
72	7/18/74	26	370	10	560	0
75	3/ 8/73	1,100	14,000	--	--	--
77	5/30/74	780	7,400	450	7,800	300
78	1/29/74	120	85	50	1,300	30
79	9/27/73	150	1,200	30	1,400	0
82	7/ 3/74	5	2,100	--	370	--
85	5/28/74	230	1,900	750	2,300	820
88	6/21/73	5	180	9	--	20
91	7/13/73	4	140	30	--	0
96	9/18/73	1	20	110	0	0
114	3/ 8/73	3	3,300	--	--	--

Trace Element Analyses (Cont.)

Data No.	Date	Arsenic	Boron	Iron	Lithium	Manganese
121	5/14/74	39	15,000	30	12,000	340
122	5/31/73	0	70	140	--	0
124	6/29/73	8	490	10	--	0
125	3/21/74	3	510	2,000	690	240
126	11/14/74	6	40	60	80	0
152	--	4,500	--	--	--	--
204	6/27/74	3	20	890	--	0
205	8/ 5/74	0	90	50	100	20
207	5/22/73	4	20	260	--	0
213	5/16/73	3	40	160	--	0
243	6/19/74	2	20	20	20	20
244	1/10/74	4	60	5	20	<3
244	3/19/73	4	50	40	5	<4
245	6/19/74	1	110	40	100	0
246	6/19/74	2	10	30	10	0
247	3/ 7/74	7	10	80	20	0
249	3/ 7/74	0	150	10	130	1,200
Baca Wells						
148	12/22/73	4,600	30,000	400	--	--
148	1/12/76	4,000	--	90	--	100
148	2/24/76	3,300	25,000	70	--	30
148	4/ 8/76	3,500	29,000	100	27,000	200
149	10/14/76	4,500	27,000	180	27,000	nd<20
151A	1/22/76	3,300	32,000	1,000	33,000	200
151A	2/25/76	4,200	30,000	190	31,000	60
151A	4/ 7/76	4,000	30,000	70	31,000	90
152	1/22/76	2,400	23,000	300	32,000	80
152	2/25/76	4,500	29,000	160	31,000	60
152	4/ 7/76	4,000	30,000	70	31,000	90
156	1/11/76	2,900	20,000	70	--	30
156	2/26/76	3,100	22,000	100	--	25
156	4/ 7/76	2,900	21,000	50	24,000	20
Stream Water						
139	10/14/76	3		200		nd<20
140	10/14/76	<1		400		40
143	10/15/76	5		44,000		2,600

GEOTHERMAL SOURCE ANALYSES

		Cl	As	TDS	Max. Temp. °F
San Ysidro Springs	T15N R1E	2,500	.2RFD	10,960	
Indian Springs	T15N R1E	1,400	.086	3,114	123
Montezuma (Las Vegas) Hot Spr.	T16N R16E	160	.04	530	131
Kaseman 1	T16N R1W	2,705		11,274	
Warm Springs (flowing well)	T16N R1W	2,940	--	12,870	128
Jemez Springs	T17N R2E	700-870	1. - .78	1,752-2,190	169
Soda Dam Spring	T18N R2E	1,540	.08-1.5	3,950	115
McCauley Spring	T18N R3E	3	.017	179	90
LASL GT-2 Well	T19N R2E	400	--	2,500	
Spence Hot Spring	T19N R3E	8-14	.01-.07	180-250	111
Sulphur Springs (water)	T19N R3E	2-241	.01-1.0	2,000-5,400	180
San Antonio Hot Spring	T20N R3E	2.3	.003	150	106
San Antonio Warm Spring	T20N R3E	8	.015	206	101
Ojo Caliente	T24N R8E	246	.06	2,438	132
Ponce de Leon Hot Spring	T24N R13E	78	.007	486	95
Mamby (American) Hot Spring	T26N R12E	59	0	520	100
	T27N R11E	55	.011	505	99
Socorro Thermal Area	T3S R1W	8-16	.01-.05	210-318	95
Socorro Thermal Area	T3S R1W	14	--	242	95
Socorro Thermal Area	T3S R1W	12	.05	298	95
Socorro Thermal Area	T3S R1W	14	--	49	95
Socorro Thermal Area	T3S R1W	42	--	3,440	95
Upper Frisco Hot Spring	T5S R19W	12	.007	223	98
The Meadows	T11S R14W	10		150	90
Low Frisco Hot Springs	T12S R20W	460	.011	1,020	121
Gila Hot Springs	T13S R13W	104	.011	496	152
Truth or Consequences Thermal Area	T14S R4W	1,300	.006	2,500	114
Barney lorio No. 1	T14S R5W	262	.015	4,931	91
Cliff-Gila Riverside Area	T16S R17W	20	.018	439	95
Derry Warm Springs	T17S R4W	257	.011	823	93
Rincon Well	T19S R2W	477	--	1,171	132
Apache Tejo	T19S R12W	16	.002	868	
Warm Springs	T20S R11W	11	.006	320	94
Faywood Hot Spring	T20S R11W	22	.011	384	131
Radium Springs	T21S R1W	1,700	.009	3,600	142
Las Alturas Estates	T23S R2E	580	.011	1,000	113
"Animas Valley Hot Spot"	T25S R19W	6-244	.01--.02	247-1,786	216

Source: Geothermal Resources of New Mexico
New Mexico State Bureau of Mines and Minerals

APPENDICES
II and III

TO

HYDROLOGY OF THE REGION SURROUNDING THE VALLES CALDERA

PROJECT OF
UNION OIL GEOTHERMAL DIVISION
UNION OIL COMPANY

WATER RESOURCES ASSOCIATES, INC.
3009 North 67th Place
Scottsdale, Arizona

WATER RESOURCES ASSOCIATES, INC.
P. O. BOX 1881
SCOTTSDALE, ARIZONA 85252

JOHN R. ERICKSON, P.E.

TELEPHONE (602) 947-7474

February 16, 1977

Mr. Richard F. Dondanville
Union Oil Company of California
Union Geothermal Division
461 South Boylston
Los Angeles, California 90017

Dear Dick:

Enclosed herewith are copies of Appendices II and III which Dick Engebretsen requested I send directly to you.

Appendix II is in three parts. Part 1 is all data, except detailed chemical analyses, relative to selected wells, springs and surface water gaging stations in the areas covered by the plates. Part 2 is water quality data for all the data points reporting chemical analyses in some detail. Part 3 in Appendix II is a table presenting trace elements which are commonly found in geothermal water.

Appendix III is made up of a group of work sheets of Stiff diagrams of all data points corresponding to Part 2 of Appendix II. The diagrams are not in order, but each one is numbered in accordance with the master tabulation. These diagrams were used in evaluation of the water chemistry and in the preparation of Plates IV and V.

Also enclosed is a copy of revised Plate VI, which now includes the high arsenic content of the Baca wells in the Redondo Creek area.

Sorry this has taken so long, but I think you appreciate the amount of time involved to bring all these data together.

Sincerely,

John R. Erickson, P.E.

Enclosure
cc: Dick Engebretsen

WATER RESOURCES ASSOCIATES, INC.
P. O. BOX 1681
SCOTTSDALE, ARIZONA 85252

JOHN R. ERICKSON, P.E.

TELEPHONE (602) 947-7474

February 17, 1977

R. O. ENGEBRETSEN
FEB 22 1977

Mr. Dick Engebretsen
Union Oil Company
Union Geothermal Division
Mountain Route Box 76
Jemez Spring, New Mexico 87025

Dear Dick:

Transmitted herewith are eleven copies of our Appendices II and III of the report on Hydrology of the Region Surrounding The Valles Caldera.

One copy was transmitted to Dick Dondanville on February 16. A copy of the letter of transmittal to him is enclosed.

Sincerely,

John R. Erickson, P.E.

Enclosure

APPENDIX II

Part 1

Selected Wells, Springs and Surface Water Gaging Stations

APPENDIX II

Basic Data

)ata For Selected Wells, Springs and
Related Data at Surface Water Gaging Stations
Jemez Mountains Area, New Mexico

Data Number	Name	Type	Township & Range	Section	Latitude	Longitude	Land Surface Altitude (ft)	Depth To Water (ft)	Altitude of Water Level (ft)
1	Rio Grande At Albuquerque	Surface			35°05'21"	106°40'48"			
2		Well	12N2E	14.433	35°15'46"	106°42'05"	5602	637	4965
3		Well	12N2E	25.421	35°14'22"	106°40'42"	5370	373	4997
4		Well	21N3E	31.134			5200		
5		Well	12N3E	30.121	35°14'46"	106°40'06"	5356	420	4936
6		Well	12N3E	24.423			5030		
7		Well	12N4E	6.200			5050		
8		Well	12N4E	5.214			5040		
9		Well	13N3E	18.31			5733		
10	Jemez River Below Jemez Canyon Dam	Surface	13N4E	5.1	35°23'24"	106°32'03"			
11	"	Surface			35°23'10"	106°31'45"	5100		
		Well	13N4E	1.234			5580		
13		Well	13N4E	1.412			5100		
13A		Well	13N4E	1.421			5100		
14		Well	14N5E	19.221			5150		
15	San Ysidro Group	Spring	15N1E	8.32			5540		
16	Indian Springs	Spring	15N1E	9.2			5580		
17		Well	15N1E	16.233			5530		
18	San Ysidro Group	Spring	15N1E	10.14			5530		
18A		Spring	15N1E	10.310			5530		
19		Well	15N2E	22.400			5500		
20		Well	15N2E	12.431			5750		
21		Well	15N5E	13.330			5170		
22		Spring	16N1W	29.230			5830		
23		Spring	16N1W	1.421			6020		
24		Spring	16N1E	6.321			6360		
25	Hot Well	Well	16N1W	1.243			6021		
26	Kaseman Well	Well			35°37'04"	106°52'54"	5900		
27	Penasco Spring	Spring	16N1E	20.32			6000		
28	Log Spring	Spring	16N1E	5.244			7175		
29		Spring	16N1E	3.441			7000		
30		Spring	16N1E	25.244			5700		
31		Spring	16N2E	30.313			5600		
32		Spring	16N2E	20.332			5540		
33		Spring	16N2E	18.214			5860		
34	Owl Spring	Spring	16N2E	7.441			5780		
		Spring	16N2E	7.432			5850		
		Well	16N2E	16.411			5580		

Altitude of Water Level (ft)	Depth of Well (ft)	Source of Formation For Water	Temp. °F	Date Sampled	Total Dissolved Solids ppm	Electric Conductivity µmhos	pH	Rate of Flow (gpm)
4965		Santa Fe	67	12/12/74	265	367	--	1,000
4997		Santa Fe	55	12/12/74	267	352	7.4	650
	350	Santa Fe		4/27/65	343	501	7.8	
4936		Santa Fe	61	12/12/74	255	348	7.5	1,000
	96	Santa Fe		2/26/65	598	878	7.5	
	--	Santa Fe		1/21/65	457	666	7.5	
		Santa Fe	81	9/25/74	421	642	--	
	10,000		90	8/26/72	2,460	3,140	9.5	
		Santa Fe	78	9/25/74	548	749	6.6	
		Santa Fe	67	9/25/74	780	1,050	--	
		Santa Fe	71	9/25/74	1,420	1,880	6.4	
	98	Santa Fe		2/4/65	(691)	1,020	7.5	
		Wingate-Chinle	86	9/15/24	10,960	(16,800)	--	
		Penn Rocks	95	8/30/62	3,470	5,680	8.0	
		Chinle	64	10/18/74	--	20,000	--	
		Chinle	68	9/15/24	7,320	11,200	--	
		Chinle	63	5/2/73	6,650	9,950	6.5	
	335	Santa Fe		2/27/65	330	519	7.6	
		Santa Fe	63	4/4/74	332	490	7.9	
	82	Santa Fe		1/21/65	(872)	1,190	7.3	
		Chinle	70	6/5/73	7,760	10,100	8.5	2
		Chinle	126	6/5/73	11,100	15,700	6.8	85
		Chinle	79	10/2/73	599	960	7.9	
			129	3/16/64	11,000	15,300	7.3	
	550		115	9/29/24	11,120	--	--	2,450
			70	9/14/24	7,510	(11,500)	--	
		Pre-cambrian		5/23/73	310	487	7.6	
		Abo		5/23/73	418	651	7.6	
		Chinle		8/5/73	1,840	2,440	6.4	2
		Alluvial	66	9/5/73	2,350	3,190	7.0	
		Chinle	59	5/24/73	4,150	6,420	6.4	
		Abo	66	5/24/73	674	1,070	7.0	
		Penn Rocks		5/1/53		1,270		32
		Madera	61	5/24/73	482	788	7.3	
	81	Alluvial		1/19/65	589	946	7.6	

Depth to Water (ft)	Altitude of Water Level (ft)	Depth of Well (ft)	Source Formation For Water	Temp. °F	Date Sampled	Total Dissolved Solids ppm	Electric Conductivity µmhos	pH	Rate of Flow (gpm)
			Alluvial	73	8/30/73	3,780	5,694	8.0	
		82			1967		980		
			Alluvial	68	8/30/73	628	1,014	8.0	
			Chinle	77	5/24/73	1,570	2,550	7.6	
			Chinle	57	5/25/73	324	527	7.7	
			Santa Fe		6/8/73	245	367	7.5	
			Dakota S.S. Alluvial	60	9/22/24				
			Dakota S.S.	60	9/22/24	396	--	--	
			Abo	57	8/31/73	335	549	8.0	
					11/14/74	164	254	7.9	
		200	Pre-cambrian	55	11/2/73	284	390	8.0	
			Madera	66	8/21/73	638	984	8.0	
			Perm Rocks		8/21/73	638	100	7.6	
			Pre-cambrian	55	11/2/73	292	472	8.2	
					11/14/74	350	584	7.4	
			Abo	61	10/20/73	1,960	3,200	8.4	
			Alluvial	82	10/5/73	647	1,090	7.5	
		128	Permian	61	10/26/73	1,964	2,320	8.4	
6.5	5[illegible]		Alluvial	59	6/8/73	692	1,000	7.6	
			Chinle	64	6/6/73	364	571	7.4	
				59	10/2/73	205	241	7.2	
					6/8/73	350	370		
			Alluvial	65	6/8/73	104	190	7.8	
				54	9/18/73	159	182	6.8	
				55	8/28/73	155	161	7.6	
				59	9/28/73	153	179	6.7	
				51	8/28/73	161	194	7.5	
			Madera	51	10/30/73	365	636	7.2	
		56	Precambrian	52	10/30/73	398	500	7.2	
			Bandelier	55	11/30/73	230	383	7.7	
			Bandelier	59	11/30/73	172	212	8.2	
			Abo	63	9/24/73	2,080	3,290	8.5	
			Madera	65	1/17/73	1,520	2,540	6.7	
			Madera	65	5/17/73	814	1,360	6.9	
						135	164	7.2	
			Limest. & sandst.	70	5/8/73	188	135	7.4	

Data For Selected Wells, Springs and
Related Data at Surface Water Gaging Stations
Jemez Mountains Area, New Mexico

Data Number	Name	Type	Township & Range	Section	Latitude	Longitude	Land Surface Altitude	Depth to Water	Altitude of
							(ft)	(ft)	(ft
36		Spring	16N2E	29.142			5490		
37	Jemez Pueblo Well	Well	16N2E	16.444			5600		
38		Spring	16N2E	16.411			5540		
39									
40		Spring	16N2E	10.424			5720		
41		Spring	16N2E	11.234			5750		
42	Ojo Chamisa Spring	Spring	16N3E	29.344			6175		
43	Rio Grande Below Cochiti Dam	Surface	16N6E	17.13	35°37'04"	106°19'26"			
44	Ojo del Esperito Santo	Spring			35°41'55"	106°55'46"	6300		
45		Spring	17N1W	15.34			6250		
46		Spring	17N1E	23.223			6960		
	Rio Guadalupe	Surface			35°43'52"	106°45'44"	6040		
	U.S.G.S. Testhole	Well			35°43'45"	106°45'44"	6050		
49		Spring	17N2E	29.311			6040		
50	Jemez School Spring	Spring			35°40'20"	106°45'29"	6000		
51		Spring	17N2E	6.221			6800		
52	Jemez River	Surface			35°39'42"	106°44'34"	5640		
53		Spring			35°41'13"	106°44'10"	5760		
54		Spring	17N2E	21.144			5760		
55	Abandoned Well	Well			35°42'50"	106°43'10"	5850		
55A	Redwood Grove	Well			35°42'50"	106°43'10"	5850	6.5	58
56		Spring	17N2E	36.433			5920		
57		Spring	17N3E	16.244			6800		
58	Vallecitos Creek	Surface	17N3E	16.333			6620		
59	Paliza Spring	Spring	17N3E	16.220			7000		
60		Spring	17N3E	24.113			7750		
61		Spring	17N4E	29.133			7400		
62		Spring	17N4E	6.443			8273		
63		Spring	17N4E	8.444			8500		
64		Spring	18N1E	1.321			7280		
65	U.S.G.S. Testhole	Well			35°49'23"	106°47'31"	7250		
66		Spring	18N1E	13.234			7080		
67		Spring	18N1E	24.443			6960		
68		Spring	19N3E	32.331			6755		
68A		Spring			35°49'46"	106°38'42"	6755		
68B		Spring			35°49'46"	106°38'42"	6755		
	Jemez River below East Fork	Surface			35°49'39"	106°38'51"	6720		
70	Sino Springs	Spring			35°49'16"	106°40'11"	7560		

Date For Selected Wells, Springs and
Related Data At Surface Water Gaging Stations
Jemez Mountains Area, New Mexico

Data Number	Name	Type	Township & Range	Section	Latitude	Longitude	Land Surface Altitude (ft)	Depth to Water (ft)
71	Jemez River	Surface			35°49'45"	106°39'03"	6750	
72		Spring	18N3E	6.1			6640	
73		Spring			35°48'23"	106°40'51"	6640	
73A	Russel Springs	Spring	18N3E	6.2	35°48'	106°40'	6640	
74	Agua Durme Spring	Spring			35°48'29"	106°41'54"	7600	
75	Soda Dam Spring	Spring	18N2E	14/13			6380	
75A	Soda Dam Spring	Spring	18N2E	14/13			6380	
76	Jemez River	Surface			35°46'27"	106°42'00"	6240	
77	Jemez Hot Springs	Spring			35°46'19"	106°40'50"	6200	
78	Bell Well	Well			35°46'10"	106°41'38"	6180	
79		Spring	18N2E	34.232			6040	
80	Morgan Well	Well			35°44±	106°43'±	6020	
81	U.S.G.S. Testhole	Well			35°45'±	106°42'29"	6150	
82		Spring	18N2E	26.334			6200	
83	Jemez River	Surface			35°46'05"	106°41'36.1"	6160	
84	San Diego Canyon	Spring			35°46'18"	106°41'26"		
84A		Spring			35°46'13"	106°41'32"	6160	
85	Via Coeli Well	Well			35°46'41"	106°41'16"	6280	
85A		Well			35°46'14"	106°41'29"	6280	
86		Well	18N2E	24.211	35°46'04"	106°41'36"	6160	
87	Church Canyon Sprg.	Spring	18N3E	18.144			7660	
88		Spring			35°48'08"	106°40'50"	6446	
89	Russel Well	Well			35°48'40"	106°40'17"	6560	
90		Well	18N3E	6.321			6750	
91		Well	18N3E	6.143	35°49'15"	106°39'43"	6640	
92	U.S.G.S. Testhole	Well	18N3E	5.1			6850	
92A	Camp Shaver Well	Well	19N3E	32.34			6800	20
93		Well	18N3E	4.321			7240	
93A		Well	18N3E	4.321			7240	
94	McCauley Spring	Spring	18N3E	4.144			7550	
95	East Fork	Surface	18N3E	2.122			7950	
96		Spring	18N3E	22.412			8190	
97	East Fork	Surface	18N4E	4.334			8510	
98	Santa Fe County	Well			35°49'26"	106°17'54"	7130	
99	Santa Fe County	Well			35°49'20"	106°17'00"	7000	
100	Santa Fe County	Well			35°48'48"	106°17'00"	6800	
101		Spring			35°48'49"	106°10'53"	5460	
102		Spring			35°48'24"	106°11'00"	5500	

Altitude (ft)	Depth to Water (ft)	Altitude of Water Level (ft)	Formation For Water	Temp. °F	Date Sampled	Total Dissolved Solids (ppm)	Electric Conductivity µmhos	pH	Rate of Flow (gpm)
750					Many	(a)	(b)		
640			n Rocks		4/20/50	1,480	2,276		
640			f	48	3/19/73		1,140		16
640			n Rocks	48	3/19/73	984	1,280	7.4	16
600			est.&Sandst.	59	5/8/73	178	130	7.8	
380			dalena	115	9/23/75	2,400	5,500	6.1	36
380			dalena	110	10/20/76	4,200	6,500	7.5	27
240					Many	424	60		
200			n Rocks Fault	(c)	Many	2,611	3,200	7.5	200
180					10/14/54		1,140		
040			uvial	64	9/27/73	626	1,030	7.5	
020				64	9/27/73	634	6,000	8.1	
150			mian Rocks	63	10/24/73	2,190	2,500	8.2	
200				62	10/26/73	2,170	3,210	7.6	
160					1/29/74	480	807	7.8	
			uvial		1/25/74				
160			era	120	5/18/73	2,140	3,550	6.7	
280			uvial	62	10/14/54	625	925	7.3	
280			era	136	5/30/74	1,960	3,460	7.1	
160			era	63	5/28/74	580	1,340	8.0	
660			ndres Glorietta		1/20/65	178	184	7.5	
446			era	61	6/21/73	856	1,380	8.2	
560			uvial		6/1/73	402	580	7.6	
750			era	60	7/13/73	952	1,430	6.6	
640			era		7/18/74	393	560	7.3	
850			Rocks	59	10/24/73	2,258	2,500	7.4	
800	20	6780	uvial		5/8/73	134	140	7.1	
240			les Rhyolite		1/16/73	149	165	8.0	
240			les Rhyolite	88	12/13/74	179	255		
550			flow & Tuff	89	10/10/76	(a)	162	(d)	(e)
950					9/23/72	58	95		
190				50	9/18/73	161	187	7.1	
510					9/23/72	96	90		
130		5971							
000		5934							
800		5934							
460									
55									

(a) 12(
(b) 14(

(c) 93 to 169
(d) 7.8 to 8.3
(e) 542 to 396

Land Surface Altitude	Depth To Water	Altitude of Water Level	Depth of Well	Source Formation For Water	Temp.	Date Sampled	Total Dissolved Solids	Electric Conductivity	pH	Rate of Flow
(ft)	(ft)	(ft)	(ft)		°F	5/11/73	(ppm)	µmhos		(gpm)
5520										
5400										
5480				Totavi Puye*						50
5480				Puye*		9/28/65	(135)	132	7.3	
5380										
5660										
7800										
7710				Bandelier Tuff	55	9/13/73	130	105	7.3	16
7800			88	Abiquiu Tuff		10/9/73	164	160	7.0	
7674										
7790				Bandelier Tuff		8/14/73	143	140	7.8	
6750				Upper Madera	66	11/17/73	1,528	2,000	6.9	16
6750					58	10/15/71	2,362	2,940	7.0	
6960				Madera		3/21/74	728	1,210	6.9	
6960				Madera	61	8/15/73	1,130	1,800	6.8	
6960			155	Madera	59	10/24/73	2,260	3,250	6.8	
6960				Madera	57	5/25/73	2,500	3,660	8.2	
8263	161.7	8101	210			10/21/76				
7900	60.9	7839	500	Bandelier Abo	48	1/22/73				
7760				Alluvial	48	1/23/73	188	120	6.7	
8475			3575		212					
8690	1750	6940	6346	Sandia Madera	133	3/18/74	2,500	(a)		
8685				Madera		4/23/73	16,800	22,900	8.8	
8685			3557	Precambrian	169	5/3/74	9,380	18,100	7.7	
8685				Precambrian		7/17/74	1,730	2,720	7.2	
7640	30	7610	80	Alluvial	48	6/8/73	204	220	7.5	
8000				Bandelier	47	5/31/73	151	166	7.9	
7600				Abo	63	6/29/73	933	1,470	8.5	
7500				Abo	70	7/3/73	1,160	1,780	8.4	
6840	43.4	6797				10/20/76				
6840	69.4	6771				10/20/76				
6840	31.6	6808				10/20/76				
6800						11/14/74	144	176	7.7	
6800						9/23/72	104	110		
6800						9/23/72	206	170		
7325				Rhyolite Lava	105	10/20/76	(b)	280	(c)	(d)
7750				Cenezoic Volc.	61	4/30/73	210	130	7.4	
7960						10/13/71	264	230	8.0	
7960						11/23/72	299	230	7.6	

(a) 12,800
21,900

(b) 200 to 300

(c) 7.8 to 8.3

*Totavi Puye and Puye are members of the Santa Fe Group.

Data For Selected Wells, Springs and
Related Data At Surface Water Gaging Stations
Jemez Mountains Area, New Mexico

Data Number	Name	Type	Township & Range	Section	Latitude	Longitude	Land Surface Altitude (ft)
103		Spring	18N7E	9.422			
104		Spring			35°48'36"	106°10'35"	5520
105		Spring			35°46'47"	106°12'17"	5400
106		Spring	18N7E	20.312			5480
106A		Spring	18N7E	20.312			5480
107		Spring			35°46'21"	106°13'13"	5380
108		Spring			35°46'02"	106°14'15"	5660
109	Rio del Las Vacas	Surface	19N1E	2.122			7800
110	Spring Canyon	Spring			35°52'38"	106°44'54"	7710
111	Testhole Fenton Lake	Well	19N2E	10.322			7800
112	Fenton Lake	Surface	19N2E	9.444			7674
113	Lakefork Canyon	Spring			35°51'52"	106°43'10"	7790
114	Battleship Rock	Spring	19N3E	32.3			6750
14A	Shaver Spring	Spring	19N3E	32.344			6750
115		Well	19N3E	32.331			6960
115A		Well			35°49'46"	106°38'46"	6960
115B		Well			35°49'49"	106°38'56"	6960
115C		Well	19N3E	32.324			6960
116	Forest Service	Well	19N2E	24.213			8263
117	LASL Well D	Well	19N2E	10.422			7900
118	Barley Springs	Spring	19N2E	10.411			7760
119	GT-1 Well	Well	19N2E	1.444			8475
120	GT-2 Well	Well	19N2E	12			8690
121		Well			35°52'54"	106°40'12"	8685
121A		Well			35°52'54"	106°40'12"	8685
121B		Well			35°52'54"	106°40'12"	8685
122	Hazlett Well	Well	19N3E	20.14			7640
123		Well	19N3E	20.331			8000
124		Spring	19N3E	29.342			7600
124A		Spring	19N3E	29.413			7500
125	USGS Battleship Rock	Well	19N3E	32.3334			684(
125A	" Upper Fm	Well	19N3E	32.3334			684(
125B	" Lower Fm	Well	19N3E	32.3334			684(
126	Jemez River below Jemez Spring	Surface			35°49'39"	106°38'51.1"	680(
126A	East Fork	Surface	18N3E	5.1222			680
127	San Antonio Creek	Surface	19N3E	32.0			680
128	Spence Spring	Spring	19N3E	28.312			732
129		Spring	19N3E	20.1			775
130	Horseshoe Springs	Spring	19N3E	18.233			796
130A		Spring	19N3E	18.233			796

Altitude (ft)	Depth To Water (ft)	Altitude of Water Level (ft)	Depth of Well (ft)	Source Formation For Water	Temp. °F	Date Sampled	Total Dissolved Solids (ppm)	Electric Conductivity µmhos	pH	Rate of Flow (gpm)
490			1184	Caldera Fill	54	10/26/49	165	160		Flows
475							90	79	8.5	
580							108	132	7.0	
280				Tshirege						5
510			590	Caldera Fill	63	11/12/49	125	90		Flows
510			to	Caldera Fill	61	10/26/49	142	110		Flows
510			1184	Caldera Fill	57	10/26/49	142	125		Flows
740		8740			64	10/22/76	(a)		(b)	6.6
520				Valles Rhyolite		6/20/50	108	84		900
523					46	10/15/73	127	104	7.4	
726				Valles Rhyolite						5
726					40	10/15/71	109	88	7.2	
750				Valles Rhyolite		6/20/50				5
680					42	10/15/71	111	77	7.7	
506	+11	8517	595	Caldera Fill		10/26/49	142	126		
506	+11	8517	595	Caldera Fill		10/26/49	142	109		
506	+10	8516	1185	Caldera Fill		6/20/50	121	94		
760	16	8744	634			10/22/76				
606					52	10/15/71	94	68	7.7	
900						6/20/50	108	85		
000				Talus & Alluv.						20
660				Talus & Alluv.						25
				Tshirege*						4
240				Talus & Alluv.						4
216				Tschicoma*						2
000				Tshirege*						90
7450		6208								
960				Puye*		9/23/65	(229)	370	7.2	
400		6077								
640		5886								
640		5870								
640			815	Totavi Puye*		9/23/65	(123)	194	7.4	
640	750	5890	2552							
7000		5907								
715	850	5865	2300							
520	740	5780	2499							
380		5778								

(a) 118 to 164
(b) 7.7 to 8.1

*Tschicoma Formation is in the Tewa Group
Tshirege is a member of the Bandelier Tuff
Puye and Totavi Puye are members of the Santa Fe Group

Data For Selected Wells, Springs and
Related Data At Surface Water Gaging Stations
ez Mountains Area, New Mexico

Data Number	Name	Type	Township & Range	Section	Latitude	Longitude	Land Surface Altitude (ft)	Depth To Water (ft)
163	Valle Grande H-10	Well			35°51'11"	106°28'45"	8490	
164	East Jemez Creek	Surface			35°50'55"	106°29'37"	8475	
165	Wet Weather Creek	Surface			35°50'12"	106°29'32"	8580	
166	American Springs	Spring	19N5E	35.144			8280	
167	Valle Grande H-7	Well			35°51'52"	106°27'29"	8510	
167A	Valle Grande H-2	Well			35°51'52"	106°27'29"	8510	
167B	Valle Grande H-5	Well			35°51'52"	106°27'29"	8510	
168	Valle Grande #7	Well	19N5E	19.134			8740	
169		Spring	19N5E	18.430			8520	
169A	South Medio Spring	Spring	19N5E	18.443			8523	
170		Spring	19N4E	12.341			8726	
171	S.W. Medio Spring	Spring			35°53'19"	106°28'16"	8726	
172		Spring	19N4E	2.114			8750	
72A	West Medio Spring	Spring			35°54'27"	106°39'06"	8680	
173		Well	19N5E	19.133			8506	+11
173A		Well	19N5E	19.134a			8506	+11
174		Well	19N5E	19.134			8506	+10
175	Valle Grande #12	Well	19N5E	19.424			8760	16
176	Valle Grande Ent. Spring	Spring			35°51'14"	106°27'10"	8606	
177	East Fork	Surface			35°54'34"	106°25'15"	8900	
178		Spring	19N5E	12.143			8000	
179		Spring	19N5E	14.431			8660	
180		Spring	19N5E	25.111				
180A		Spring	19N5E	26.221			8240	
181	Armstead Spring	Spring	19N5E	26.332			8216	
182		Spring	19N5E	25.333			8000	
183	Santa Fe County	Well	19N6E	8.233	35°52'45"	106°19'24"	7450	
184		Spring	19N6E	9.441			6960	
185	Santa Fe County	Well	19N6E	9.443	35°53'16"	106°18'16"	7400	
186	Santa Fe County	Well	19N6E	14.223	35°53'02"	106°16'10"	6640	
187	Santa Fe County	Well	19N6E	13.433	35°52'24"	106°15'27"	6640	
187A		Well	19N6E	13.344			6640	
188		Well	19N6E	24.324	35°51'43"	106°15'48"	6640	750
189		Well	19N6E	23.411	35°51'49"	106°16'28"	7000	
190	PM-2	Well			35°50'11"	106°14'33"	6715	850
191	PM-1	Well	19N7E	20.331	35°51'34"	106°13'31"	6520	740
192	Santa Fe County	Well	19N7E	20.221	35°52'12"	106°12'59"	6380	

Data For Selected Wells, Springs and
Related Data At Surface Water Gaging Stations
mez Mountains Area, New Mexico

Data Number	Name	Type	Township & Range	Section	Latitude	Longitude	Land Surface Altitude (ft)	Depth To Water (ft)
131	Hofein Fire Prot.	Well	19N3E	17.330a			7800	45.4
131A	Hofein Sub Artesian	Well	19N3E	17.330			7800	3.8
132	Hofein Artesian	Well	19N3E	17.342			7680	
133	LASL Well A	Well	19N3E	18.321			8450	485.5
134	LaCueva Spring	Spring	19N3E	17.34			7750	
134A	Laudermilk Spring	Spring	19N3E	17.344			7680	
134B		Spring	19N3E	17.431			7680	
135	Eckert Well	Well	19N3E	17.1134			7800	103.2
135A	Brown's Cabin	Well	19N3E	17.11			7800	
136	Glass Well	Well	19N3E	4/5			8600	174.6
137		Spring	19N3E	4.000			8600	
138	San Antonio Campground	Well	19N3E	8.33			7750	100
139	San Antonio Creek	Surface	19N3E	17.0			7670	
140	Sulphur Creek	Surface	19N3E	17.44			7680	
141	Sulphur Creek	Surface	19N3E	20.2213	35°52'10"	106°38'14"	7640	
142	Redondo Creek	Well	19N3E	20.444	35°51'35"	106°36'14"	8050	3
143	Redondo Creek	Surface			35°51'54"	106°35'55"	8190	
144	USFS Redondo Well	Well	19N3E	16.4342			7850	2.5
145	Sulphur Springs	Spring			35°54'04"	106°36'	8420	
146	Baca #1 Well	Well			35.9168°	106.5350°	8697.3	
147	Baca #16 Well	Well			35.9037°	106.5688°	9622	
148	Baca #11 Well	Well			35.8950°	106.5760°	9064.9	
149	Baca #15 Well	Well			35.8946°	106.5803°	9117.1	
150	Baca #6 Well	Well			35.8880°	106.5823°	8725.7	
151	Baca #9 Well	Well			35.8825°	106.5868°	8604.8	
151A	Baca #14 Well	Well			35.8825°	106.5865°	8605	
152	Baca #12 Well	Well			35.8737°	106.5898°	8429.8	
153	Baca #5 Well	Well			35.8777°	106.5783°	9289.5	
154	Baca #10 Well	Well			35.8863°	106.5853°	8734.5	
155	Baca #4 Well	Well			35.8892°	106.5705°	9318	
156	Baca #13 Well	Well			35.8966°	106.5655°	9291.7	
157	Jaramillo Head Spg.	Spring			35°53'55"	106°33'00"	9320	
158	Redondo Head East	Spring			35°53'36"	106°33'58"	9480	
159	Jaramillo Creek	Surface			35°54'47"	106°30'22"	8772	
160	Cerro Pinon Spring	Spring			35°53'40"	106°29'40"	8630	
161	San Antonio Head	Spring	20N4E	14.424			8630	
162		Well	19N4E	26.222			8491	+23

Altitude (ft)	Depth To Water (ft)	Altitude Of Water Level (ft)	Depth of Well (ft)	Source Formation For Water	Temp. °F	Date Sampled	Total Dissolved Solids (ppm)	Electric Conductivity µmhos	pH	Rate of Flow (gpm)
300	45.46	7754	209			6/21/76				
300	3.82	7796	68			10/21/76				
580			95	Alluvial	66	10/21/76	(a)		(b)	40±
450	485.5	7934	590	Abo	88	5/24/73				
750				Alluvial		6/8/73	230	180	7.4	
680					48	10/15/71	209	180	7.6	
680				Battleship Rock	68	8/14/73	599	912	7.5	
800	103.25	7697	180			10/21/76				
800				Alluvial		6/5/73	322	380	7.2	
600	174.6	8425	190			10/20/76				
600				Mesa Verde	178	7/21/67	4,240	17,300	1.4	
750	100									
7670						9/23/72	164	130		
7680						9/23/72	700	662		
7640						10/15/71	850	1,165	3.5	
8050	3	8047	75	Volcanic Debris		6/5/73	294	320	7.5	
8190					55	10/15/71	157	176	7.5	
7850	2.9	7847								
8420					97					
8697.3										
9622		8347								
9064.9		8243								
9117.1										
8725.7		8294								
8604.8		8275								
8605		8275								
8429.8		8200								
9289.5		8316								
8734.5		8243								
9318		8263								
9291.7		8344								
9320					42	10/15/71	131	107	6.3	
9480							50	67	7.0	
8772					41	10/15/71	94	67	7.5	
8630					44	10/15/71	89	88	7.0	
8630				Alluvial						
84	+23	8514	589	Caldera Fill		10/26/49	165	157		

(a) 460 to 500
(b) 7.7 to 8.0

Altitude (ft)	Depth To Water (ft)	Altitude of Water Level (ft)	Depth Of Well (ft)	Source Formation For Water	°F Temp:	Date Sampled	Total Dissolved Solids	Electric Conductivity µmhos	pH	Rate of Flow (gpm)
28	390	5838	1940	Santa Fe						
22	580	5842	1530							
06	450	5856	1840	Santa Fe						
39	345	5794	1792	Santa Fe						
14	305	5709	1519							
54	390	5714	1970	Santa Fe						
73	280	5693	2000	Santa Fe						
24	50	5574	870	Santa Fe						
22	25	5597	1750							
51	100	5561	870	Santa Fe						
72	75	5597	870	Santa Fe						
50	Flows				63	9/19/51	173	251		
40	160	5680	1750	Santa Fe						
70	15	5655	1790	Santa Fe						
75	285	5690	1965	Santa Fe						
80				Basalt	52	9/23/65	(183)	292	7.1	
80				Basalt	52	9/23/65	(183)	292	7.1	
20		5510								
						10/17/73				
00				Abo	51	8/5/74	344	580	7.2	
50										
60				Bandelier Tuff	54	1/17/73	102	95	7.4	32
60				Bandelier Tuff	55	5/22/73	99	105	7.4	
00				Bandelier Tuff	57	1/17/73	102	80	7.2	32
75				Bandelier Tuff	48	9/23/73	150	105	7.3	
25	453.8	8156	650	Tschicoma Abo	87	5/24/73				
00	315.6	8384	750	Abiquiu Abo	64	1/22/73	138	200	8.6	
00				Bandelier Tuff	48	1/17/73	114	90	7.5	
80				Lava Flow & Tuff	105	10/27/76	(a)	120	(b)	(c)
80				Valles Rhyolite	105	5/16/73	150	122	7.7	
40							168	94	8.0	
40						10/16/49	105	80		
40						10/15/71	152	220	8.5	
24.4		8275								
00				Caldera Fill		6/13/63	2,970	2,225	8.0	
00						10/22/49	1,800	2,270		
00.5										
40										

(a) 140 to 230

(b) 7.8 to 8.0

(c) 272-332

Data For Selected Wells, Springs and
Related Data At Surface Water Gaging Stations
J[illegible]Mountains, New Mexico

Data Number	Name	Type	Township & Range	Section	Latitude	Longitude	Land Surface Altitude (ft)	Depth To Water (ft)	Altitude of Water Level (ft)
193	G-4	Well	19N7E	5.231	35°54'32"	106°13'11"	6228	390	5838
194	G-6	Well	19N7E	6.214	35°54'36"	106°14'07"	6422	580	5842
195	G-5	Well	19N7E	5.112	35°54'51"	106°13'35"	6306	450	5856
196	G-3	Well	19N7E	4.133	35°54'36"	106°12'37"	6139	345	5794
197	G-1A	Well	19N7E	4.441	35°54'10"	106°12'02"	6014	305	5709
197A	G-2	Well	19N7E	4.411	35°54'16"	106°12'12"	6054	390	5714
198	G-1	Well	19N7E	4.444	35°54'01"	106°11'47"	5973	280	5693
199	LA-1	Well	19N7E	13.114	35°53'00"	106°09'19"	5624	50	5574
199A	LA-1B	Well	19N7E	13.112	35°53'01"	106°09'19"	5622	25	5597
199B	LA-2	Well	19N7E	14.222	35°55'02"	106°09'37"	5651	100	5561
199C	LA-3	Well	19N7E	14.221	35°33'08"	106°09'46"	5672	75	5597
199D		Well	19N7E	36.314			5550	Flows	
200	LA-5	Well	19N7E	15.434	35°52'27"	106°10'42"	5840	160	5680
2[illegible]	LA-6	Well	19N7E	14.312	35°52'38"	106°10'18"	5770	115	5655
201	LA-4	Well	19N7E	22.114	35°52'08"	106°11'29"	5975	285	5690
202		Spring	19N7E	22.131			5980		
202A		Spring	19N7E	22.131			5980		
203	Santa Fe County	Well	19N7E	1.444	35°54'03"	106°08'34"	5620		5510
204	Rio Grande at Otowi Bridge	Surface	19N8E	18.33	35°52'29"	106°08'30"			
205		Well	20N1E	6.233			7800		
206	Rio del Las Vacas	Surface	20N1E	1.3			8050		
207	Calaveras Spring	Spring	20N2E	27.111			8160		
207A		Spring	20N2E	27.222			8160		
208	Calaveras Campground	Spring	20N2E	27.443			8000		
209	USFS Spring	Spring	20N3E	24.14			8175		
210	LASL Well B	Well	20N3E	31.123			8625	453.8	8156
211	LASL Well C	Well	20N3E	9.343			8700	315.6	8384
212	Seven Springs	Spring	20N3E	18.322			8400		
213	San Antonio Hot Springs	Spring	20N3E	29.124			8380		
213A		Spring	20N3E	29.123			8380		
214	West San Antonio Sp.	Spring			35°59'10"	106°35'39"	8440		
215	San Antonio Creek	Surface			35°57'36"	106°29'30"	8540		
216	San Antonio Creek	Surface			35°59'52"	106°36'56"	8340		
217	Baca #7	Well			35.9372°	106.5912°	8724.4		8275
218	Sulphur Creek Steam Hole	Well			35°55'09"	106°36'06"	8500		
219	Sulphur Creek	Surface			35°54'58"	106°36'20"	8400		
220	Baca #2	Well			35.9173°	106.6017°	8500.5		
221	Sulphur Springs	Spring			35°55'00"	106°35'01"	8640		

Depth To Water (ft)	Altitude of Water Level (ft)	Depth of Well (ft)	Source Formation For Water	Temp. °F	Date Sampled	Total Dissolved Solids (ppm)	Electric Conductivity µmhos	pH	Rate of Flow (gpm)
			Alluvial	55	10/15/71	197	164	7.5	
				99		(a)		(b)	
				36	10/15/71	113	81	7.0	
					6/20/50	108	86		
			Valles Rhyolite		7/6/49	98	80		800
8	8595	285	Caldera Fill		10/16/49	90	85		
+39		405	Caldera Fill		10/16/49	123	107		
	8680			58.5	10/22/76	(c)		(d)	
		650	Caldera Fill	63	10/16/49	124	100		
+20		444	Caldera Fill	54	10/16/49	124	100		
	8750	444		52		(c)		(f)	10.3
		285	Caldera Fill	64	10/16/49	90	85		Flows
+36		652	Caldera Fill	62	7/27/49	143	122		
				53	10/15/71	94		8.2	
			Caldera Fill	63	10/16/49	125	110		
			Caldera Fill	55	10/16/49	111	85		
			Caldera Fill	46	7/6/49	103	80		
			Tshirege						25
			Tshirege						40
			Talas						15
	5920								
	5715								
	5570								
			Alluvial		1/7/65	358	539	8.0	
			Abo	51	6/19/74	332	570	7.1	
			Chinle	52	3/7/74	263	430	7.4	
			Tewa	61	6/19/74	112	120	6.8	
				50	10/15/71	188	147	8.0	
			Tewa	64	3/7/74	124	141	7.8	
			Morrison		3/7/74	2,390	3,190	7.5	

(a) 182 to 253
(b) 7.7 to 7.8
(c) 85 to 106
(d) 7.7 to 8.0
(e) 88 to 158
(f) 7.3 to 8.1

Data For Selected Wells, Springs and
Related Data At Surface Water Gaging Stations
Je[illegible] Mountains Area, New Mexico

Data Number	Name	Type	Township & Range	Section	Latitude	Longitude	Land Surface Altitude (ft)	Depth To Water (ft)
222	Baca #8 Well	Well			35.9173°	106.5898°	8631.3	
223	Pipeline Seep	Spring			35°58'45"	106°33'52"	8500	
224	San Antonio Warm Spring	Spring	20N4E	18.111	35°58'18"	106°33'44"	8440	
225								
226	Puerto D'Abringo	Spring			35°55'34"	106°27'26"	8820	
227	San Antonio Creek	Surface	20N4E	14.433				
228		Spring	20N4E	14.300			8560	
229		Well	20N4E	14.443			8603	8
230		Well	20N4E	24.213			8643	+39
230A	Valle Toledo #1	Well	20N4E	24.214			8680	
231	Valle Toledo H-6	Well			35°56'45"	106°37'24"	8720	
232		Well	20N5E	19.333			8720	+20
[illegible]	Valle Toledo #6	Well	20N5E	19.333			8750	
233	Valle Toledo H-4	Well			35°57'29"	106°29'	8609	
233A		Well	20N4E	24.214			8650	+36
233B	Big Well Toledo	Well			35°57'27"	106°28'45"	8609	
234	Valle Toledo H-3	Well			35°57'25"	106°28'	8650	
235	Valle Toledo H-2	Well			35°57'25"	106°28'	8650	
235A	Valle Toledo H-1	Well			35°57'25"	106°28'	8650	
236		Spring	20N5E	26.113			8850	
237		Spring	20N5E	26.311			8840	
238		Spring	20N5E	35.433			8660	
239	Rio Arriba County	Well	20N7E	17.111	35°58'17"	106°13'37"	6840	
240	Rio Arriba County	Well	20N7E	25.441	35°55'53"	106°08'36"	5800	
241	Rio Arriba County	Well	20N8E	3.324	35°59'32"	106°04'48"	5590	
242		Spring	21N1W	14.421			7400	
243		Well	21N2E	14.433			8800	
244	Rio Chama near Chamita	Surface			36°04'26"	106°06'40"		
245		Well	22N3E	22.111			7400	
246		Spring	22N5E	6.324			6817	
247	Agua Caliente	Spring			36°12'	106°20'	6884	
247A		Well	22N5E	1.322	36°09'57"	106°21'19"	6884	
248	Rio Chama Below Abiquiu Dam	Surface	23N5E	8.44	36°14'12"	106°24'59"		
249		Well	23N5E	15.212			6140	

APPENDIX II

Part 2

Water Quality Data

WATER QUALITY DATA
Jemez Basin and Vicinity

Data No.	Date	Ca^{++}	Mg^{++}	Na^{+}	K^{+}	HCO_3^{-}	SO_4^{--}	Cl^{-}	TDS	Ec	pH	Temp °F
1												
2		18.0	3.5	53.0	5.0	127.0	43.0	6.8	265.0	367	--	67
3		28.0	5.0	36.0	7.6	156.0	35.0	7.3	264.0	352.0	7.4	55
4	4/27/65	57.0	10.0	29.0	--	134.0	58.0	51.0	343.0	501.0	7.8	--
5		31.0	5.9	30.0	6.4	142.0	37.0	7.4	255.0	348.0	7.5	61
6	2/26/65	112.0	17.0	60.0	--	357.0	143.0	22.0	598.0	878.0	7.5	--
7	1/21/65	60.0	11.0	69.0	--	248.0	85.0	37.0	457.0	666.0	7.5	--
8		41.0	6.8	79.0	7.9	200.0	40.0	72.0	421.0	642.0	--	81
9	8/26/72	1.2	0.3	740.0	22.0	334/226	49.0	97.0	2,460.0	3,140.0	9.5	90
10	10/ 9/73	80.0	14.0	330.0	16.0	348.0	290.0	280.0	1,220.0	1,950.0	8.1	54
11	3/10/66	54.0	7.4	175.0	--	274.0	90.0	161.0	662.0	1,110.0	7.6	--
11	6/22/66	79.0	9.5	278.0	15.0	330.0	266.0	228.0	1,070.0	1,720.0	7.5	--
12		65.0	15.0	77.0	11.0	394.0	29.0	35.0	548.0	749.0	6.6	78
13		150.0	22.0	50.0	3.0	193.0	350.0	24.0	780.0	1,050.0	--	67
13A		210.0	51.0	180.0	11.0	514.0	580.0	53.0	1,420.0	1,880.0	6.4	71
14	2/ 4/65	117.0	22.0	88.0	--	388.0	218.0	19.0	691.0	1,020.0	7.5	--
15	9/15/24	494.0	91.0	3,310.0	--	1,969.0	3,401.0	2,500.0	10,960	--	--	86
16		100.0	9.0	--	--	1,280.0	286.0	1,140.0	3,470.0	5,680.0	8.0	95
17		--	--	3,900.0	140.0	--	--	2,800.0	--	20,000.0	--	64
18	9/15/24	368.0	85.0	2,219.0	--	1,757.0	1,712.0	1,940.0	7,320.0	--	--	68
18A	5/ 2/73	300.0	68.0	2,000.0	81.0	1,970.0	1,300.0	1,900.0	6,650.0	9,930.0	6.5	63
19	2/27/65	48.0	9.0	46.0	--	158.0	66.0	36.0	330.0	519.0	7.6	--
20		49.0	1.5	56.0	5.5	228.0	57.0	4.2	332.0	490.0	7.9	63
21	1/21/65	147.0	25.0	92.0	--	205.0	450.0	22.0	872.0	1,190.0	7.3	--
22	6/ 5/73	120.0	9.0	2,400.0	6.6	241.0	4,500.0	580.0	7,760.0	10,100.0	8.5	70
23	6/ 5/73	380.0	61.0	3,500.0	88.0	1,410.0	3,300.0	3,100.0	11,100.0	15,700.0	6.8	126
24	10/ 2/73	77.0	26.0	100.0	5.5	335.0	120.0	82.0	599.0	960.0	7.9	79
25												
26	9/29/74	400.0	73.0	3,450.0	--	1,498.0	3,645.0	2,660.0	11,120.0	--	--	115
27	9/14/74	260.0	70.0	2,400.0	--	1,301.0	1,728.0	2,370.0	7,510.0	--	--	70
28	5/23/73	57.0	13.0	28.0	2.6	217.0	63.0	9.3	310.0	487.0	7.6	60
29	5/23/73	96.0	15.0	24.0	1.7	331.0	72.0	11.0	418.0	651.0	7.6	54
30	9/ 5/73	210.0	37.0	310.0	14.0	171.0	990.0	160.0	1,840.0	2,440.0	6.4	60

Water Quality Data, Jemez Basin and Vicinity

Data No.	Date	Ca^{++}	Mg^{++}	Na^{+}	K^{+}	HCO_3^{-}	SO_4^{--}	Cl^{-}	TDS	Ec	pH	Temp. °F
31	9/ 5/73	270.0	62.0	420.0	26.0	594.0	850.0	410.0	2,350.0	3,190.0	7.0	66
31		292.3	53.5	1,820.0	90.0	1,197.2	1,221.3	1,900.0	6,737.7	9,100.0	6.8	
32	5/24/73	110.0	18.0	1,400.0	63.0	1,320.0	470.0	1,400.0	4,150.0	6,420.0	6.4	59
33	5/24/73	100.0	15.0	120.0	7.3	416.0	91.0	96.0	674.0	1,070.0	7.0	66
34	5/ 1/53	102.0	19.0	144.0	1,220.0	436.0	90.0	133.0	--	1,220.0	--	--
34A	5/24/73	88.0	12.0	69.0	4.1	338.0	55.0	60.0	482.0	788.00	7.3	61
35	1/14/65	68.0	16.0	118.0	--	385.0	49.0	87.0	589.0	946.0	7.6	--
36	8/30/73	110.0	21.0	1,300.0	73.0	1,440.0	270.0	1,200.0	3,780.0	5,694.0	8.0	73
37	1967	59.0	18.0	122.0	--	374.00	44.0	116.0	597.0	980.0	--	--
38	8/30/73	73.0	15.0	120.0	15.0	419.0	40.0	100.0	628.0	1,014.0	8.0	68
40	5/24/73	60.0	11.0	520.0	41.0	788.0	220.0	290.0	1,570.0	2,550.0	7.6	77
41	5/21/73	21.0	4.0	87.0	12.0	281.0	38.0	7.2	324.0	527.0	7.7	57
42	6/ 8/73	31.0	4.0	46.0	3.3	211.0	20.0	3.0	245.0	367.0	7.5	--
44	9/22/24	90.0	12.0	29.0	--	259.0	99.0	4.0	396.0	--	--	60
46	8/31/73	85.0	15.0	11.0	2.0	326.0	26.0	4.4	335.0	549.0	8.0	57
47		40.0	3.4	10.0	2.0	152.0	7.1	2.5	164.0	234.0	7.9	37
48	11/ 2/73	50.0	12.0	37.0	--	216.0	--	10.0	284.0	390.0	8.0	55
49	8/21/73	32.0	5.7	190.0	8.2	366.0	120.0	49.0	638.0	984.0	8.0	66
50	8/21/73	30.0	8.0	185.0	--	296.0	--	48.0	660.0	780.0	7.8	--
51	11/ 2/73	50.0	9.9	38.0	4.9	263.0	25.0	5.9	292.0	472.0	8.2	55
52		48.0	5.1	60.0	9.8	203.0	15.0	71.0	350.0	584.0	7.4	39
53	10/26/73	7.2	2.7	790.0	7.4	1,470.0	97.0	300.0	1,960.0	3,200.0	8.4	61
54	10/ 5/73	78.0	14.0	120.0	16.0	362.0	52.0	130.0	647.0	1,090.0	7.5	82
55	10/26/73	6.0	7.0	600.0	--	1,156.0	--	290.0	1,964.0	2,320.0	8.4	61
55A	6/ 8/73	85.0	18.0	128.0	--	284.0	--	176.0	692.0	1,000.0	7.6	59
56	6/ 6/73	63.0	14.0	37.0	3.7	218.0	87.0	11.0	364.0	571.0	7.4	64
57	10/ 2/73	27.0	5.8	14.0	2.1	129.0	9.8	7.9	205.0	241.0	7.6	59
58	6/ 8/73	48.0	11.0	37.0	--	188.0	--	6.0	350.0	370.0	--	--
59	6/ 8/73	26.0	10.0	12.0	--	108.0	--	6.0	104.0	190.0	7.8	--
60	9/18/73	19.0	5.9	7.3	5.9	91.0	17.0	2.4	159.0	182.0	6.8	54
61	8/28/73	15.0	4.2	13.0	1.8	97.0	4.9	2.5	155.0	161.0	7.6	55
62	9/18/73	18.0	5.1	7.5	7.0	79.0	16.0	3.6	153.0	179.0	6.7	59
63	8/28/73	20.0	5.9	7.0	5.5	88.0	22.0	3.7	161.0	194.0	7.5	51
64	10/30/73	100.0	11.0	14.0	5.8	367.0	21.0	13.0	365.0	636.0	7.2	51
65	10/30/73	101.0	14.0	14.0	--	300.0	--	16.0	398.0	500.0	7.7	52
66	11/30/70	66.0	4.6	9.1	1.6	238.0	6.5	2.4	230.0	383.0	7.7	55

Water Quality Data, Jemez Basin and Vicinity

Data No.	Date	Ca^{++}	Mg^{++}	Na^{+}	K^{+}	HCO_3^{-}	SO_4^{--}	Cl^{-}	TDS	Ec	pH	Temp. °F
67	11/30/73	28.0	3.2	11.0	1.6	116.0	7.3	3.7	172.0	212.0	8.2	59
68	9/24/73	19.0	44.0	720.0	66.0	1,550.0	150.0	120.0	2,080.0	3,290.0	8.5	63
68A		140.0	13.0	390.0	51.0	761.0	32.0	470.0	1,520.0	2,540.0	6.7	66
68B	5/17/73	96.0	8.7	180.0	26.0	490.0	38.0	180.0	814.0	1,360.0	6.9	65
69	5/ 5/65	12.0	2.4	8.3	2.8	48.0	16.0	2.8	104.0	124.0	7.1	--
69	3/ 5/66	16.0	2.4	18.0	--	74.0	21.0	4.4	146.0	185.0	7.0	--
69	6/16/66	17.0	2.3	18.0	2.9	91.0	10.0	7.1	153.0	183.0	7.2	--
70		16.0	6.0	12.0	--	88.0	3.0	6.0	188.0	135.0	7.4	70
71	4/ 1/71	16.0	9.0	14.0	--	64.0	--	<1.0	120.0	145.0	--	--
71	11/11/71	16.0	4.0	17.0	--	72.0	--	4.0	158.0	140.0	--	--
71	5/10/71	14.0	6.0	18.0	--	72.0	--	4.0	132.0	155.0	--	--
71	9/23/72	18.0	4.0	17.0	--	76.0	--	6.0	126.0	155.0	--	--
71	10/ 4/72	14.0	6.0	19.0	--	72.0	--	4.0	144.0	150.0	--	--
71	8/ 8/73	19.0	3.0	4.0	--	72.0	--	8.0	126.0	180.0	--	--
71	Avg.	15.0	2.4	16.0	--	73.0	15.0	4.4	137.0	164.0	--	--
71	Max.	20.0	3.0	21.0	--	90.0	36.0	7.8	158.0	207.0	--	--
71	Min.	12.0	1.7	8.3	--	21.0	7.6	0.6	98.0	88.0	--	--
72	4/20/50	313.0	30.0	--	--	872.0	196.0	6.0	1,480	--	--	--
73	3/19/73	174.0	22.0	59.0	--	640.0	--	12.0	922.0	1,140.0	7.5	48
73A	3/19/73	157.0	31.0	105.0	--	752.0	--	140.0	984.0	1,280.0	7.4	39
74		18.0	5.0	13.0	--	88.0	3.0	6.0	178.0	130.0	7.8	59
75	10/20/76	193.0	16.5	990.3	182.2	951.0	42.0	--	2,436.0	--	7.0	103
75	6/28/49	327.0	27.0	--	--	1,400.0	51.0	1,080.0	3,060.0	5,160.0	6.8	97
75	6/28/49	344.0	29.0	--	--	1,580.0	42.0	1,500.0	3,880.0	6,520.0	6.9	--
75	1/16/73	299.0	24.0	940.0	--	1,236.0	36.0	1,450.0	3,962.0	5,000.0	6.7	115
75	8/21/24	328.0	23.0	1,000.0	--	1,440.0	70.0	1,320.0	3,458.0	--	--	104
75		320.0	16.0	850.0	--	1,200.0	38.0	1,480.0	4,000.0	5,900.0	--	115
75		328.3	14.6	930.0	180.0	1,158.8	41.2	1,480.0	4,256.2	5,770.0	7.0	110
75	4/ 6/76	159.0	21.1	1,140.0	144.3	966.0	39.9	--	3,580.0	--	7.6	101
75	11/ 6/75	312.6	30.6	991.0	186.2	1,150.0	38.4	--	3,870.0	--	7.5	--
76	9/23/72	43.0	5.0	69.0	--	164.0	--	106.0	424.0	600.0	--	--
77		1,121.0	15.1	650.0	110.0	599.8	51.4	940.0	2,611.8	3,200.0	7.5	157
77	4/15/47	18.0	6.0	12.0	--	94.0	15.0	4.0	1,530.0	1,840.0	--	--
77		47.0	14.0	14.0	--	228.0	15.0	4.0	2,700.0	3,510.0	--	--
77		138.0	7.0	572.0	--	735.0	49.0	795.0	2,150.0	3,560.0	7.2	159
77	4/ 3/56	136.0	10.0	618.0	--	716.0	44.0	870.0	2,190.0	3,860.0	6.7	192

Water Quality Data, Jemez Basin and Vicinity

Data No.	Date	Ca^{++}	Mg^{++}	Na^{+}	K^{+}	HCO_3^{-}	SO_4^{--}	Cl^{-}	TDS	Ec	pH	Temp. °F
77	1/16/73	126.0	7.0	650.0	--	600.0	42.0	900.0	2,364.0	300.0	7.2	156
77	8/21/24	166.0	9.0	645.0	--	791.0	42.0	820.0	2,184.0	--	--	125
78	10/14/54	117.0	17.0	--	--	465.0	81.0	106.0	--	1,140.0	--	--
79	9/27/73	75.0	13.0	120.0	19.0	387.0	21.0	120.0	626.0	1,030.0	7.5	64
80	9/27/73	70.0	14.0	92.0	--	308.0	--	116.0	634.0	1,000.0	8.1	64
81	10/24/73	14.0	13.0	600.0	--	1,292.0	--	200.0	2,190.0	2,500.0	8.2	63
82	10/26/73	12.0	10.0	860.0	8.5	1,640.0	250.0	200.0	2,170.0	3,210.0	7.6	62
83		51.0	4.7	98.0	17.0	230.0	17.0	120.0	480.0	807.0	7.9	48
(84)	8/31/24	303.0	33.0	157.0	--	0	6,156.0	54.0	7,887.0	--	--	110
(84)	8/31/24	316.0	51.0	127.0	--	0	3,159.0	1.0	4,344.0	--	--	76
(84)	8/31/24	41.0	16.0	52.0	--	0	2,337.0	20.0	2,562.0	--	--	99
84A	5/18/73	170.0	9.2	550.0	68.0	800.0	49.0	800.0	2,140.0	3,550.0	6.7	120
85	10/14/54	93.0	12.0	--	--	370.0	28.0	129.0	--	995.0	--	63
85A		160.0	6.6	510.0	63.0	773.0	43.0	700.0	1,960.0	3,460.0	7.0	58
86		68.0	9.8	170.0	24.0	--	22.0	220.0	580.0	1,340.0	8.0	63
87	1/20/65	17.0	3.3	18.0	--	91.0	11.0	4.2	178.0	184.0	7.5	--
88	6/21/73	180.0	34.0	75.0	8.9	844.0	71.0	14.0	856.0	1,330.0	7.2	61
89	6/ 1/73	99.0	9.0	23.0	--	292.0	--	14.0	402.0	580.0	7.6	--
90	7/13/73	250.0	23.0	67.0	6.1	937.0	76.0	12.0	952.0	1,430.0	6.6	60
91		38.0	4.4	70.0	5.5	254.0	18.0	40.0	393.0	560.0	7.3	--
92	10/24/73	172.0	53.0	400.0	--	1,156.0	--	300.0	2,258.0	2,500.0	7.4	59
92A	5/ 8/73	22.0	5.0	9.0	--	84.0	11.0	6.0	134.0	140.0	7.1	--
93	1/16/73	8.7	4.7	19.0	0.9	94.0	6.6	3.8	149.0	165.0	8.0	--
93A		12.0	4.8	25.0	1.4	88.0	6.8	28.0	179.0	255.0	--	88
94		8.8	8.3	25.0	0	117.8	0	10.0	179.9	162.0	8.2	83
94	1/16/73	44.0	5.0	22.0	0	92.0	6.0	8.0	180.0	140.0	7.8	86
94	10/25/76	9.6	3.0	20.8	0.8	68.9	6.0	--	121.0	--	8.3	89
94	4/19/76	7.0	1.9	20.0	0.8	66.0	6.2	--	149.0	--	8.2	88
94	11/ 6/75	4.6	4.5	20.0	1.2	68.6	7.2	--	130.0	--	8.3	--
95	9/23/72	13.0	3.0	10.0	--	52.0	--	2.0	58.0	95.0	--	--
96	9/18/73	18.0	4.8	9.6	7.8	98.0	12.0	2.6	161.0	187.0	7.1	50
97	9/23/72	11.0	4.0	11.0	--	48.0	--	4.0	96.0	90.0	--	--
106A	9/28/65	13.0	2.8	10.0	--	72.0	2.6	2.8	135.0	132.0	7.3	--
110	9/13/73	11.0	1.0	9.0	--	60.0	--	6.0	130.0	105.0	7.3	55
111	10/9/73	22.0	4.0	11.0	--	84.0	--	8.0	164.0	160.0	7.0	--
112	10/ 9/73	11.0	3.0	8.0	--	52.0	--	4.0	118.0	95.0	--	--

Water Quality Data, Jemez Basin and Vicinity

Data No.	Date	Ca^{++}	Mg^{++}	Na^{+}	K^{+}	HCO_3^{-}	SO_4^{--}	Cl^{-}	TDS	Ec	pH	Temp °F
113	8/14/73	19.0	5.0	7.0	--	68.0	2.0	4.0	148.0	140.0	6.8	52
114		115.0	10.0	210.0	--	464.0	30.0	290.0	1,100.0	1,300.0	--	61
114	1/17/73	130.0	19.0	390.0	--	597.0	27.0	442.0	1,528.0	2,000.0	6.9	--
114A		169.0	14.1	520.0	50.0	661.5	102.9	670.0	2,362.0	2,940.0	7.0	58
115		130.0	25.0	100.0	11.0	662.0	32.0	61.0	728.0	1,210.0	6.9	62
115A	8/15/73	130.0	12.0	250.0	35.0	606.0	32.0	320.0	1,130.0	1,880.0	6.8	61
115B	10/24/73	210.0	59.0	570.0	34.0	1,530.0	290.0	300.0	2,260.0	3,250.0	6.8	59
115C	5/25/73	35.0	46.0	840.0	45.0	1,810.0	280.0	330.0	2,500.0	3,660.0	8.2	57
117	1/22/73	6.0	17.0	70.0	--	140.0	<1.0	60.0	272.0	400.0	8.6	48
118	1/22/73	14.0	4.0	12.0	--	64.0	5.0	6.0	188.0	120.0	6.7	48
120		78.0	42.0	550.0	--	1,230.0	200.0	400.0	2,500.0	2,920.0	--	133
121		1.7	2.1	6,300.00	350.0	6,820.0	2,100.0	3,500.0	16,800.0	22,900.0	8.8	--
121A		7.3	13.0	4,800.0	180.0	--	1,600.0	2,600.0	9,380.0	18,100.0	7.7	169
121B		30.0	3.6	580.0	35.0	993.0	160.0	320.0	1,730.0	2,720.0	7.2	
122	6/ 8/73	35.0	5.0	14.0	--	124.0	--	2.0	204.0	220.0	7.5	48
123	5/31/73	16.0	3.7	8.4	6.0	39.0	33.0	3.4	151.0	166.0	7.9	47
124	6/29/73	12.0	4.7	360.0	4.6	905.0	59.0	5.7	933.0	1,470.0	8.5	63
124A	7/ 1/73	9.8	6.2	470.0	4.9	1,150.0	35.0	6.6	1,160.0	1,780.0	8.4	70
126	9/23/72	14.0	6.0	23.0	--	64.0	--	4.0	104.0	110.0	--	--
126		15.0	3.0	17.0	2.8	71.0	13.0	6.4	133.0	176.0	7.7	40
126A		5.6	3.4	8.0	T	55.5	0	0	90.5	79.0	8.5	54
127	9/23/72	19.0	6.0	18.0	--	84.0	--	8.0	206.0	170.0	--	--
128	8/1/47	8.0	2.0	--	--	139.0	17.0	11.0	234.0	293.0	7.3	136
128	1/17/73	8.0	6.0	53.0	--	120.0	17.0	8.0	250.0	240.0	8.1	100
128		6.4	3.4	56.0	2.0	173.3	0	9.0	300.1	263.0	8.4	100
128	10/20/76	6.8	1.1	64.5	0.4	111.0	44.0	--	228.0	--	8.1	105
128	4/19/76	4.8	0.5	57.7	1.2	107.0	15.8	--	215.0	--	8.3	105
128	11/ 6/75	6.6	1.7	52.4	1.6	107.0	18.3	--	200.0	--	8.1	--
129	4/30/73	11.0	3.0	16.0	--	64.0	7.0	4.0	210.0	130.0	7.4	61
130	11/23/72	18.0	1.0	31.0	--	100.0	4.0	6.0	299.0	200.0	7.6	--
130		14.4	4.9	39.0	0	172.1	0	0	264.4	230.0	8.0	44
131	8/14/73	34.0	9.0	162.0	--	480.0	5.0	4.0	652.0	880.0	7.5	68
132	10/26/76	29.9	6.4	121.0	5.0	394.0	7.0	--	461.0	--	7.6	66.5
132	4/ 6/76	29.5	5.7	43.4	3.9	352.0	4.8	--	460.0	--	7.9	64
132	11/ 5/75	29.3	7.5	136.0	12.5	368.0	9.1	--	458	--	7.8	--
133	8/25/72	6.0	1.0	170.0	--	124.0	34.0	176.0	566.0	760.0	7.4	--

Water Quality Data, Jemez Basin and Vicinity

Data No.	Date	Ca^{++}	Mg^{++}	Na^{+}	K^{+}	HCO_3^{-}	SO_4^{--}	Cl^{-}	TDS	Ec	pH	Temp. °F
133	5/24/73	3.0	2.0	167.0	--	356.0	<1.0	22.0	498.0	700.0	9.1	88
134	6/ 8/73	19.0	5.0	20.0	--	68.0	--	<1.0	230.0	180.0	7.4	--
134A		18.4	5.3	10.0	7.5	79.9	32.9	--	209.0	180.0	7.6	48
134B	8/14/73	32.0	9.1	170.0	6.9	604.0	11.0	5.5	599.0	912.0	7.5	68
135A		62.0	7.0	15.0	--	200.0	6.0	13.0	322.0	380.0	7.2	--
137		72.0	18.0	25.0	34.0	0	4,520.0	20.0	4,240.0	17,300.0	1.4	178
138		22.0	5.0	12.0	--	68.0	--	8.0	220.0	170.0	7.3	54
139	7/23/72	16.0	4.0	15.0	--	64.0	--	2.0	164.0	130.0	--	--
140	9/23/72	78.0	15.0	48.0	--	16.0	--	164.0	700.0	662.0	--	--
141		100.1	19.9	45.0	23.0	0	551.4	50.0	850.1	1,165.0	3.5	--
142	6/ 5/73	48.0	11.0	10.0	--	156.0	18.0	14.0	294.0	320.0	7.5	--
143		19.2	0.5	11.0	2.5	94.0	--	--	157.2	176.0	7.2	48
145	8/31/49	168.0	23.0	14.0	--	0	614.0	8.0	967.0	1,270.0	3.1	--
145	8/31/49	185.0	52.0	7.0	--	0	1,570.0	4.0	1,950.0	4,570.9	1.9	160
145	8/31/49	110.0	11.0	24.0	--	0	2,740.0	20.0	2,960.0	8,510	1.6	--
145	8/31/49	101.0	23.0	10.0	--	0	3,280.0	3.0	3,160.0	12,700	1.4	--
145	11/ 4/63	7.0	10.0	24.0	--	0	35,100.0	24.0	--	13,800.0	1.8	189
148		30.0	0.1	1,959.0	--	456.0	99.0	68.0	3,453.0	6,895.0	--	--
151A		22.0	0.1	2,123.0	528.0	112.0	107.0	3,828.0	7,533.0	--	--	--
152		16.0	0.2	2,152.0	443.0	144.0	93.0	3,627.0	7,203.0	--	--	--
155		6.3	0.3	1,473.0	300.0	182.0	42.0	2,495.0	5,100.0	--	--	--
156		6.8	0.5	1,733.0	329.0	214.0	164.0	2,783.0	6,477.0	--	--	--
157		14.4	2.4	6.0	5.0	79.9	0	0	130.7	107.0	6.3	42
158		3.2	0	8.0	0	31.1	0	0	50.3	67.0	7.0	46
159		7.2	2.9	6.0	1.5	54.9	--	--	93.5	67.0	7.5	41
160		5.6	1.5	8.0	0	45.8	0	0	88.9	88.0	7.0	44
160		8.5	0.1	1,721.0	322.0	84.0	30.0	3,082.0	6,018	--	--	--
162	10/29/49	13.0	2.4	19.0	--	87.0	9.3	2.0	165.0	157.0	--	--
163		13.0	2.4	--	--	87.0	9.3	2.0	165.0	160.0	--	54
165		14.4	2.9	7.0	2.0	25.0	16.5	20.0	107.8	132.0	7.0	46
167	10/26/49	6.0	2.2	19.0	--	73.0	2.5	1.0	142.0	126.0	--	--
167		6.0	0.9	--	--	55.0	2.0	1.5	125.0	90.0	--	63
167A		10.0	2.7	--	--	75.0	4.1	2.0	142.0	110.0	--	61
167B		6.0	2.2	--	--	73.0	2.5	1.0	142.0	125.0	--	57
168	10/26/49	10.0	2.7	16.0	--	57.0	4.1	2.0	142.0	109.0	--	--
168	10/22/76	5.2	0.2	12.2	0.4	39.7	3.0	--	129.0	--	8.0	64

Water [illegible]ity Data, Jemez Basin and Vicinity

Data No.	Date	Ca^{++}	Mg^{++}	Na^{+}	K^{+}	HCO_3^{-}	SO_4^{--}	Cl^{-}	TDS	Ec	pH	Temp. °F
168	4/28/76	4.0	0.1	197.0	0.4	36.2	1.0	--	118.0	--	7.7	65
168	11/ 6/75	5.2	0.5	13.3	0.4	38.0	4.3	--	122.0	--	8.0	--
169A		6.4	2.4	18.0	1.3	81.1	--	--	127.2	104.0	7.4	46
169A	6/20/50	6.0	2.0	11.0	--	48.0	2.1	1.5	108.0	84.0	--	--
171		6.4	2.9	10.0	3.5	66.5	0	0	109.3	88.0	7.2	40
172A		4.0	2.4	7.0	4.0	48.8	0	T	111.2	77.0	7.7	42
176		4.0	1.0	17.0	T	62.2	0	0	94.2	67.5	7.7	52
177	6/20/50	6.0	2.0	--	--	48.0	2.1	1.5	108.0	85.0	--	--
184	9/23/65	24.0	3.2	48.0	13.0	179.0	15.0	14.0	229.0	370.0	7.2	--
187	9/23/65	18.0	5.4	13.0	--	104.0	4.4	5.4	123.0	194.0	7.4	--
193	6/ 7/51	16.0	2.6	19.0	--	96.0	4.9	4.5	146.0	177.0	--	79
195	4/ 1/52	19.0	4.4	12.0	--	96.0	4.4	4.5	139.0	176.0	--	78
195	5/14/52	10.0	0.5	54.0	--	140.0	6.9	3.0	192.0	254.0	--	62
196	4/ 1/52	13.0	2.1	25.0	--	103.0	4.8	3.0	156.0	172.0	--	82
197	3/29/52	13.0	1.4	54.0	--	166.0	8.2	4.8	222.0	281.0	--	85
198	4/ 4/52	13.0	1.1	25.0	--	97.0	4.9	3.5	163.0	169.0	--	78
199	5/14/52	7.4	1.0	80.0	--	177.0	20.0	18.0	244.0	383.0	--	63
199B	5/14/52	5.8	1.0	84.0	--	185.0	18.0	2.0	251.0	379.0	--	65
199C	5/14/52	16.0	0.5	32.0	--	117.0	7.5	4.0	152.0	200.0	--	58
200A	5/14/52	2.9	0.4	63.0	--	138.0	6.9	4.0	188.0	273.0	--	78
201	5/14/52	9.2	0.3	27.0	--	91.0	3.5	2.5	125.0	151.0	--	73
202	9/23/65	31.0	7.7	13.0	--	104.0	23.0	15.0	183.0	292.0	7.1	126
204	10/17/73	34.0	6.2	19.0	2.8	126.0	43.0	6.8	198.0	305.0	8.2	53
205		50.0	12.0	65.0	5.2	374.0	9.7	4.8	344.0	580.0	7.2	51
207		11.0	3.0	10.0	--	60.0	3.0	6.0	94.0	95.0	7.4	54
207A	5/22/73	13.0	1.6	8.1	2.2	54.0	10.0	2.1	99.0	109.0	7.4	55
208	1/17/73	6.0	6.0	10.0	--	52.0	3.0	2.0	102.0	80.0	7.2	57
209	9/13/73	11.0	3.0	21.0	--	56.0	--	6.0	150.0	105.0	7.3	48
210	5/24/73	5.0	2.0	101.0	--	92.0	5.0	120.0	406.0	480.0	9.0	88
211	1/22/73	8.0	6.0	40.0	--	68.0	<1.0	32.0	138.0	200.0	8.6	64
212	1/17/73	16.0	2.0	9.0	--	64.0	4.0	2.0	114.0	90.0	7.5	48
213	10/20/76	3.0	0.1	25.0	0.8	42.3	7.0	--	147.0	--	7.9	105
213	4/19/76	10.4	0	22.8	1.2	42.3	7.2	--	145.0	--	7.9	105
213	11/ 5/75	2.8	0.1	23.2	2.0	43.4	8.2	--	160.0	--	8.1	--
213		4.0	1.9	26.0	2.0	90.3	0	2.0	186.2	119.0	8.2	100
213A	5/16/73	4.7	0.3	23.0	2.0	61.0	8.8	2.3	150.0	122.0	7.7	105

Water (ity Data, Jemez Basin and Vicinity

Data No.	Date	Ca^{++}	Mg^{++}	Na^{+}	K^{+}	HCO_3^{-}	SO_4^{--}	Cl^{-}	TDS	Ec	pH	Temp. °F
214		6.4	2.4	13.0	3.0	62.9	0	5.0	167.7	94.0	8.0	80
215	10/16/49	8.0	2.0	--	--	45.0	2.9	2.0	105.0	80.0	--	--
216		10.4	3.4	13.0	2.0	43.3	--	25.0	152.1	220.0	8.5	54
218		28.0	1.2	83.0	--	623.0	335.0	121.0	2,970.0	2,225.0	8.0	--
219	10/22/49	164.0	24.0	16.0	--	0	1,160.0	4.0	1,800.0	2,270.0	--	--
223		21.6	6.3	9.0	5.0	129.4	--	--	197.3	164.0	7.5	55
224	10/22/76	5.4	0.2	28.8	3.9	54.3	2.0	--	184.0	--	7.7	99
224	4/22/76	5.0	0.1	27.8	3.1	52.4	12.0	--	187.0	--	7.7	99
224	11/ 6/75	5.4	0.3	28.7	4.3	54.2	15.4	--	182	--	7.8	--
224	7/24/49	4.0	0.3	--	--	59.0	7.0	3.0	149.0	122.0	--	106
224	9/28/49	6.0	0.5	--	--	76.0	14.0	3.0	199.0	164.0	--	81
224	5/24/73	3.0	1.0	22.0	--	58.0	8.0	6.0	202.0	110.0	7.5	72
224	5/28/73	6.0	2.0	16.0	--	52.0	<1.0	6.0	206.0	110.0	7.4	70
226		6.1	2.4	8.0	4.0	58.0	--	7.0	113.5	81.0	7.0	36
227	6/20/50	7.2	0.6	12.0	--	45.0	2.1	1.8	108.0	86.0	--	--
227	10/16/49	10.0	1.6	7.2	--	42.0	3.5	3.0	90.0	85.0	--	--
228	7/ 6/49	6.0	0.9	11.0	--	38.0	2.1	2.0	98.0	80.0	--	--
230	10/16/49	15.0	1.1	16.0	--	49.0	3.3	1.0	123.0	107.0	--	--
230A	10/22/76	6.4	0.2	9.5	0.4	29.3	7.0	--	106.0	--	8.0	58
230A	4/22/76	5.0	0.1	10.1	0.4	28.8	1.0	--	85.0	--	7.8	59
230A	11/ 6/75	6.6	0.3	10.1	0.8	35.1	5.3	--	78.0	--	8.2	--
231		10.0	1.9	--	--	70.0	3.3	2.0	124.0	100.0	--	63
232	10/16/49	10.0	1.9	16.0	--	70.0	3.3	2.0	124.0	100.0	--	--
232A	10/22/76	6.8	0.2	8.9	0.4	33.7	13.0	--	103.0	--	7.7	52
232A	4/22/76	5.8	0.2	10.1	0.4	31.1	1.0	--	110.0	--	8.1	53
232A	11/ 6/75	6.4	0.5	10.1	0.4	31.7	3.4	--	88.0	--	7.3	--
233		10.0	1.6	--	--	42.0	3.5	3.0	90.0	85.0	--	64
233A	7/27/49	11.0	2.5	19.0	--	68.0	13.0	2.0	143.0	122.0	--	62
233B		4.0	0	17.0	0.3	59.3	0	0	93.5	870.0	8.2	53
234		15.0	1.1	--	--	77.0	3.3	1.0	125.0	110.0	--	63
235		8.0	0.9	--	--	48.0	3.7	2.0	111.0	85.0	--	55
235A	7/ 6/49	6.0	0.9	--	--	40.0	2.6	1.5	103.0	80.0	--	50
242	1/ 7/65	54.0	17.0	35.0	--	170.0	131.0	3.7	358.0	539.0	8.0	--
243	6/19/74	88.0	19.0	8.4	2.2	381.0	9.0	2.6	332.0	570.0	7.1	51
244	5/30/73	28.0	5.1	11.0	2.0	96.0	38.0	3.7	175.0	233.0	7.3	50
245	3/ 7/74	30.0	7.7	50.0	6.9	247.0	20.0	2.5	263.0	430.0	7.4	51
246	6/19/74	11.0	3.0	7.7	1.0	60.0	4.1	1.5	112.0	120.0	6.8	61
247A	3/ 7/74	12.0	4.8	9.9	1.1	80.0	2.1	1.9	124.0	141.0	7.8	64
249	3/ 7/74	340.0	70.0	330.0	13.0	362.0	1,100.0	330.0	2,390.0	3,190.0	7.5	--

APPENDIX II

Part 3
Trace Elements

TRACE ELEMENT ANALYSES
(Concentration In ppb)

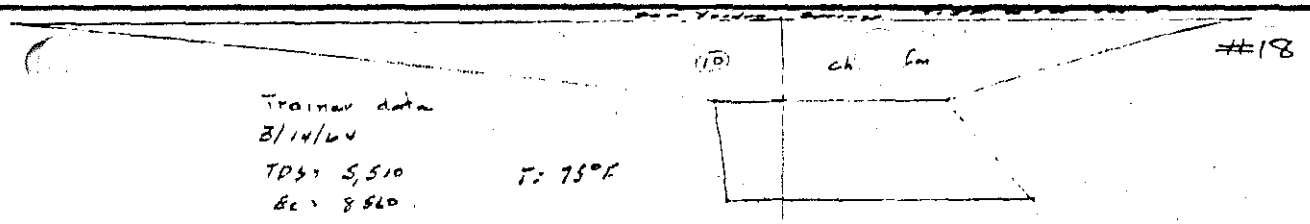
Data No.	Date	Arsenic	Boron	Iron	Lithium	Manganese
2	12/12/74	20	150	110	100	0
3	12/12/74	7	80	80	100	0
9	8/26/72	110	2,200	800	---	--
13	9/25/74	4	210	3,000	200	70
17	10/18/74	190	8,200	---	7,100	--
18	5/ 2/73	210	20	800	---	740
20	4/ 4/74	4	110	1,700	60	0
22	6/ 5/73	0	1,800	30	1,200	20
23	6/ 5/73	360	7,500	1,400	---	90
24	10/ 2/73	2	290	0	210	13
28	5/23/73	3	50	60	---	20
29	5/23/73	0	20	30	---	0
30	9/ 5/73	2	--	15,000	640	260
31	9/ 5/73	5	1,200	80	1,100	630
32	5/24/73	86	5,800	1,500	>2,800	340
33	5/24/73	8	320	400	---	210
34	5/24/73	0	170	40	---	0
35	8/30/73	17	990	540	890	750
36	8/30/73	69	8,200	50	6,700	1,300
40	5/24/73	20	3,300	30	---	70
41	5/25/73	43	670	90	---	80
42	6/ 8/73	15	50	20	---	0
46	8/31/73	0	40	--	50	--
49	8/21/73	67	380	140	---	80
51	11/ 2/73	0	210	60	140	250
52	1/29/74	50	1,000	30	960	120
54	10/ 5/73	68	1,300	90	1,500	80
56	6/ 6/73	1	60	450	---	380
57	10/ 2/73	5	20	20	10	8
61	8/28/73	1	10	10	10	0
64	10/30/73	0	60	10	60	10
66	10/30/73	2	10	20	20	0
67	10/30/73	0	10	80	30	0
69	6/ 7/73	6	2,200	--	--	--
72	7/18/74	26	370	10	560	0
75	3/ 8/73	1,100	14,000	--	--	--
77	5/30/74	780	7,400	450	7,800	300
78	1/29/74	120	85	50	1,300	30
79	9/27/73	150	1,200	30	1,400	0
82	7/ 3/74	5	2,100	--	370	--
85	5/28/74	230	1,900	750	2,300	820
88	6/21/73	5	180	9	--	20
91	7/13/73	4	140	30	--	0
96	9/18/73	1	20	110	0	0
114	3/ 8/73	3	3,300	--	--	--

Trace Element Analyses (Cont.)

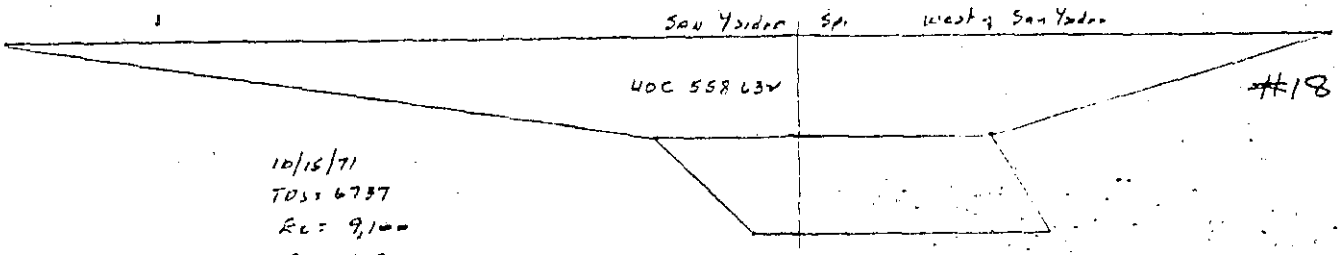
Data No.	Date	Arsenic	Boron	Iron	Lithium	Manganese
121	5/14/74	39	15,000	30	12,000	340
122	5/31/73	0	70	140	--	0
124	6/29/73	8	490	10	--	0
125	3/21/74	3	510	2,000	690	240
126	11/14/74	6	40	60	80	0
152	--	4,500	--	--	--	--
204	6/27/74	3	20	890	--	0
205	8/ 5/74	0	90	50	100	20
207	5/22/73	4	20	260	--	0
213	5/16/73	3	40	160	--	0
243	6/19/74	2	20	20	20	20
244	1/10/74	4	60	5	20	<3
244	3/19/73	4	50	40	5	<4
245	6/19/74	1	110	40	100	0
246	6/19/74	2	10	30	10	0
247	3/ 7/74	7	10	80	20	0
249	3/ 7/74	0	150	10	130	1,200

APPENDIX III

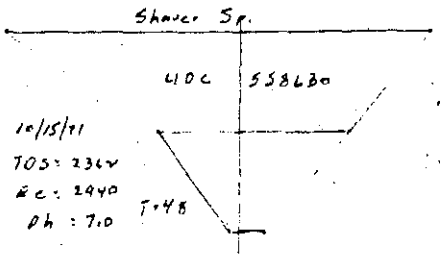
Chemical Diagrams



Trainer data
8/14/64
TDS: 5,510
Ec: 8,560
pH: 7.6
T: 75°F

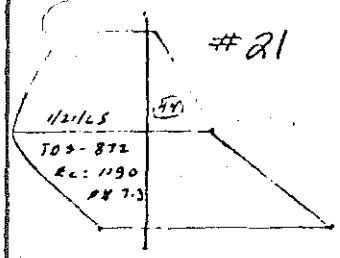


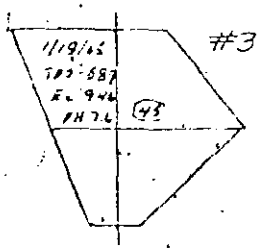
10/15/71
TDS: 6737
Ec: 9,100
pH: 6.8

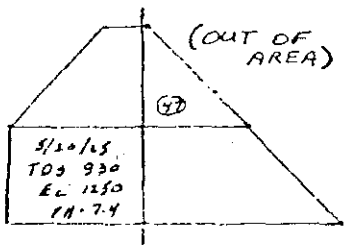


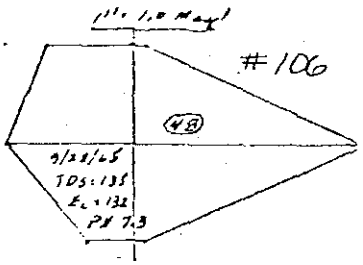
10/15/71
TDS: 2364
Ec: 2940
ph: 7.0

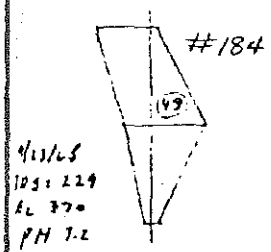
Scale 1" = 10 meq/l

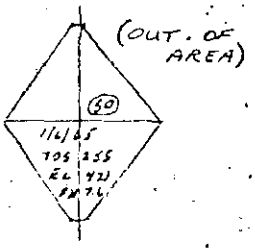


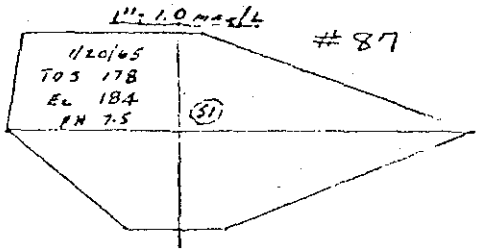


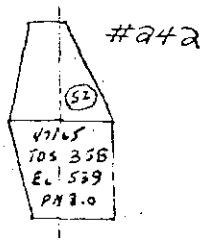


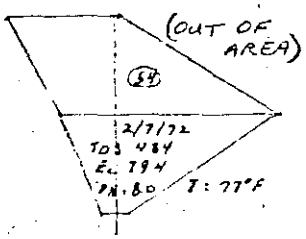


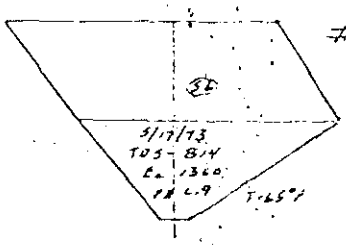


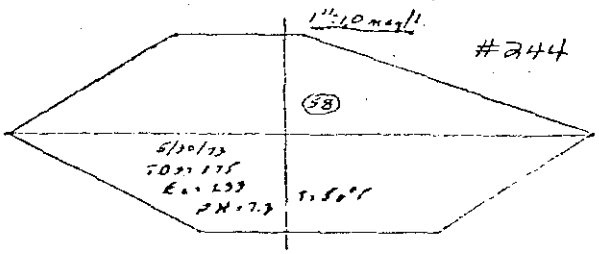


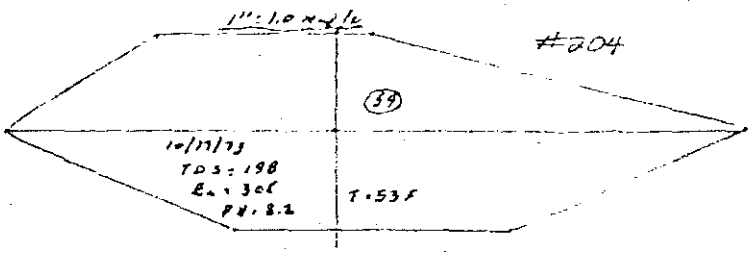


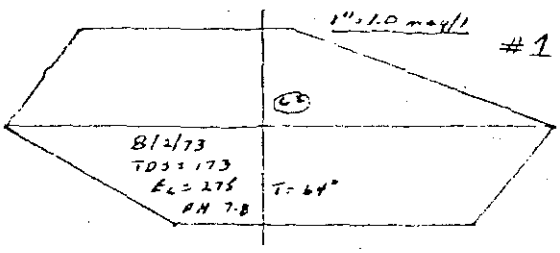


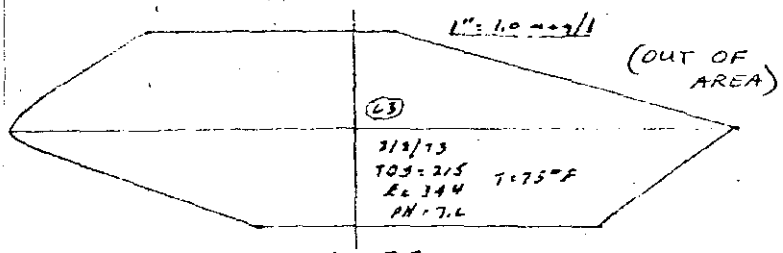




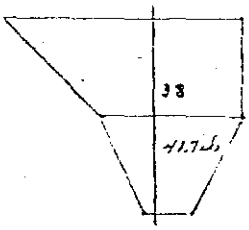




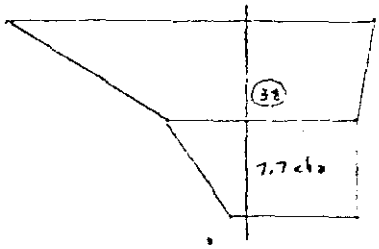




Sta 3310



Same location



Scale 1": 10 mg/l

#30

71

9/5/73
TDS: 1840
E_c: 2440
PH: 6.4

T: 70°

#31

81

9/5/73
TDS: 4350
E_c: 3190
PH: 7.0

T: 66°

Scale 1": 30 mg/L

#36

80

8/27/73
TDS: 3780
E_c: 5694
PH: 8.0

T: 73

#32

79

5/24/73
TDS: 4150
E_c: 6420
PH: 6.4
T: 59°

#22

73

6/15/73
TDS: 7,760
E_c: 10,100
PH: 8.5
T: 70°

93

Scale 1": 50 mg/L

#23

154

72

1896

23.1

6/5/73
TDS: 11,100
E_c: 15,700
PH: 6.8

T: 126°

66°

Scale 1": 10 mg/L

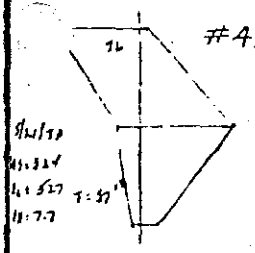
#40

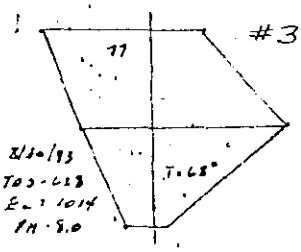
75

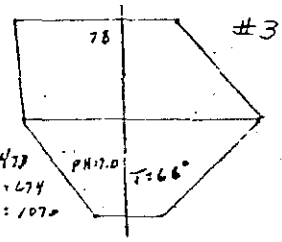
5/24/73
TDS: 1570
E_c: 2550
PH: 7.6

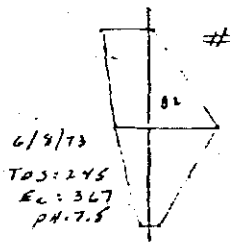
T: 77°

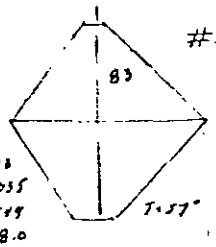
scale 1" = 10 may/1

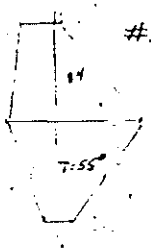


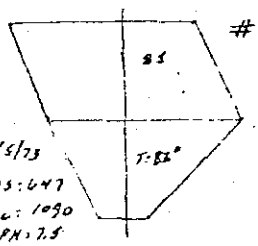


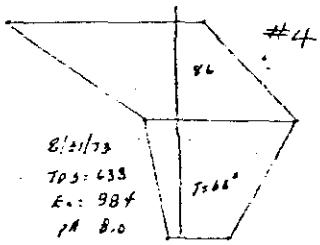


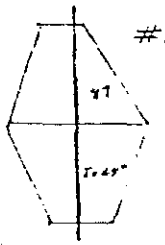


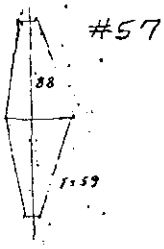


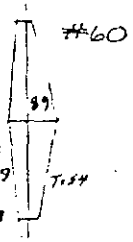


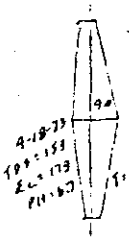


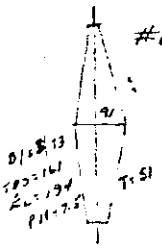


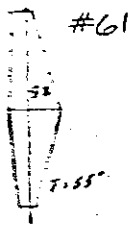


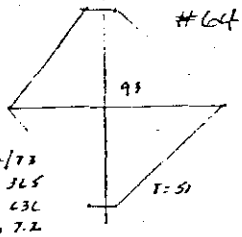


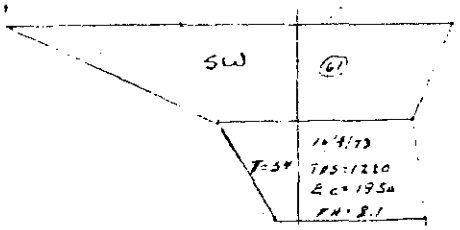


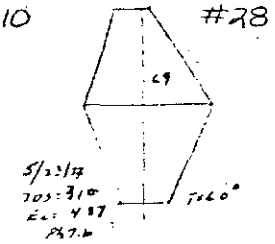


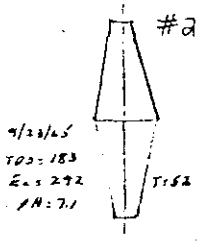


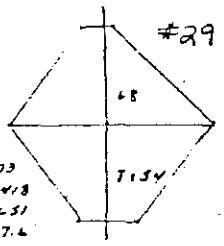


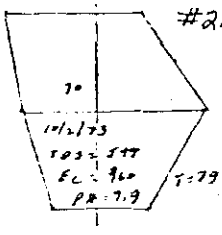


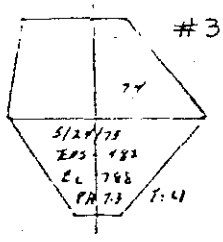




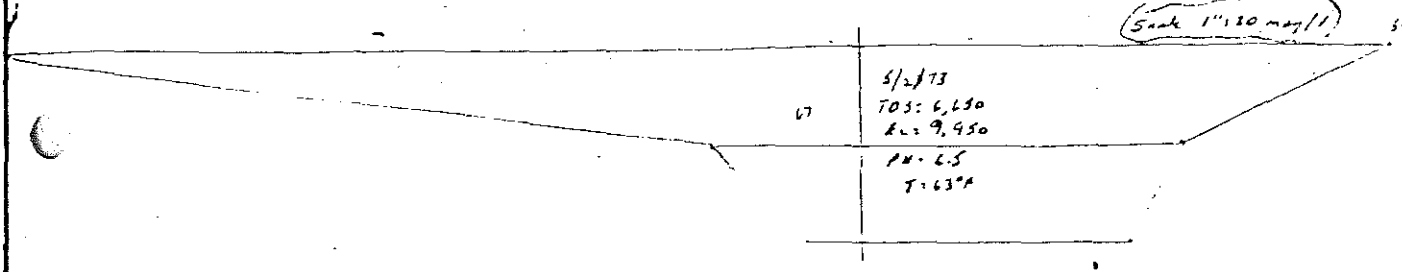




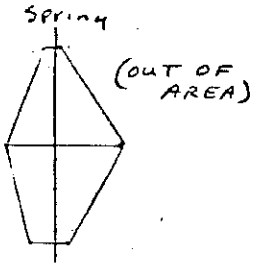


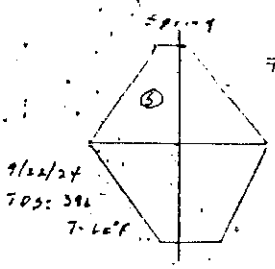


Scale 1" = 20 may/1



Scale 1": 10 mag/lit.



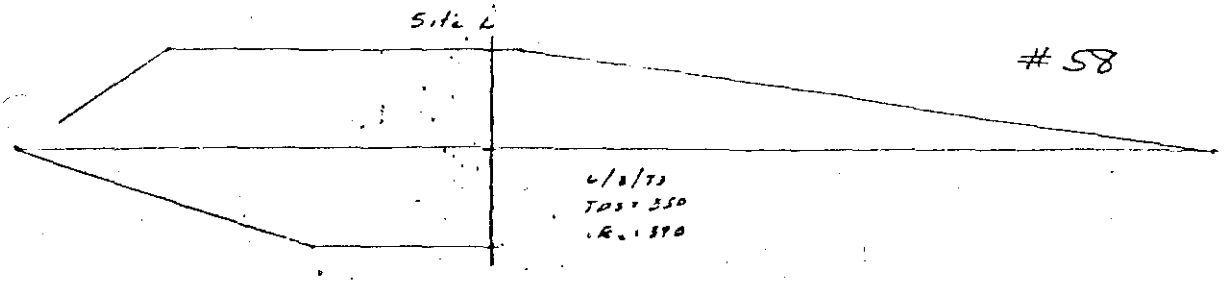


#45

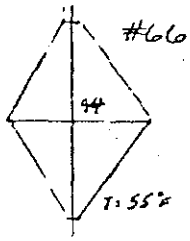
Vallecitos Creek

1" = 1.0 meq/L

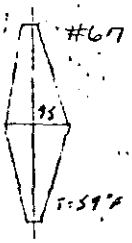
#58

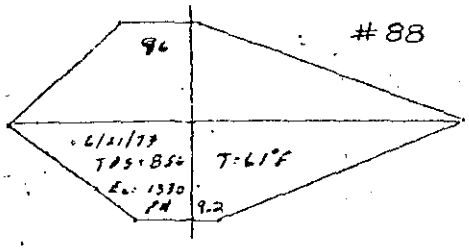


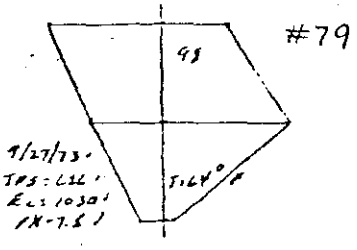
Scale 1" = 10 miles

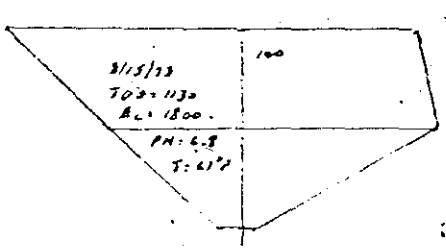


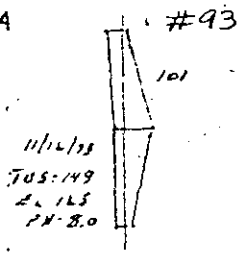
11/4/73
S: 230
L 333
PH: 7.7

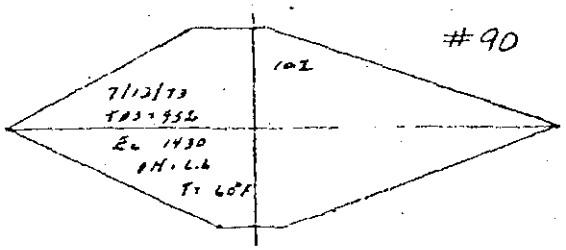


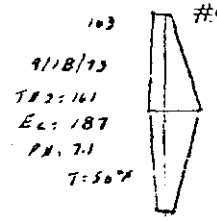


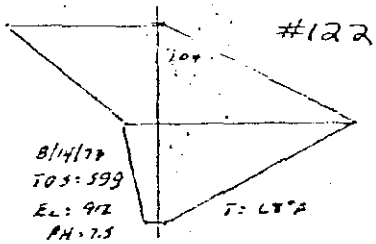


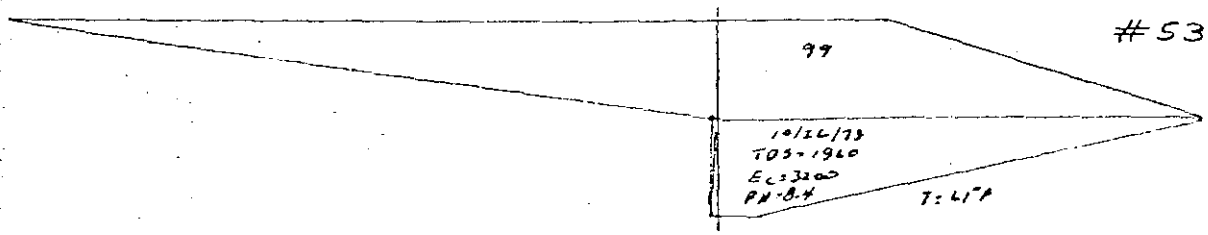


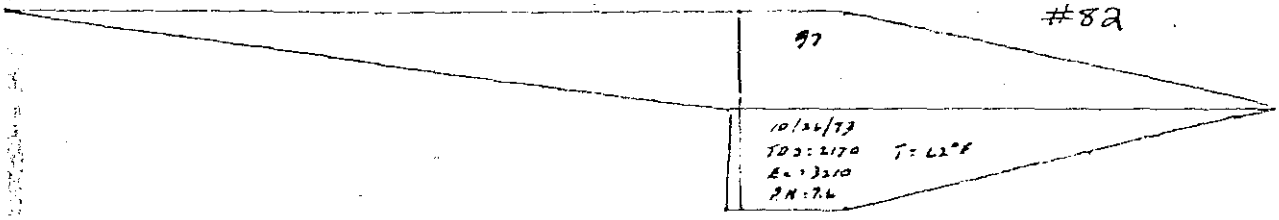


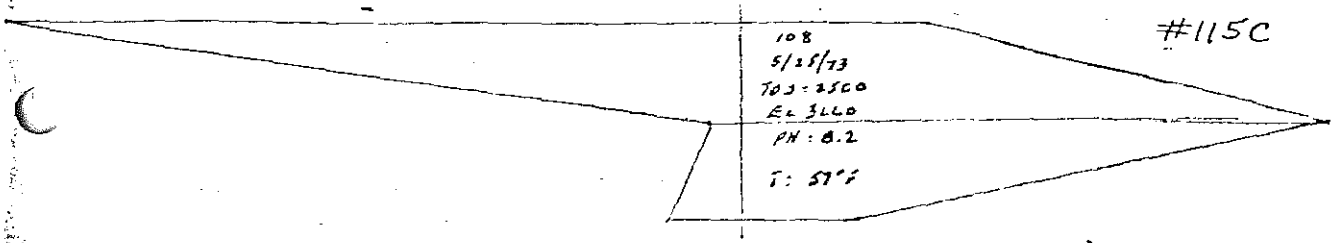






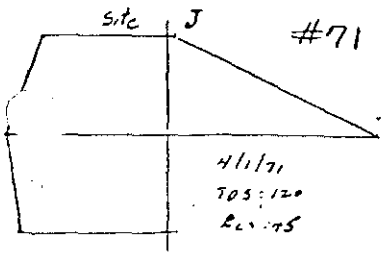


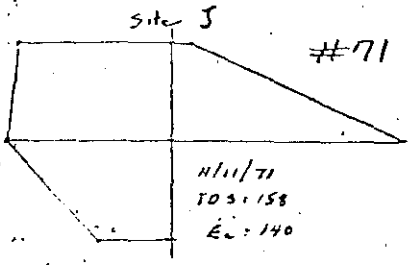


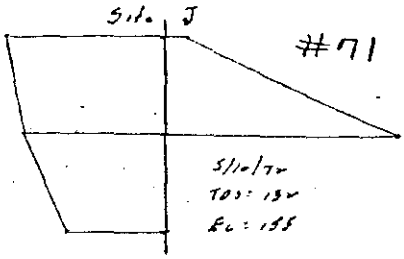


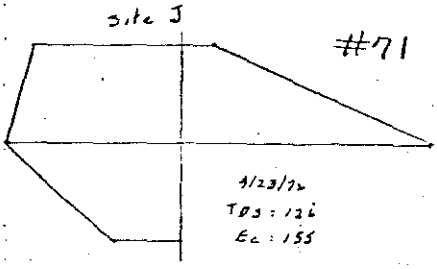
Jemez River

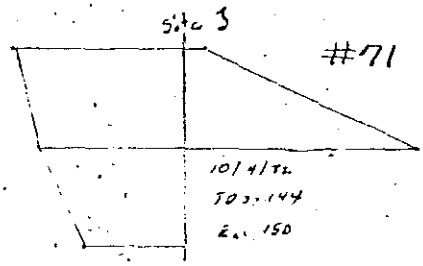
Scale 1" = 1 mg/Lt.

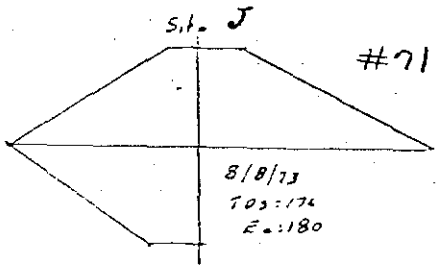


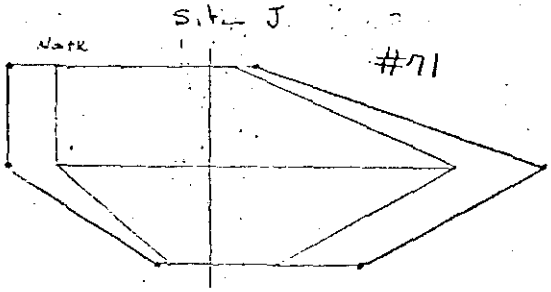








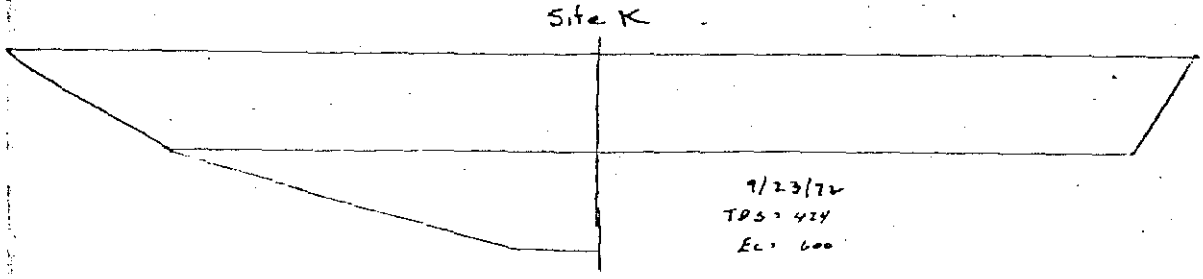


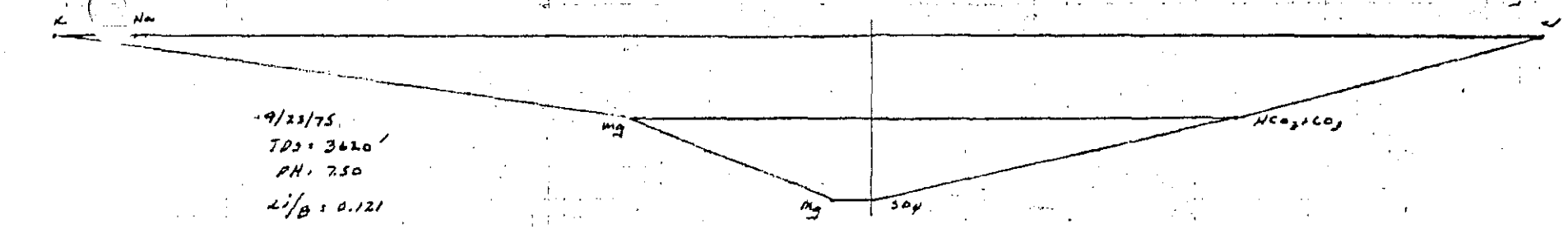


Average 17 cfs.

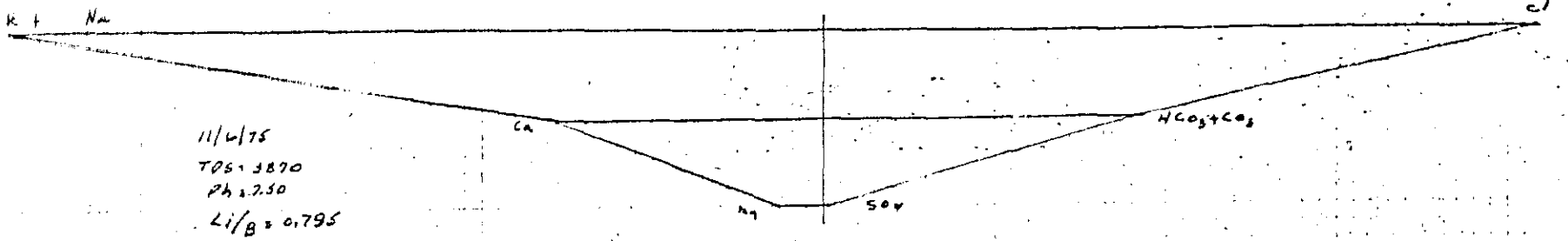
Max Conc x Min Flow = 7 cfs

Min Conc x Max Flow 58 cfs

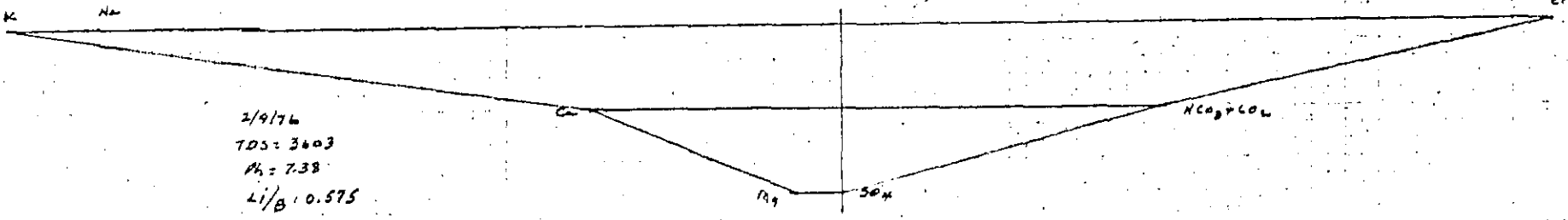




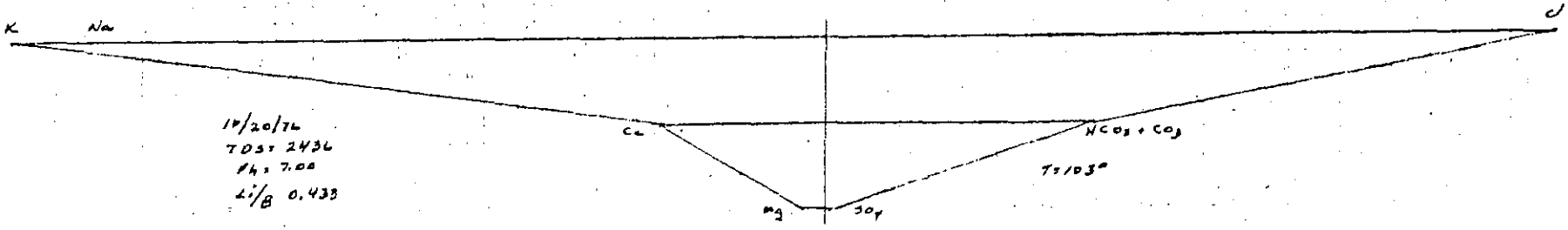
9/23/75
TDS = 3620
PH = 7.50
Li/B = 0.121



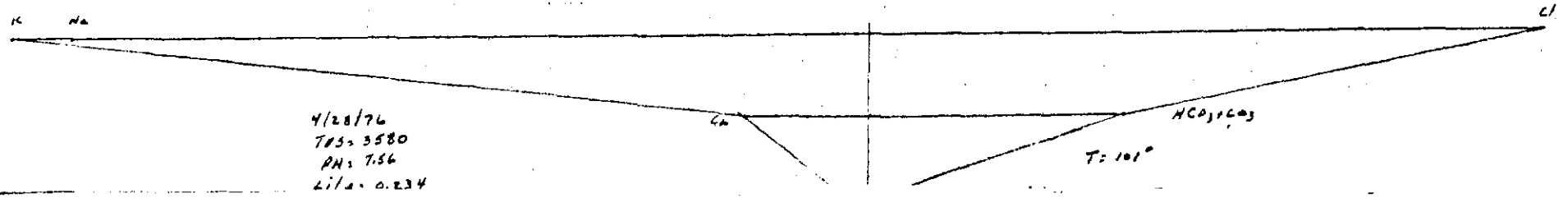
11/6/75
TDS = 3870
PH = 7.50
Li/B = 0.795



2/9/76
TDS = 3603
PH = 7.38
Li/B = 0.575



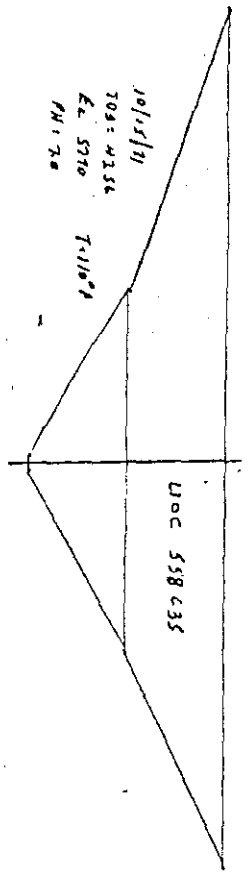
10/20/76
TDS = 2436
PH = 7.00
Li/B 0.433
T = 103°

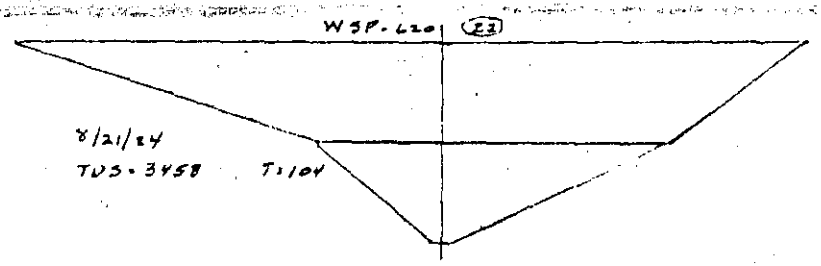


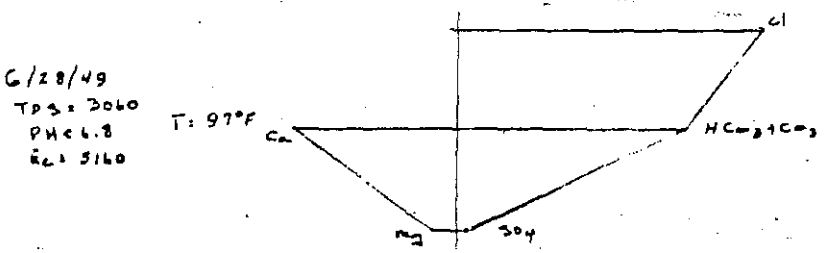
4/28/76
TDS = 3580
PH = 7.56
Li/B = 0.234
T = 101°

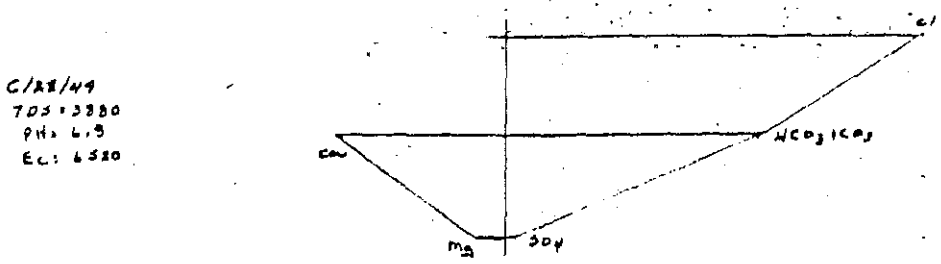
T 18N R 2E Sec 14 #75 (ALL)

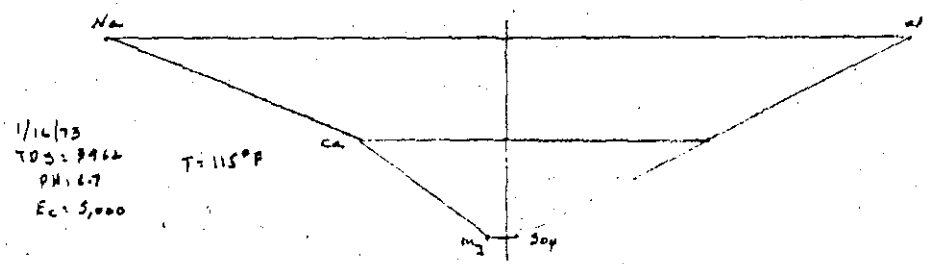
10 mg/l (A1)

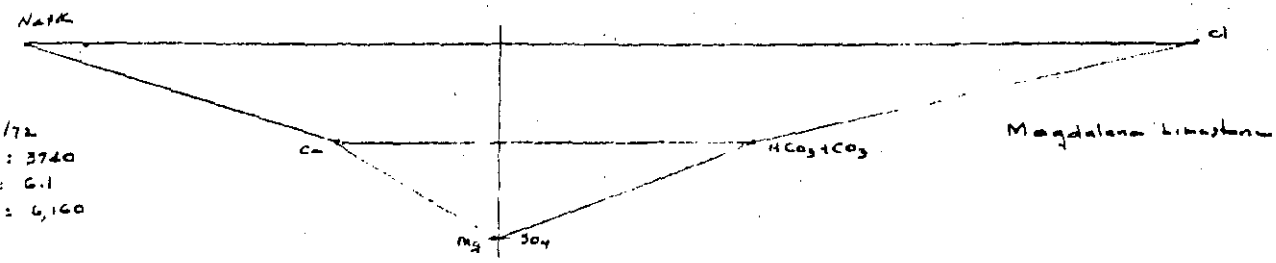












12/1/72
TDS: 3740
pH: 6.1
Ec: 6,160

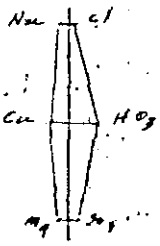
Magdalena Limestone

Trainer report

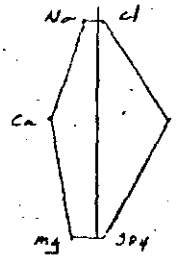
Sopa Dam Springs
#75 (ALL)

Serial #: 20 meq/L
A1

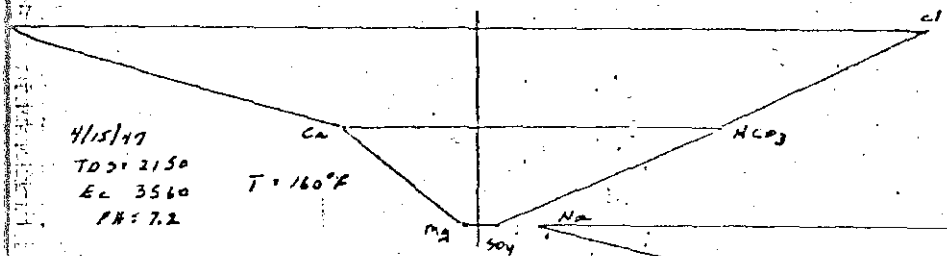
#77 (ALL)



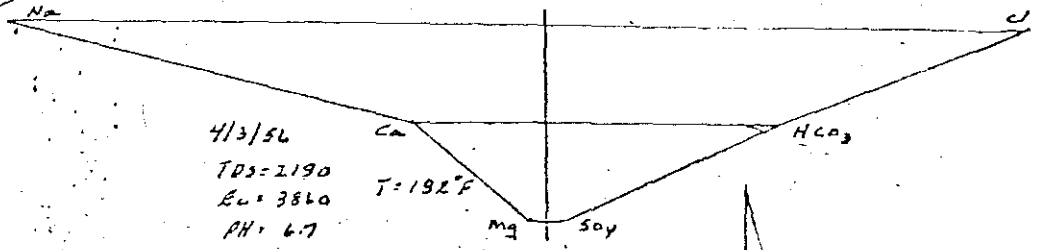
4/15/47
TDS = 1530
Ec = 1840



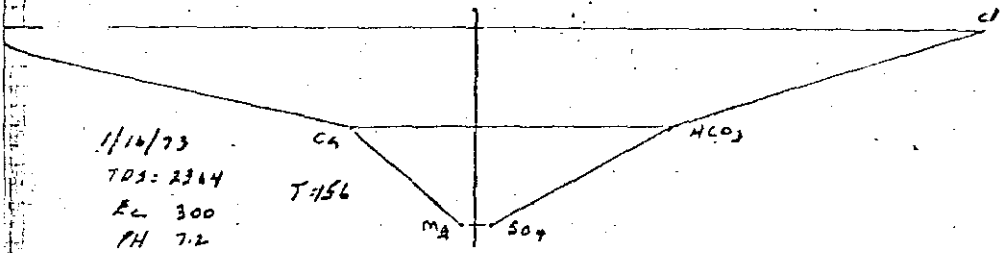
4/15/47
TDS = 2700
Ec = 3510



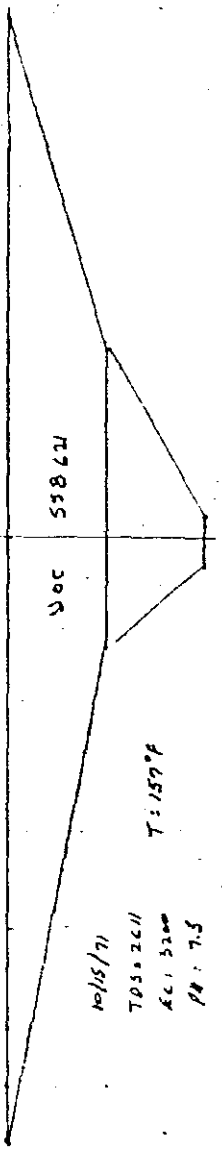
4/15/47
TDS = 2150
Ec 3560
PH = 7.2
T = 160°F



4/3/56
TDS = 2190
Ec = 3860
PH = 6.7
T = 192°F

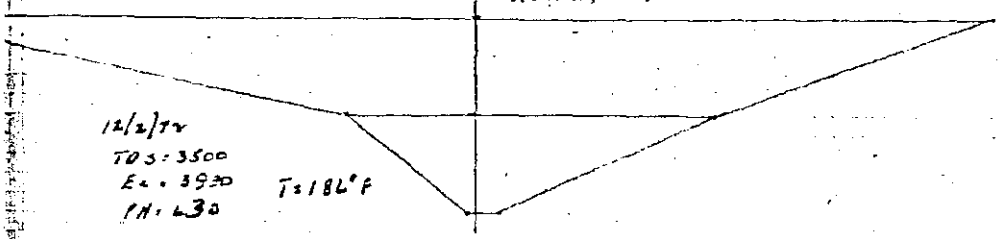


1/16/73
TDS = 2364
Ec 300
PH 7.2
T = 156

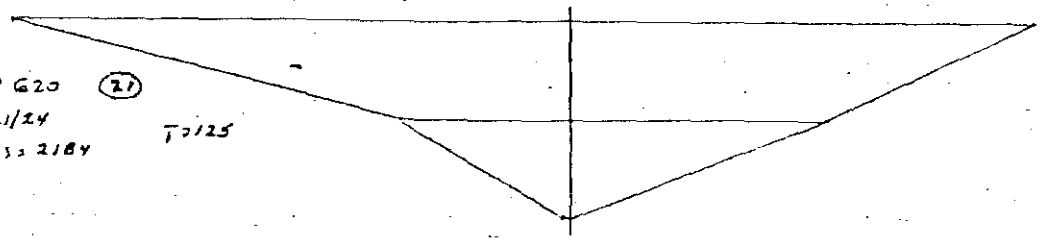


10/15/71
TDS = 2611
Ec 3200
PH = 7.5
T = 159°F

Trainer # 7



12/2/74
TDS = 3500
Ec = 3920
PH = 6.30
T = 186°F

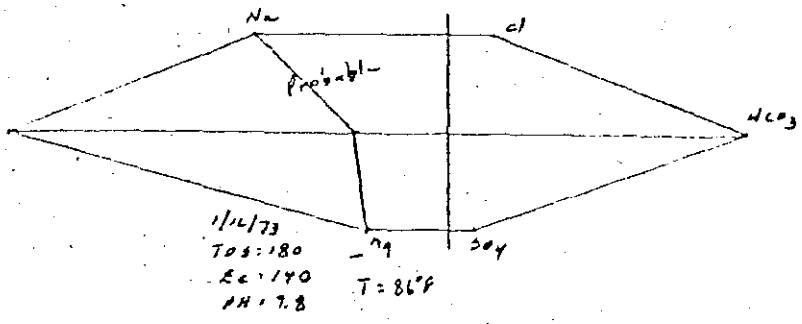


WSP G20 (21)
8/21/24
S = 2184
T = 125

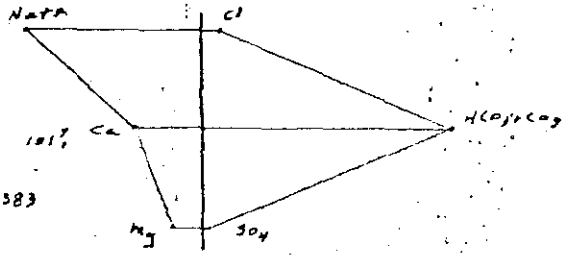
T 18 N R 3 E Sec 4.144

Scale 1/2
1" = 1 meq/l

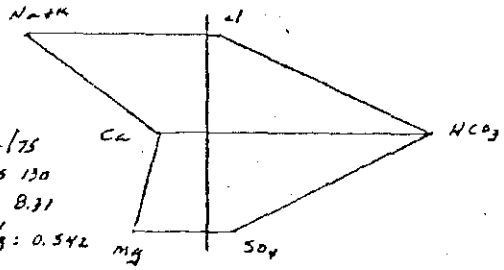
#94 (ALL)



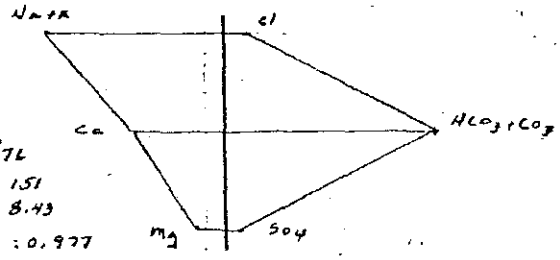
1/14/73
TDS: 180
Ec: 140
PH: 7.8
T = 86°F



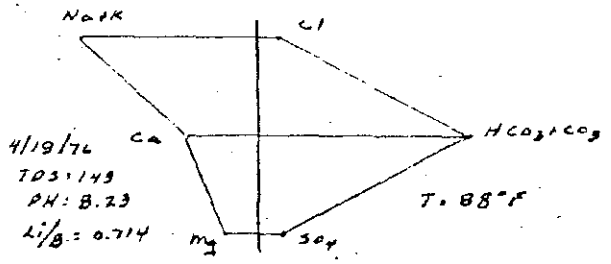
8/8/75
TDS: 202 101?
PH: 7.85
Li/B: 0.383



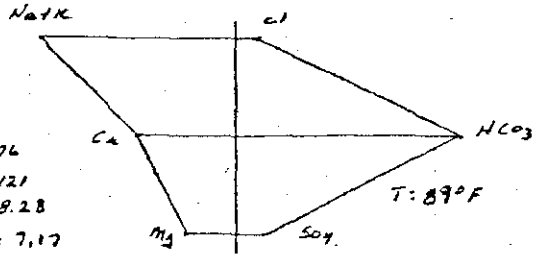
11/4/75
TDS 130
PH - 8.31
Li/B: 0.542



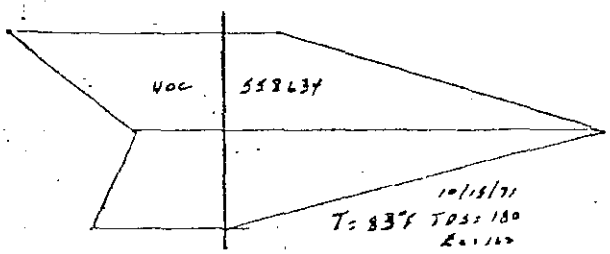
1/29/76
TDS 151
PH 8.43
Li/B: 0.977



4/19/76
TDS: 149
PH: 8.23
Li/B: 0.714
T = 88°F



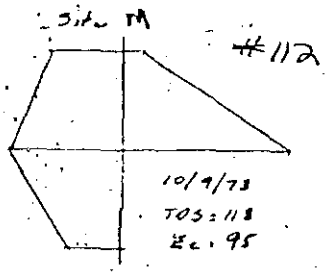
8/20/76
TDS: 121
PH 8.28
Li/B: 7.17
T: 89°F



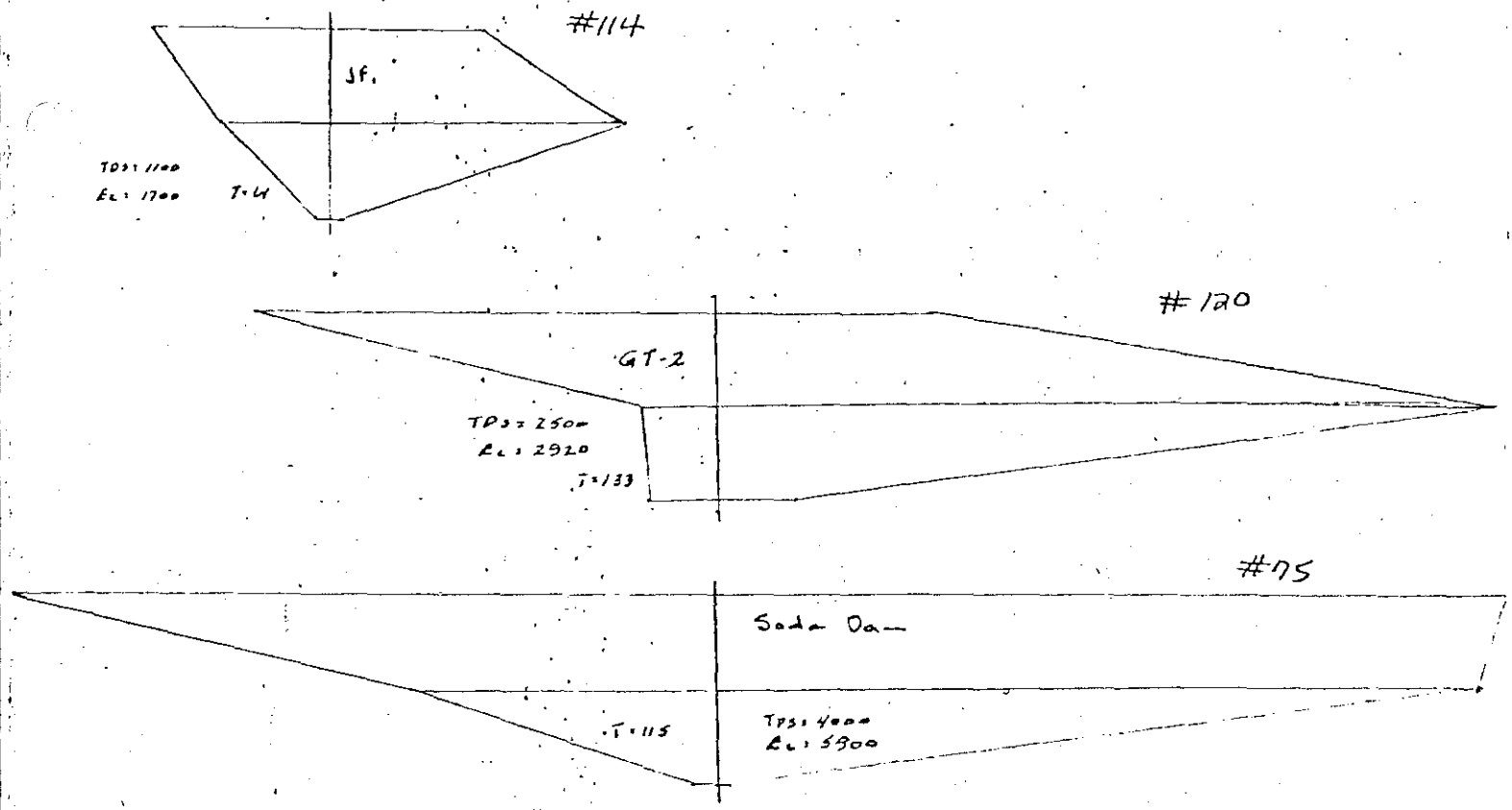
10/15/71
T: 83°F TDS: 180
Ec: 162
PH: 8.2

Fenton Lake

Scale 1" = 1.0 mg/l.t.



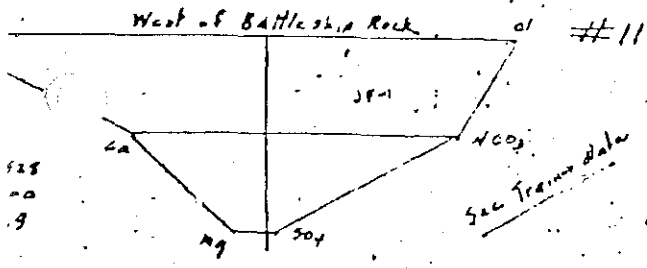
scale 1" = 10 mcy/in.



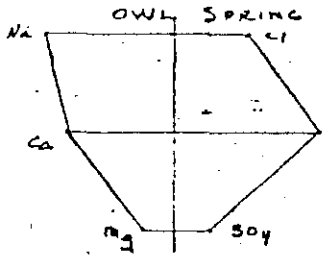
Misc Springs

Scale 1" = 10 meq/L

West of Battleship Rock #114

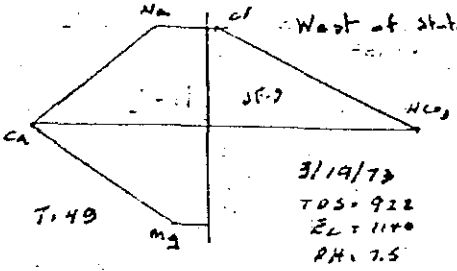


OWL Spring #34



3/1/53
Ec = 1220

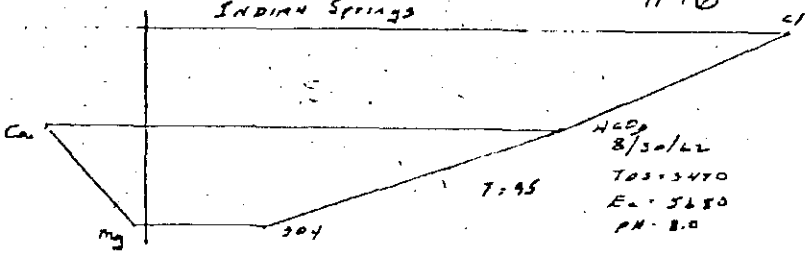
West of State Road 4 #73



T: 49

3/19/73
TDS = 922
Ec = 1170
PH = 7.5

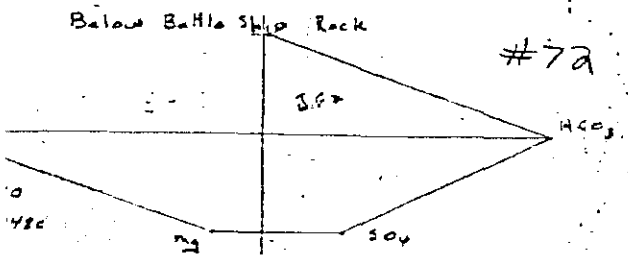
Indian Springs #16



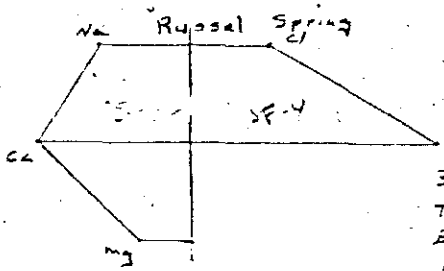
T: 95

8/30/22
TDS = 3470
Ec = 5180
PH = 8.0

Below Battle Ship Rock #72

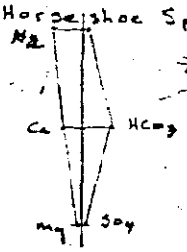


Russel Spring #73A



3/19/73
TDS = 988
Ec = 1280
PH = 7.4

Horseshoe Sp. #130



11/23/72
TDS = 299
Ec = 200
PH = 7.6

La Cueva Spr #134

6/8/73
TDS = 230
Ec = 180
PH = 7.4

West Side of Creek #129

4/30/73
TDS = 210
Ec = 130
T = 68°F
PH = 7.4

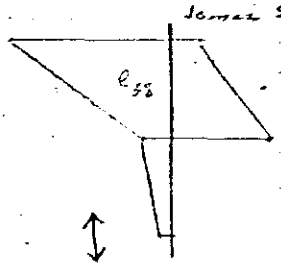
Palizo Spr. #59

6/8/73
TDS = 104
Ec = 190
T = 65°F
PH = 7.8

Calveras Spr. #207

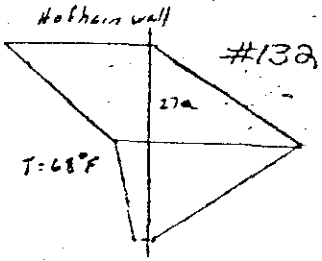
4/17/73
TDS = 102
Ec = 95
T = 54°F
PH = 7.9

Jemez School #50



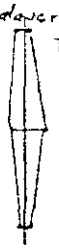
8/21/73
TDS = 660
Ec = 780
PH = 7.8

Holhein well #132



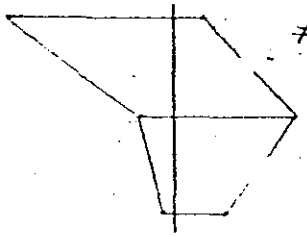
T = 68°F

Calaveras Spr. #207



Trainer
12/4/72
TDS = 122
Ec = 113
PH = 7.0

Jemez School Spring #50

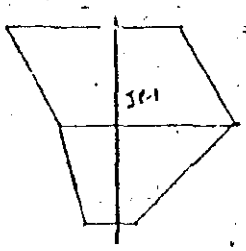


Trainer Site 9
8-24-73
TDS = 638
Ec = 1,000
PH = 7.6

Misc Wells

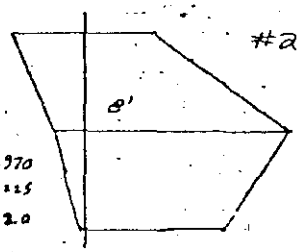
Scale 1" = 10 meq/L

#114



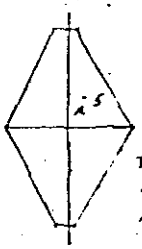
1964
TDS: 597
Ec: 980

#218



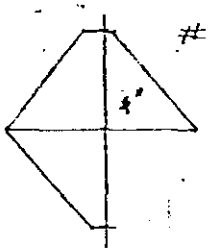
TDS = 1970
Ec = 2225
PH: 8.0

#135A



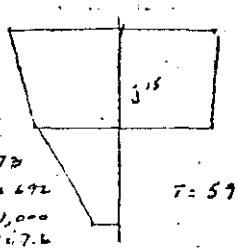
TDS = 322
Ec = 550
PH = 7.2

#89



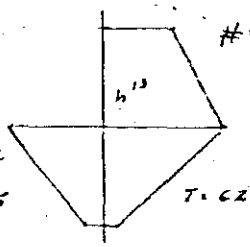
6/1/73
TDS 402
Ec 580
PH: 7.6

#55A



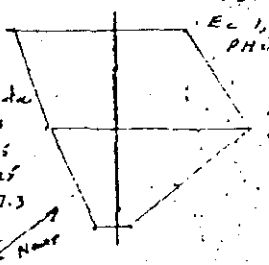
6/8/73
TDS = 692
Ec 1,000
PH: 7.6
T: 59°

#85

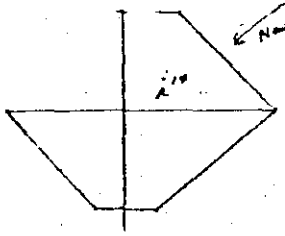


10/14/54
Ec 995
T: 62°F

3.1 c/2 Trainer data
9/27/73
TDS = 625
Ec = 925
PH: 7.3



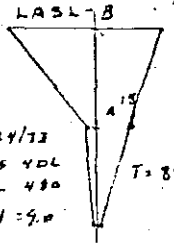
#178



1/4/.
13:
Ec 1140

LASL-B

#210

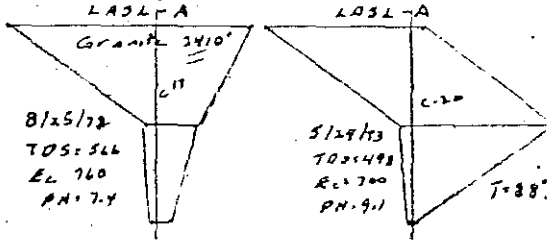


5/24/73
TDS 401
Ec 490
PH: 9.0
T: 88

#133

LASL-A
Granite 2410'

LASL-A

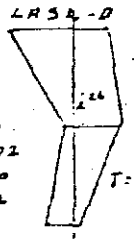


8/25/72
TDS: 566
Ec 760
PH: 7.4

5/24/73
TDS: 498
Ec: 700
PH: 9.1
T: 88°

LASL-B

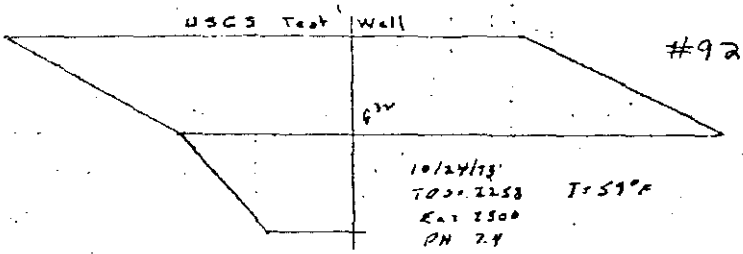
#117



1/22/73
TDS: 272
Ec: 400
PH: 8.6
T: 48°F

USGS Test Well

#92



10/24/73
TDS: 2258
Ec: 2500
PH 7.4
T: 59°F

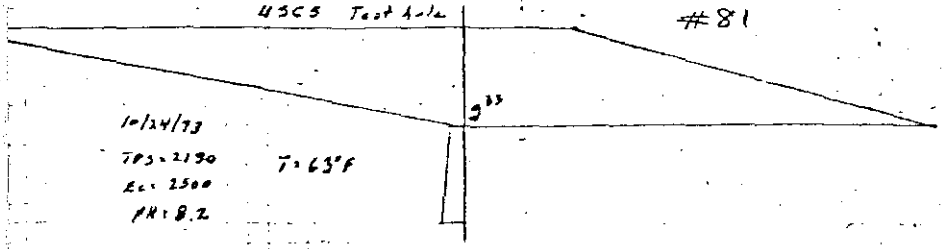
Morgan Well

#80

9/27/73
TDS: 434
Ec: 1,000
PH: 8.1
T: 64°F

USGS Test Hole

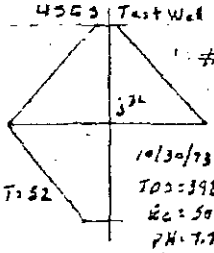
#81



10/24/73
TDS: 2190
Ec: 2500
PH: 8.2
T: 63°F

USGS Test Well

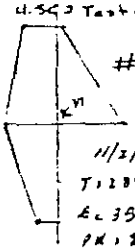
#65



10/30/73
TDS: 398
Ec: 500
PH: 7.7
T: 52

U.S.G.S. Test well

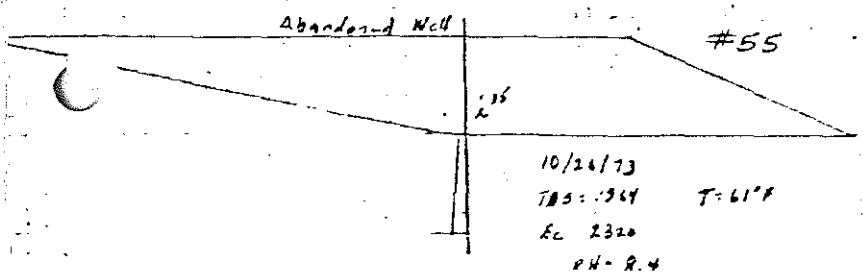
#48



11/2/73
T: 284
Ec 350
PH: 8.0
T: 55

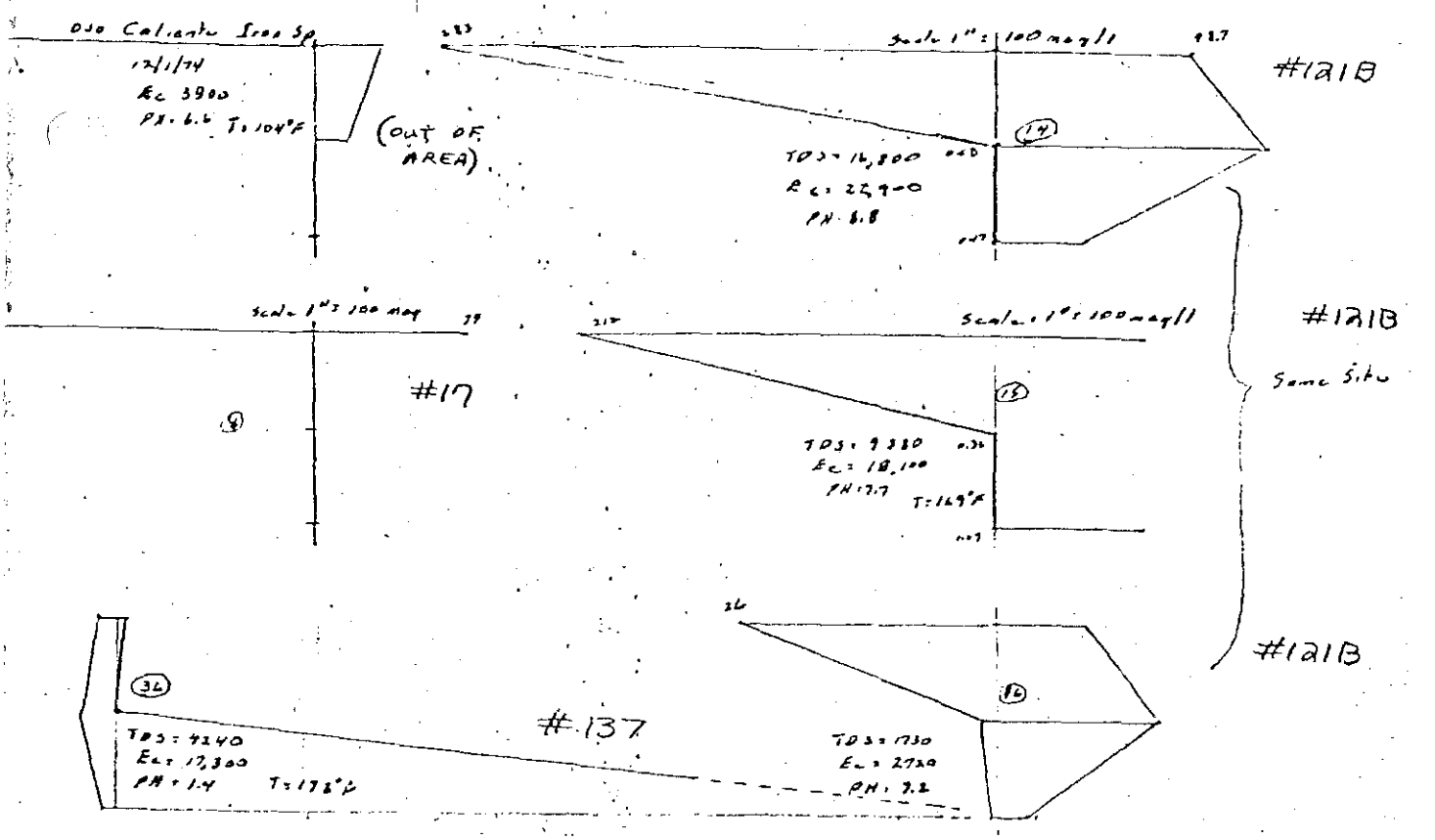
Abandoned Well

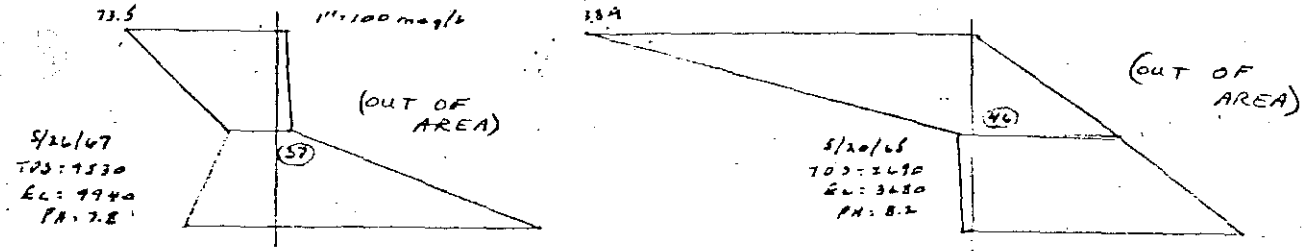
#55

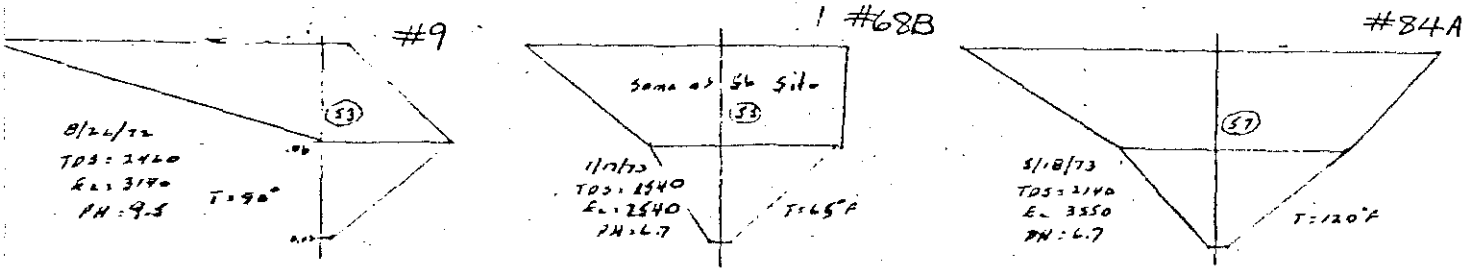


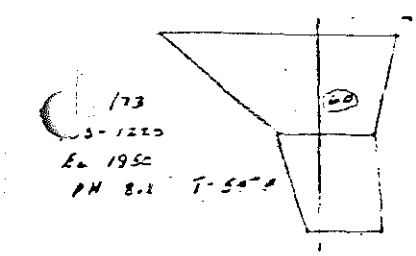
10/26/73
TDS: 364
Ec 2320
PH: 8.4
T: 61°F

Scale 1" = 20 meq/l

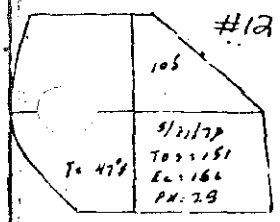


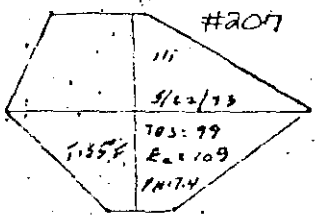


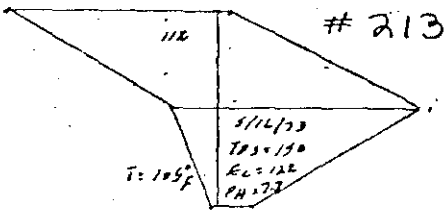




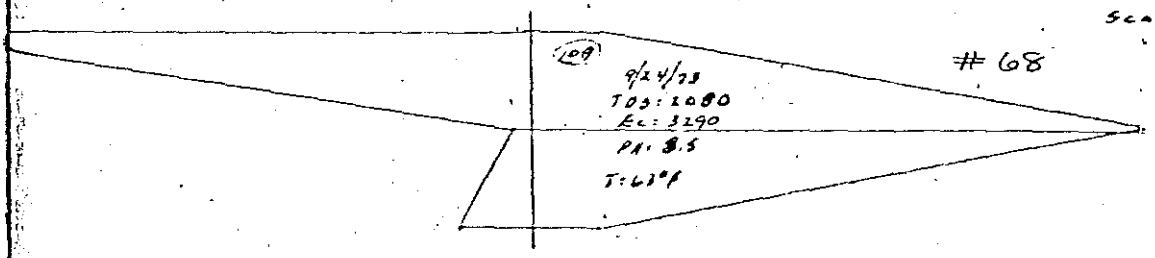
Scale 1" = 1 Meq/L

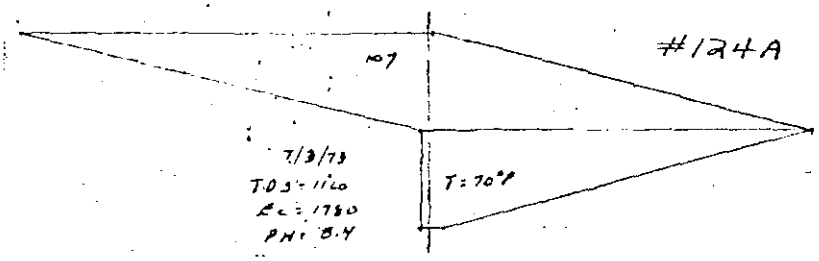


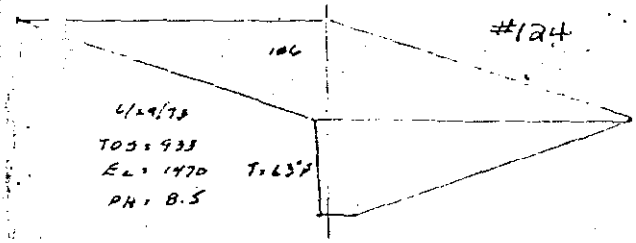


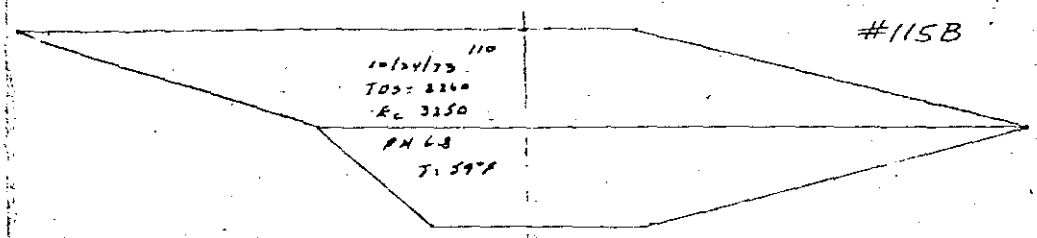


scale 1" = 10 meq/L





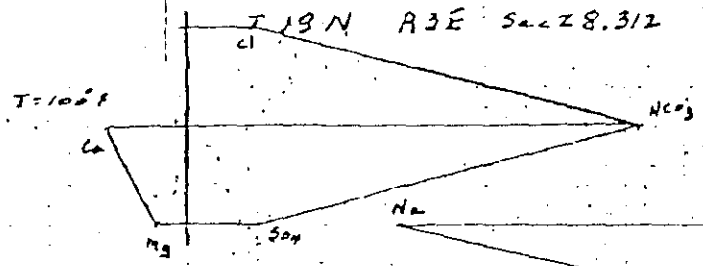




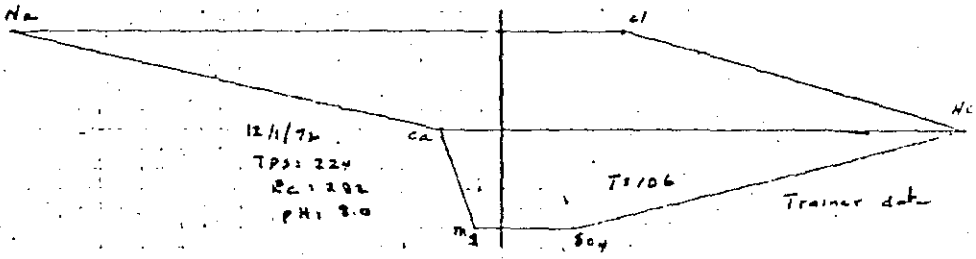
T 19 N R 3 E Sec 28.3/2

1" = 10 meq/L

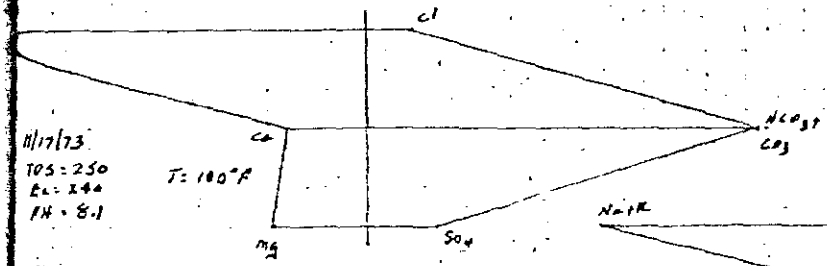
#128 (ALL)



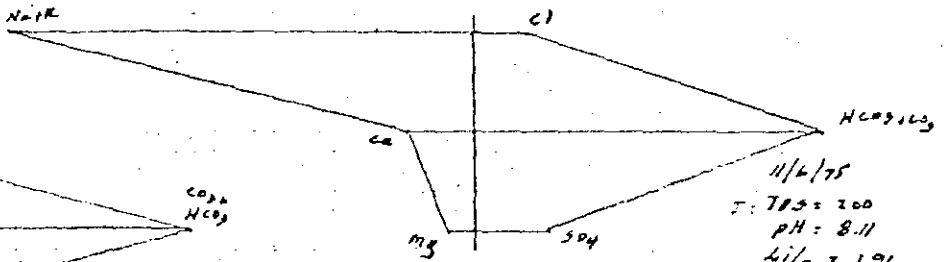
8/1/47
TDS = 234
E_c = 283
PH = 7.3



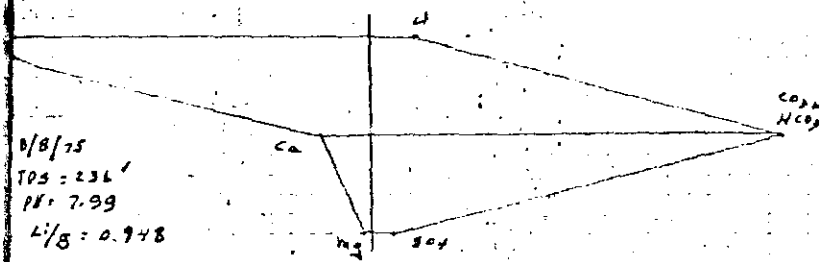
12/1/76
TDS = 224
E_c = 292
pH = 8.0



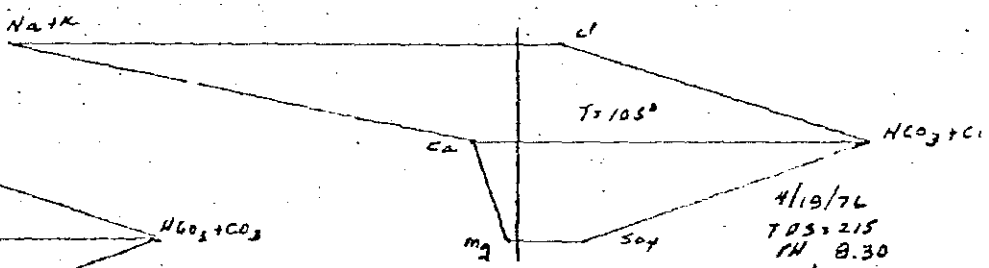
11/17/73
TDS = 250
E_c = 344
PH = 8.1



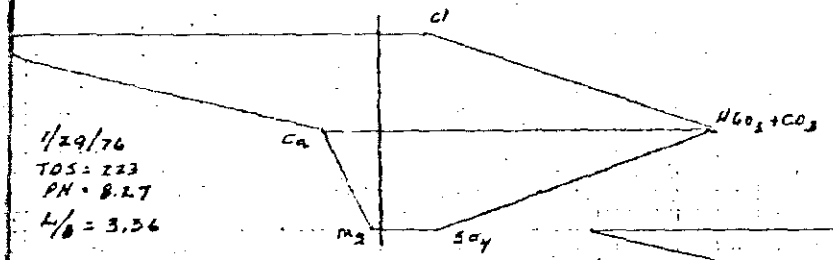
11/4/75
TDS = 200
pH = 8.11
Li/B = 1.96



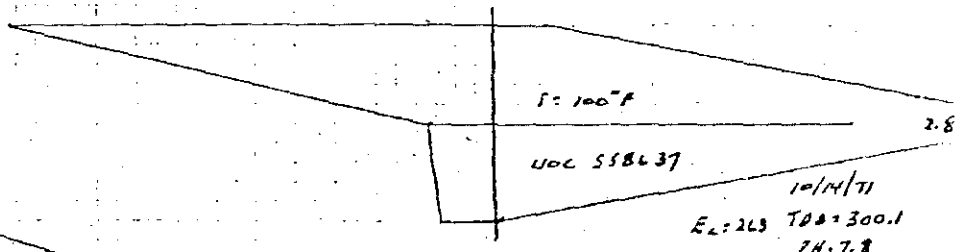
8/8/75
TDS = 236
PH = 7.99
Li/B = 0.948



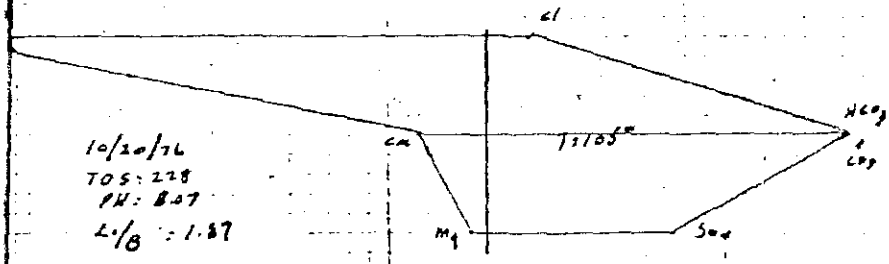
4/19/76
TDS = 215
PH 8.30
Li/B = 1.90



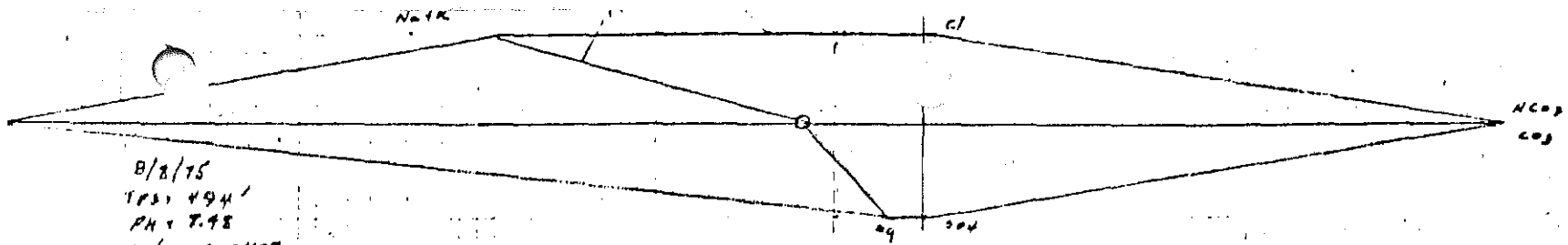
1/29/76
TDS = 223
PH = 8.27
Li/B = 3.56



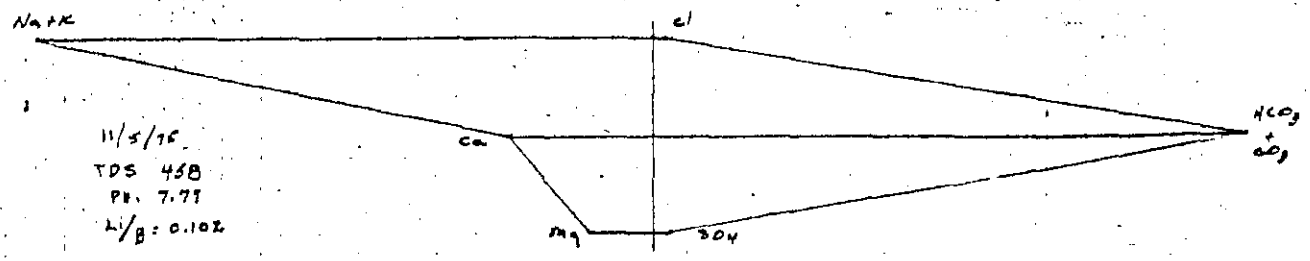
10/14/71
E_c = 263 TDS = 300.1
PH = 7.8



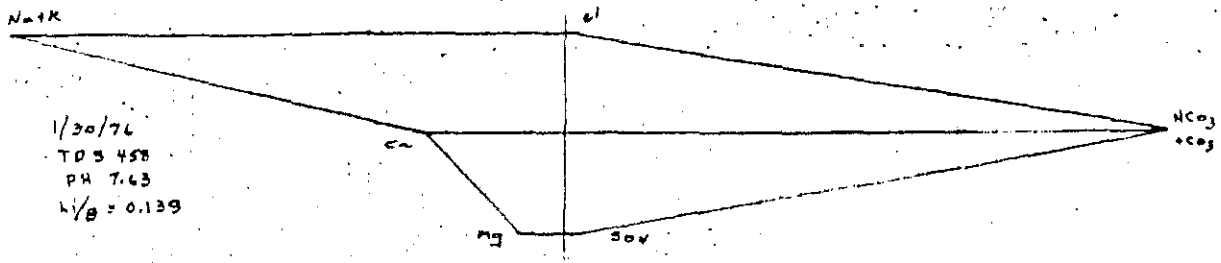
10/20/76
TDS = 228
PH = 8.07
Li/B = 1.87



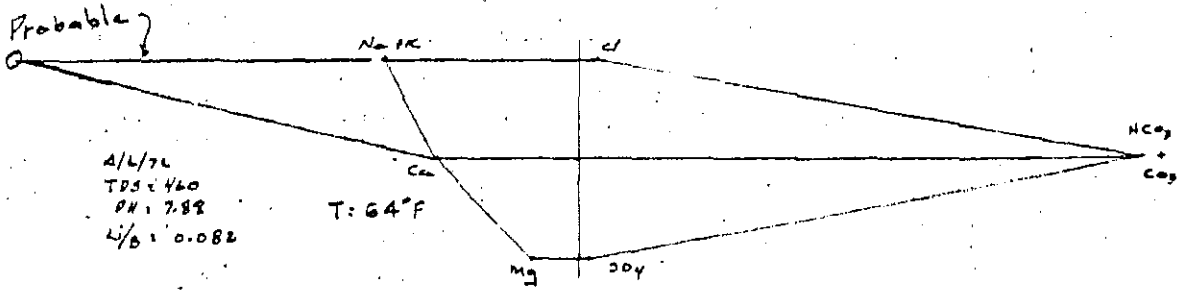
8/8/75
TDS: 494'
PH: 7.98
Li/B: 0.0497



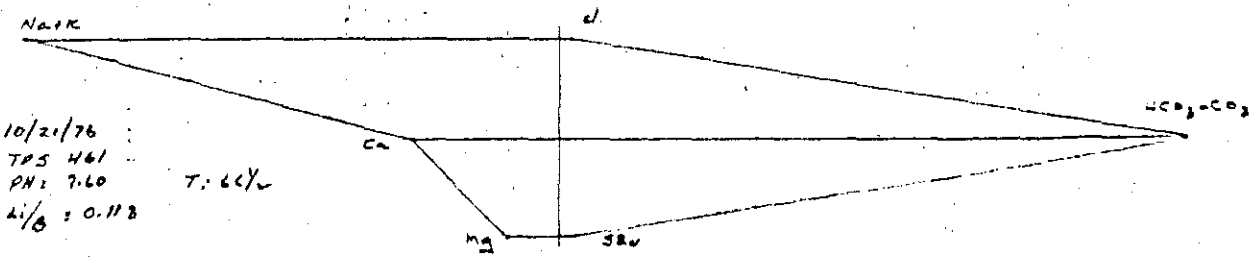
11/5/75
TDS 458
PH. 7.77
Li/B: 0.102



1/30/76
TDS 458
PH 7.63
Li/B = 0.139



4/6/76
TDS: 460
PH: 7.88
Li/B: 0.082
T: 64°F



10/21/76
TDS 461
PH: 7.60
Li/B: 0.118
T: 66°F

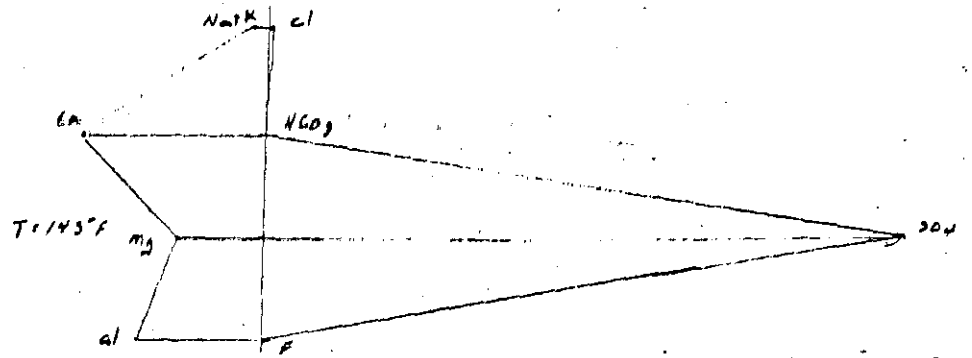
Harold Hoffman Well
T 19N R 3E Sec 17 SE
#132 (ALL)

Scale
1" = X meq/L

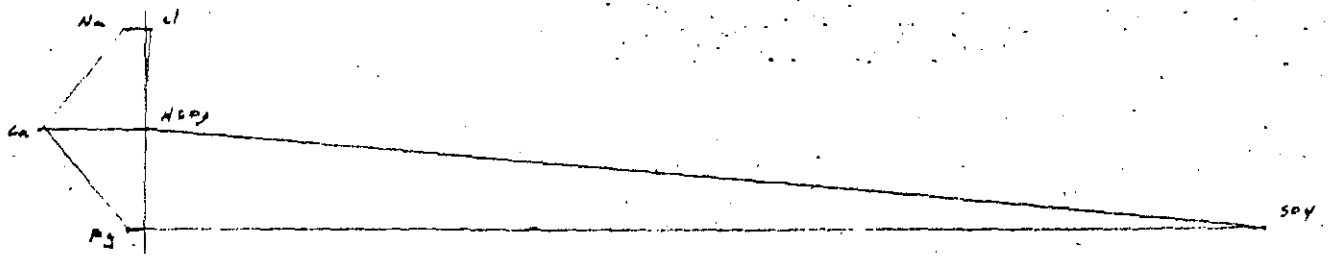
TDS: 567
EC: 1270
PH: 8.1

8/31/49
TDS: 1160
EC: 4570
PH: 1.9

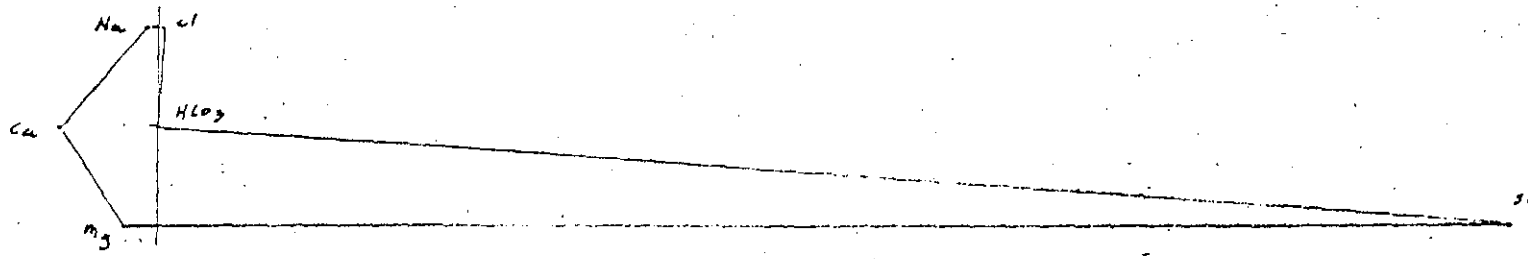
Trainer data.



8/31/49
TDS: 2960
EC: 8510
PH: 1.6

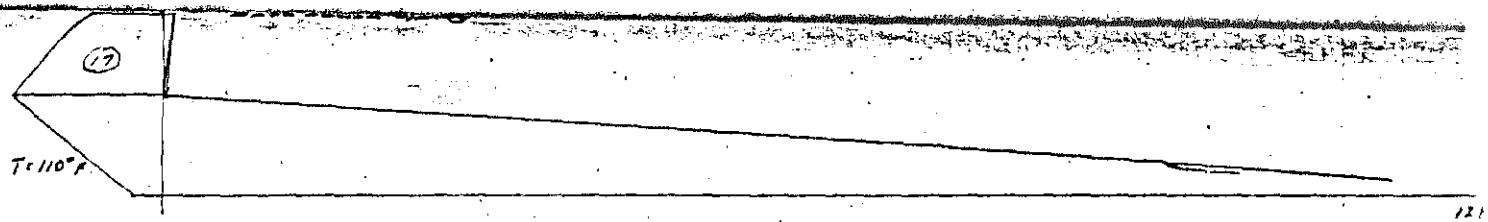


8/31/49
TDS: 5160
EC: 12,700
PH: 1.4



#145 (ALL)

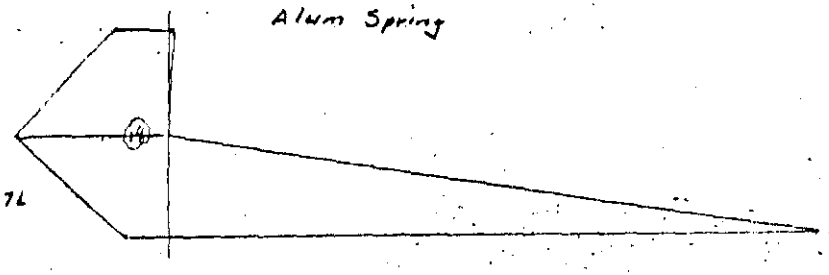
8/21/24
TDS: 7837



121

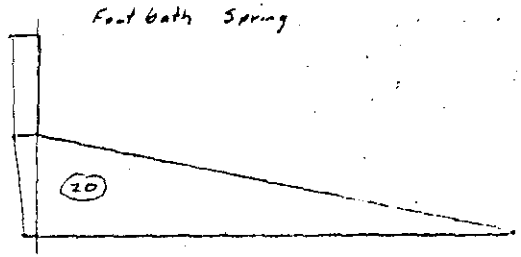
Alum Spring

8/21/24
TDS: 4344



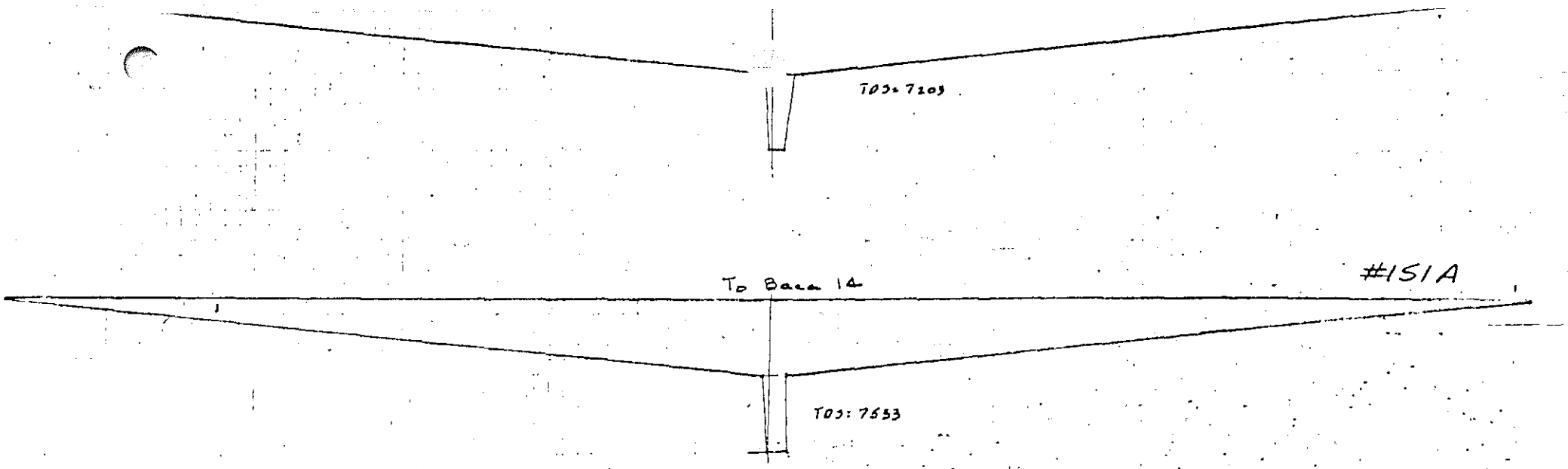
Foot bath Spring

8/21/24
TDS: 2184



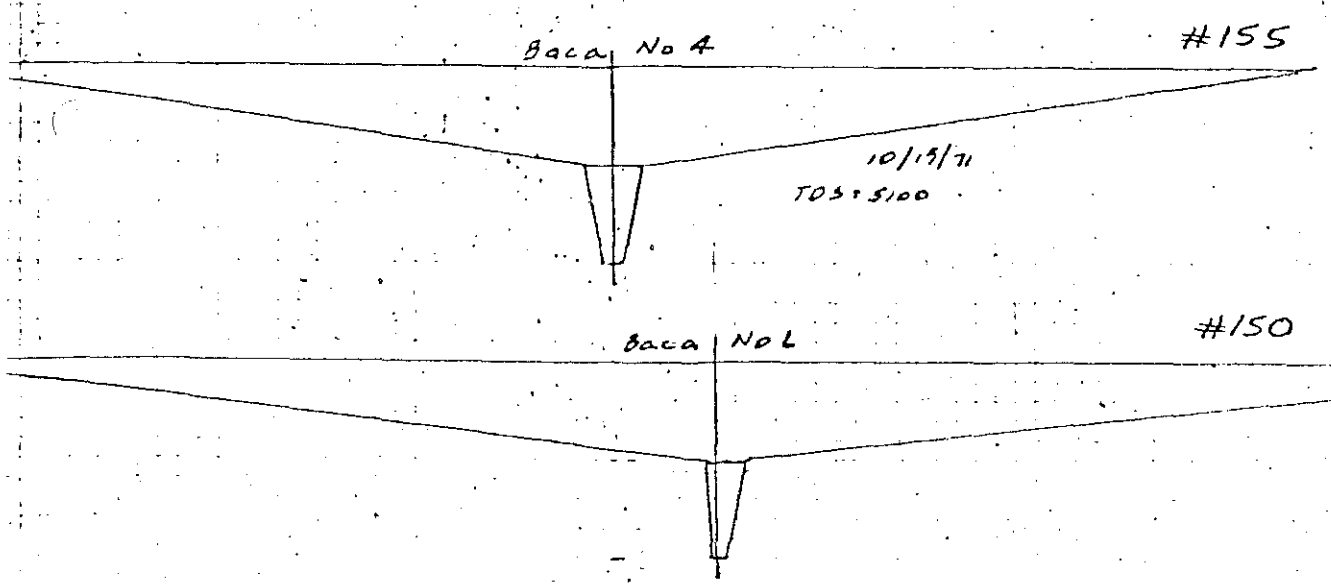
#1445 (ALL)

(G)

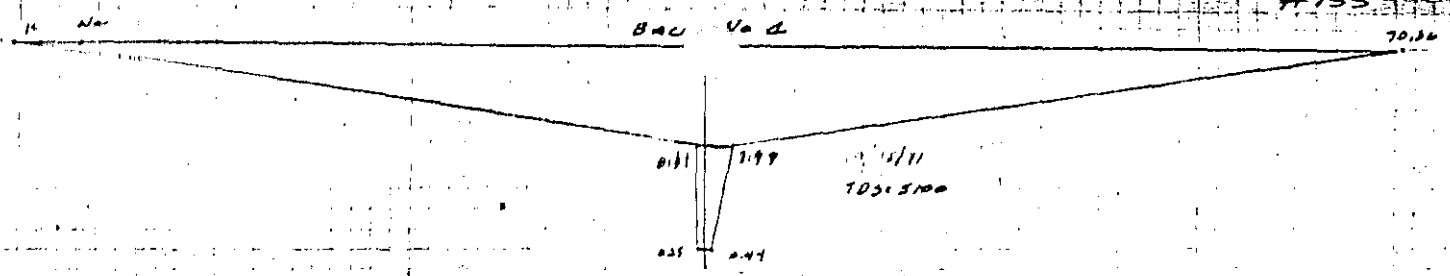

TOS: 7203
To Baca 14
#151A
TOS: 7553

Scale 1" = 20 meq/l

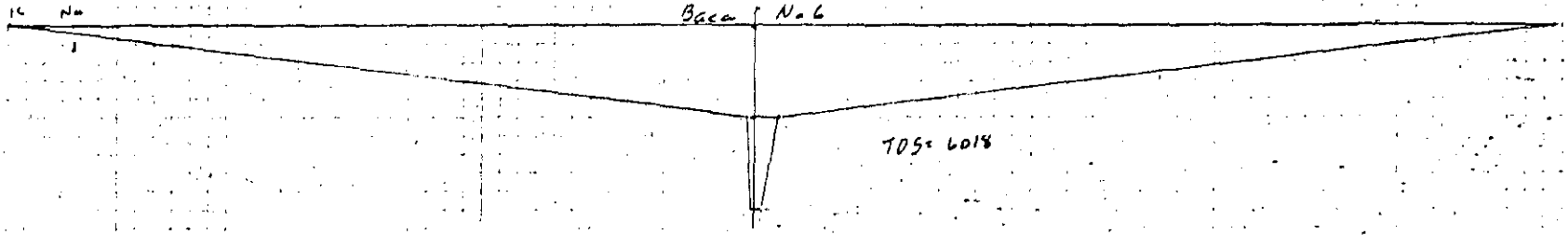
FLUID PRODUCTION



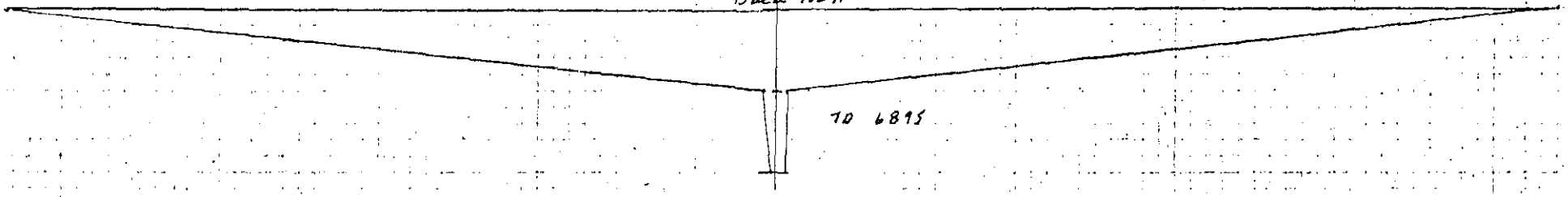
#155



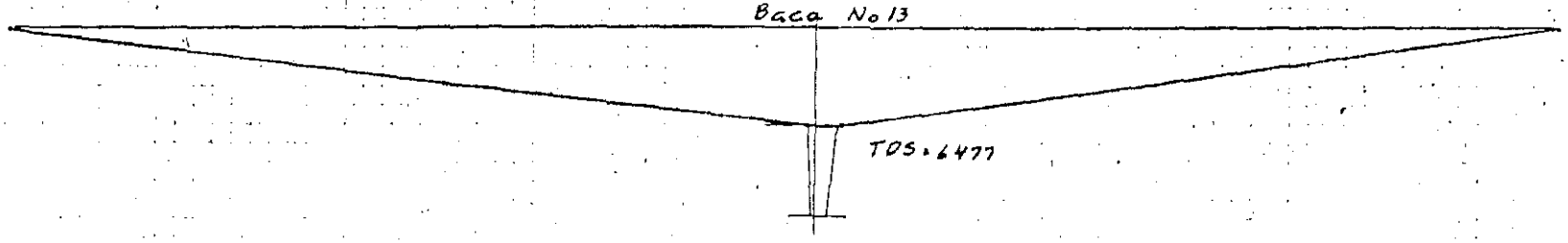
#150



#148



#156

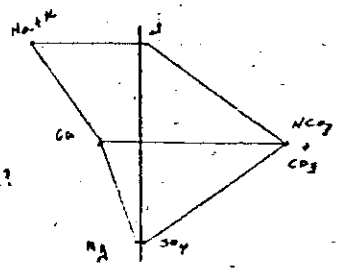


Rio Grande Well No 1
Dunnigan - owner
T 19 N R 5E Sec 19, 134

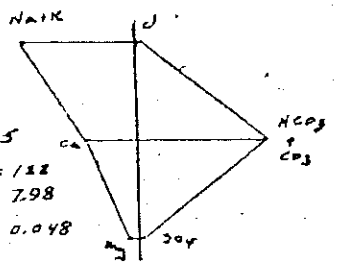
#168 (ALL)

Scale 10 x
1" = 1.0 meq/l.

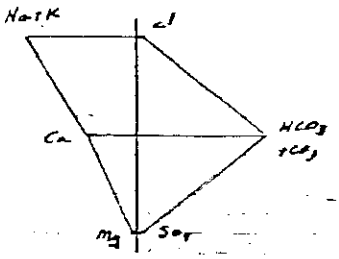
A3



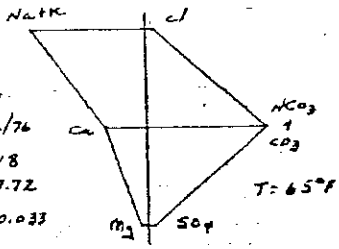
9/25/75
TDS: 164 822
pH: 7.78
Li/B: 0.364



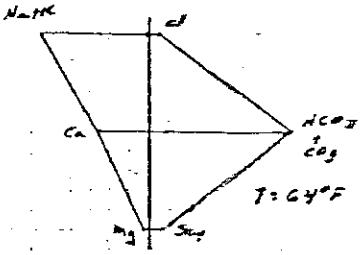
11/6/75
TDS: 122
pH: 7.98
Li/B: 0.048



1/30/76
TDS: 132
pH 8.4
Li/B: 0.036



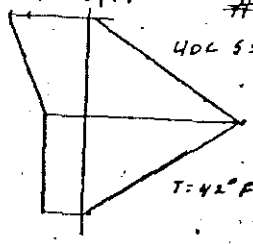
4/22/76
TDS: 118
pH: 7.72
Li/B: 0.033
T: 65°F



7/22/76
TDS: 129
pH 7.96
Li/B: 0.032
T: 64°F

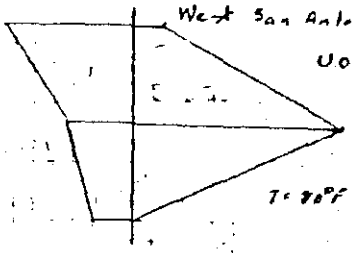
1" = 1.0 meq/l

West Medio Spr. #172



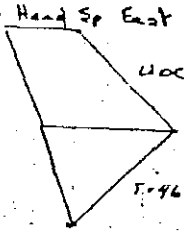
10/15/71
TDS: 111.2
EC: 77
PH: 7.7

West San Antonio #214



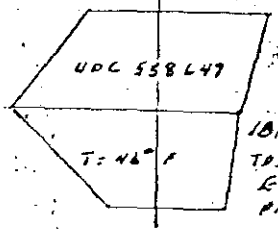
10/15/71
TDS: 147.7
EC: 94
PH: 8.0

Redondo Head Sp East #158



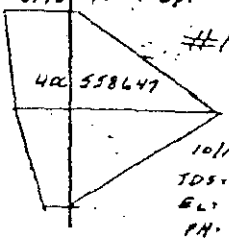
10/15/71
TDS: 50.3
EC: 69
PH: 7.0

West Weather Cr #165



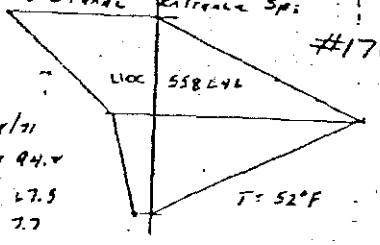
10/15/71
TDS: 108
EC: 132
PH: 7.0

Cerro Pinos Spr #160



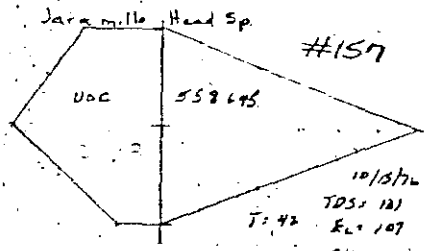
10/15/71
TDS: 89
EC: 88
PH: 7.0
T: 44°F

Valle Grande Entrance Spr #176



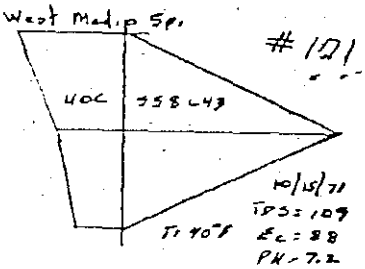
10/15/71
TDS: 94.4
EC: 67.5
PH: 7.7

Jaramillo Head Sp #157



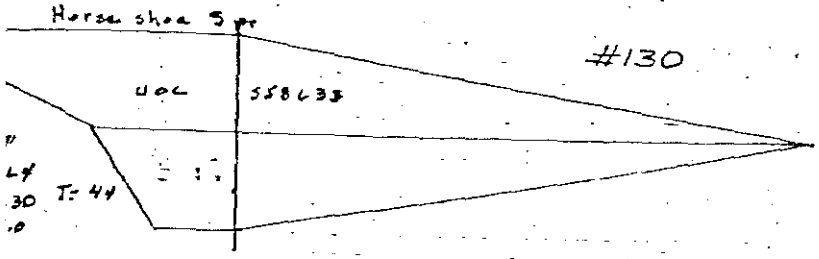
10/15/71
TDS: 121
EC: 107
PH: 6.3

West Medio Spr #171

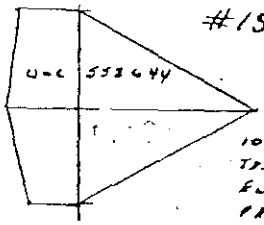


10/15/71
TDS: 109
EC: 88
PH: 7.2

Horse shoe Spr #130

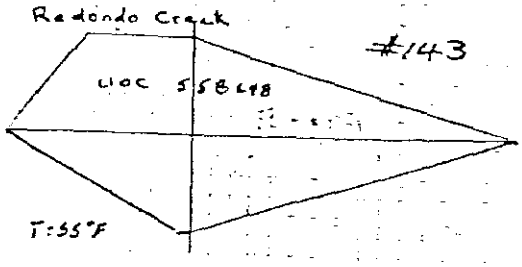


Jarmillo Cr. #159

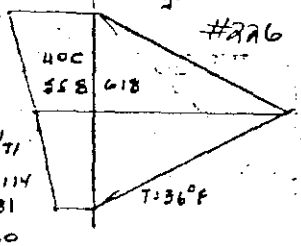


10/15/71
TDS 94
EC 67
PH 7.5
T: 41°F

Redondo Creek #143

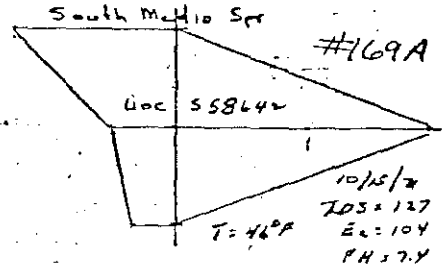


Puerto De Abrigo #226



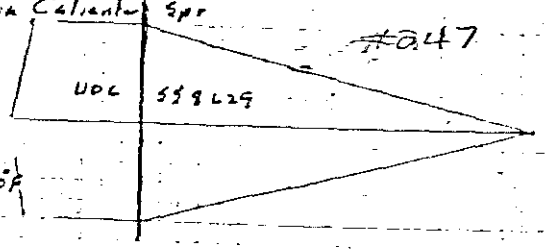
10/15/71
TDS: 114
EC: 81
PH: 7.0

South Medio Spr #169A

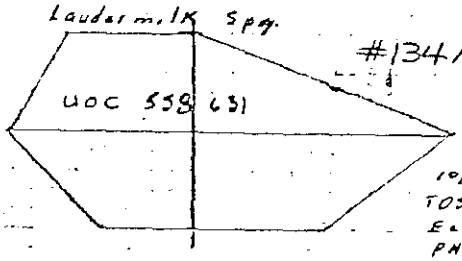


10/15/71
TDS: 127
EC: 104
PH: 7.4

Agua Caliente Spr #147



Lauder milk Spg. #134A



10/15/71
TDS 209
EC: 180
PH: 7.2
T: 48°F

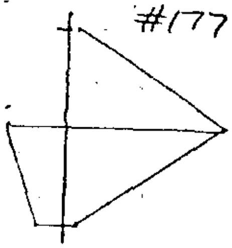
East Fork Jemas River

Scale 1" = 1.0 meq/lit

(A3)

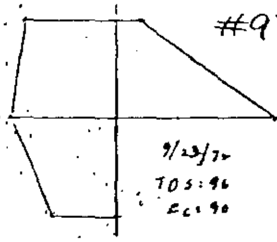
site A

#177



site B

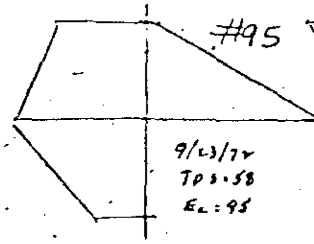
#97



9/23/72
TDS: 96
Ec: 90

site C

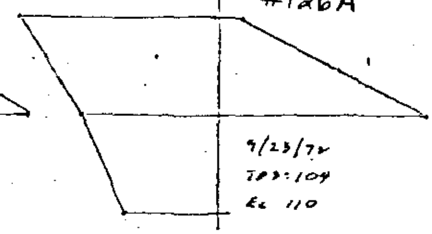
#95



9/23/72
TDS: 58
Ec: 95

site D

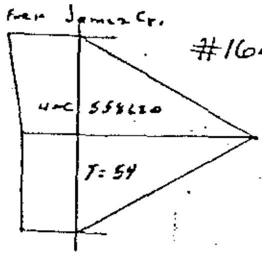
#126A



9/23/72
TDS: 104
Ec 110

East Fork James Cr.

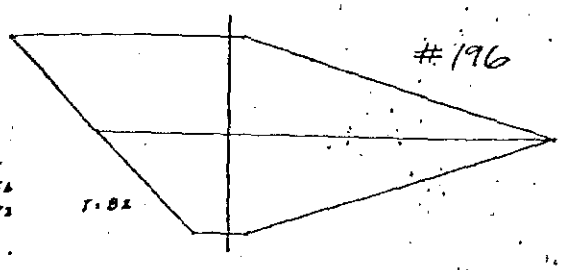
#164

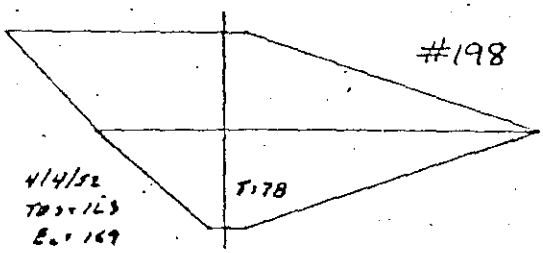


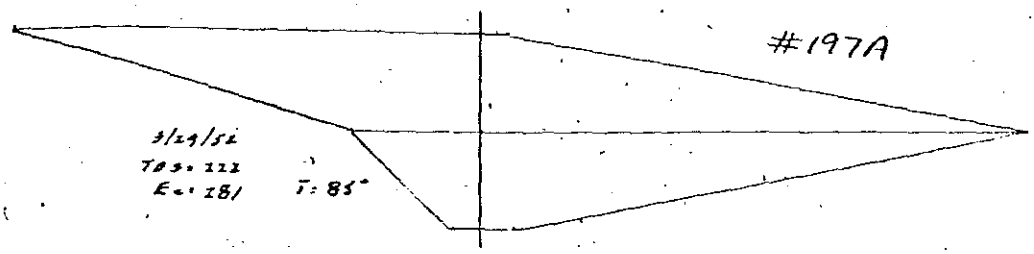
/18/71
H: 90
: 79
: 8.5

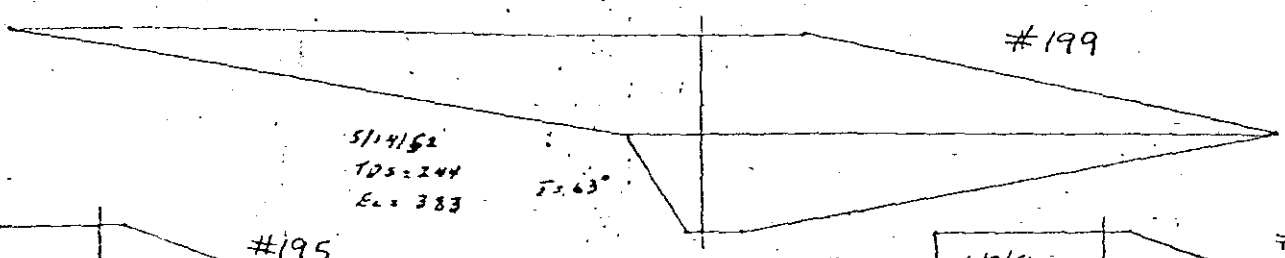
Los Alamos

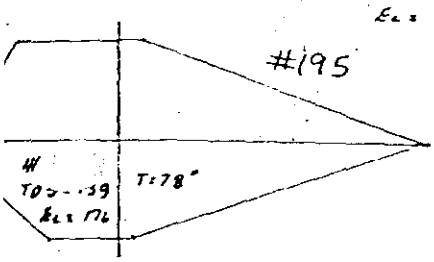
scale 1" = 1 mile

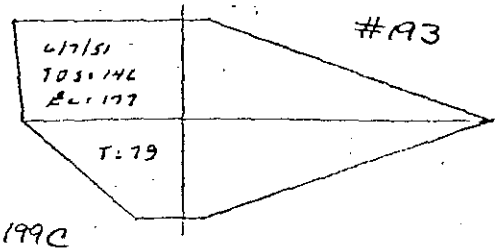


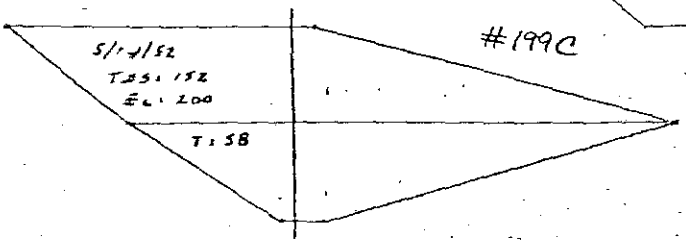


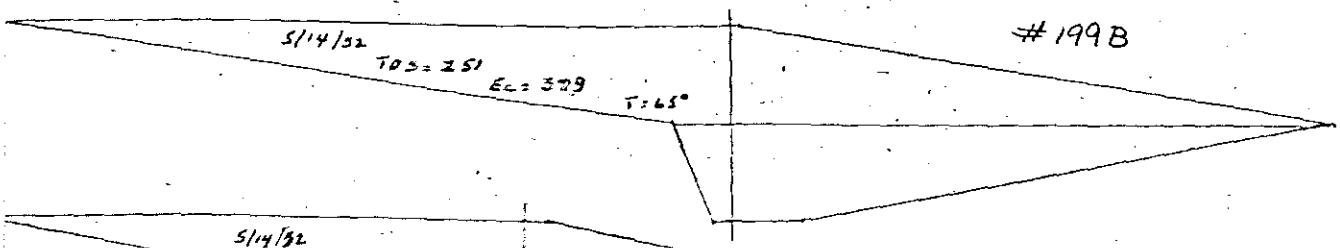


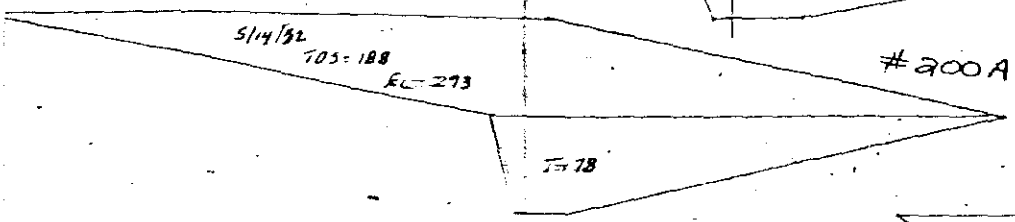


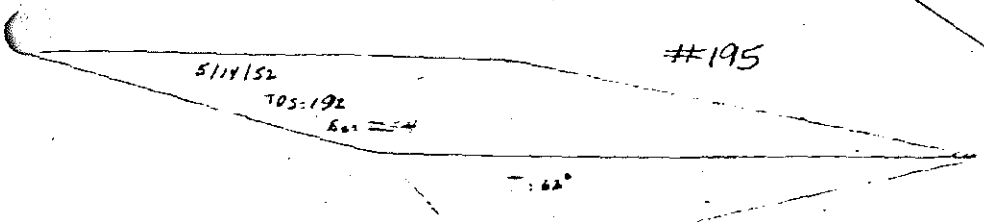


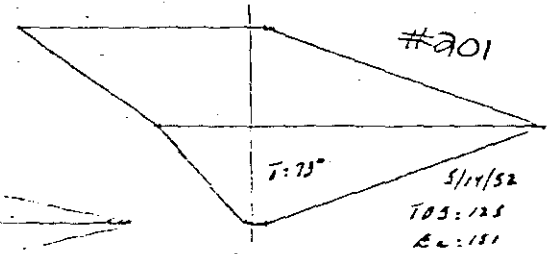




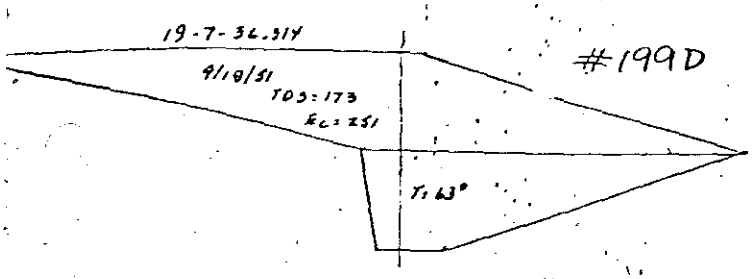


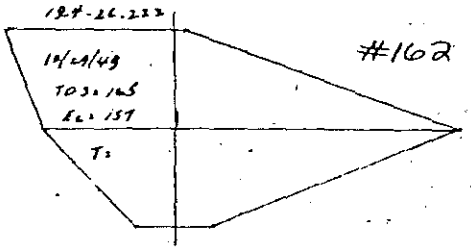


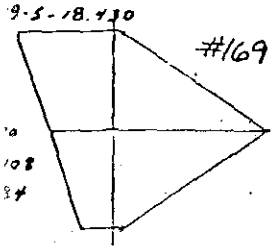


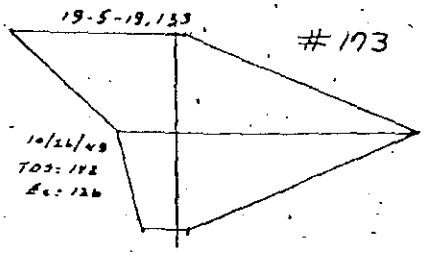


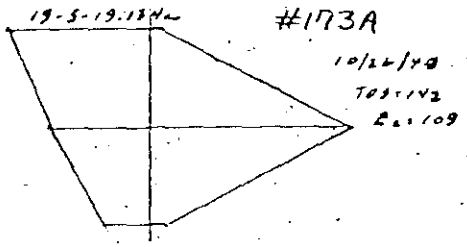
Los Alamos Area
1" = 1.0 mi

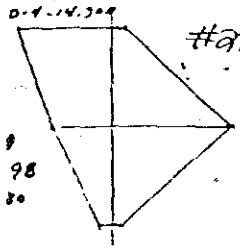


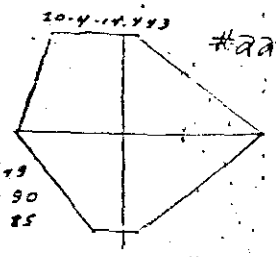


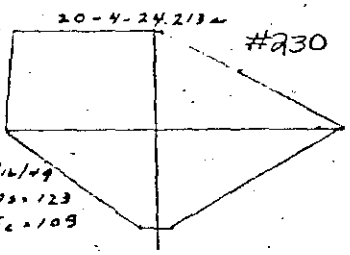


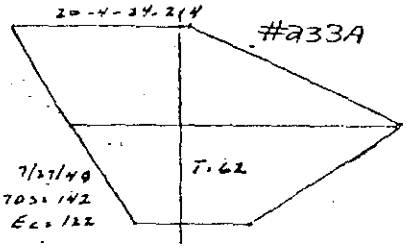


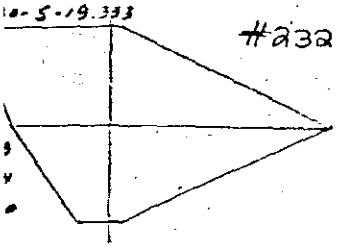




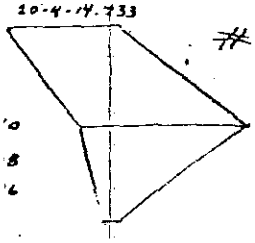




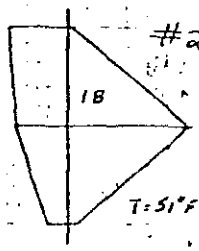




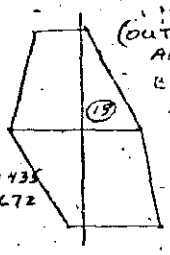
SAN ANTONIO CREEK



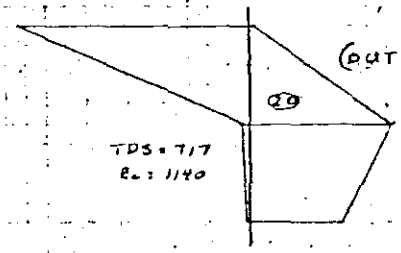
#205



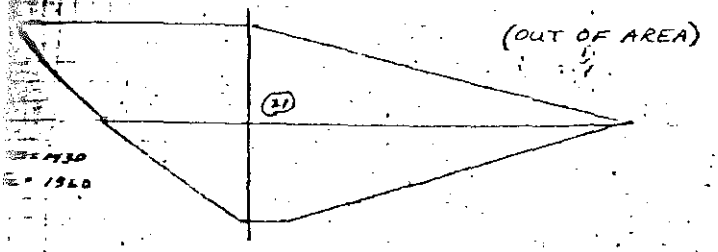
(OUT OF AREA)



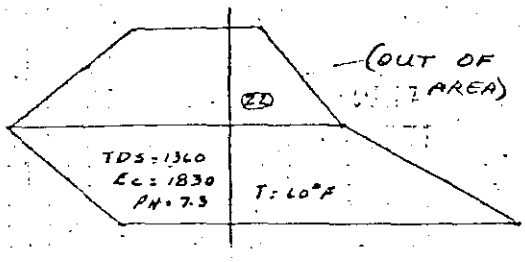
(OUT OF AREA)



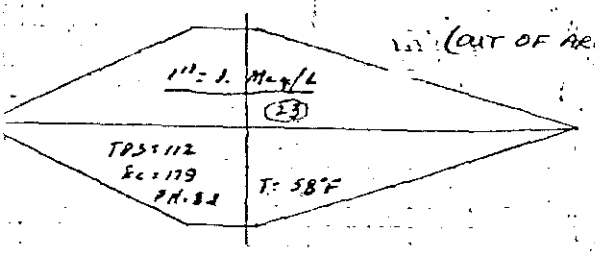
(OUT OF AREA)



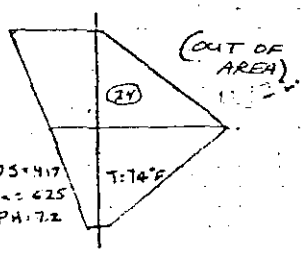
(OUT OF AREA)



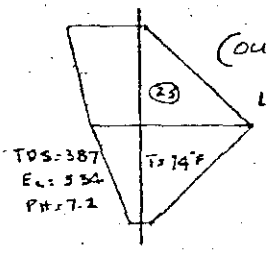
(OUT OF AREA)



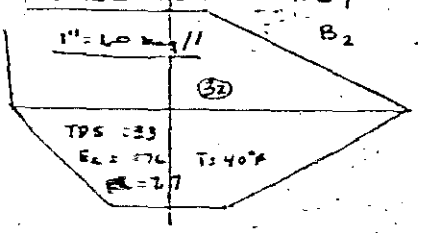
(OUT OF AREA)



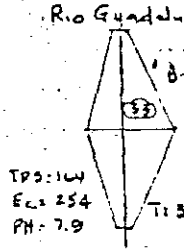
(OUT OF AREA)



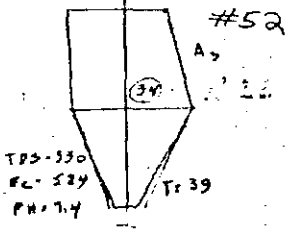
Jamca River #69



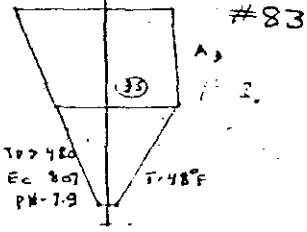
Rio Guadalupe #47



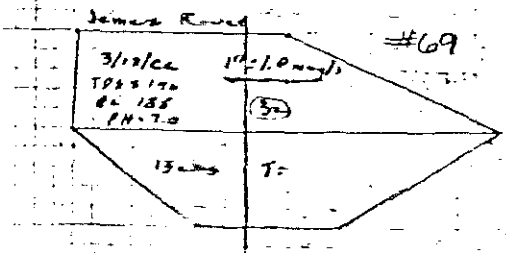
Jamca River #52



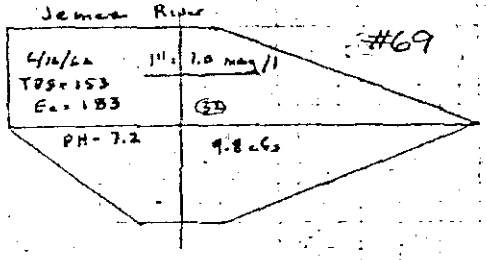
Jamca River #83



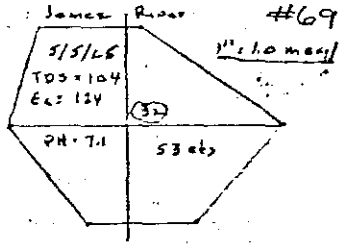
Jamca River #69



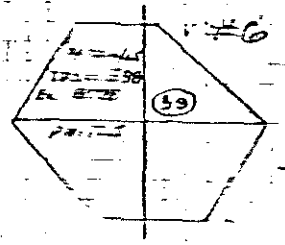
Jamca River #69



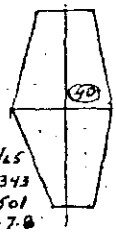
Jamca River #69



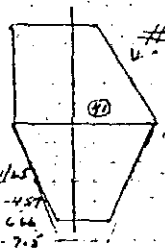
#6



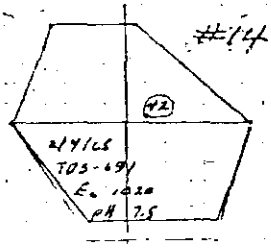
#4



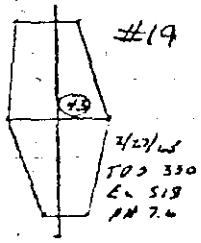
#7



#14

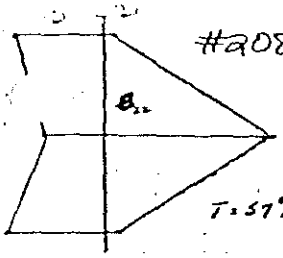


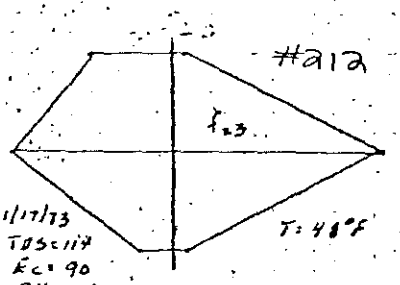
#19



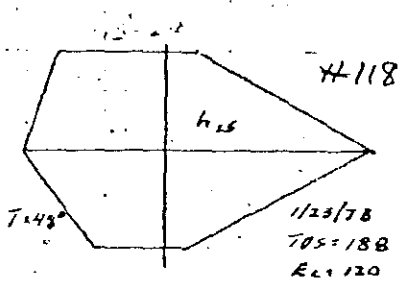
Misc. springs

Scale 1" = 10 mag/L

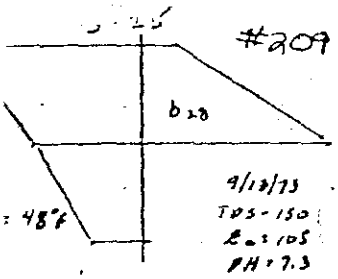




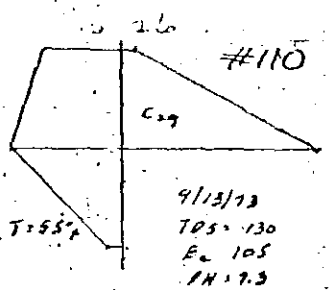
1/17/73
TDS = 114
Ec = 90
PH = 7.5



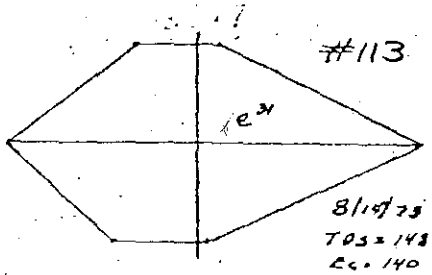
1/23/78
TDS = 188
Ec = 120
PH = 6.7



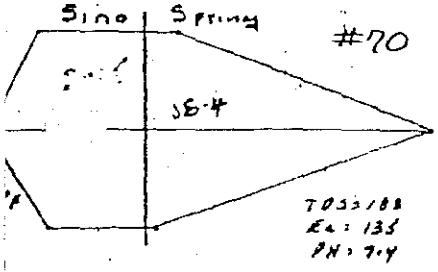
9/13/73
TDS = 150
Ec = 105
PH = 7.3

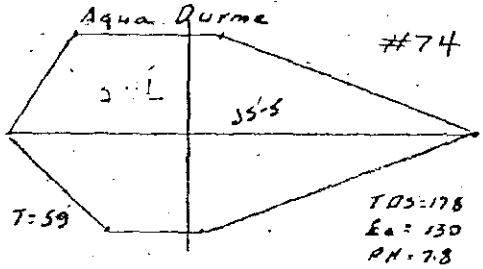


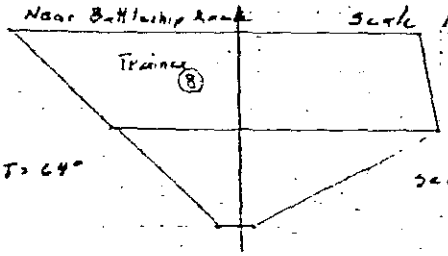
9/13/73
TDS = 130
Ec 105
PH = 7.3



8/10/73
TDS = 148
Ec = 140
PH = 7.8







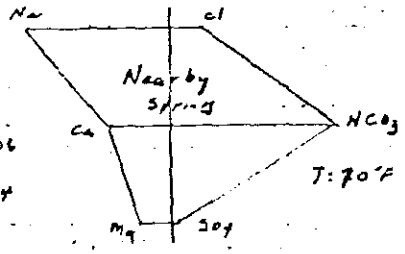
19-3-3W
8/15/73
TDS = 1130
Ec = 1880
PH = 6.8

see Ghost ranch book

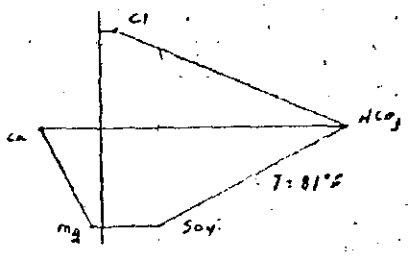
T 20N R 3E Sec 29, 12A

1" = 1.0 meq/l

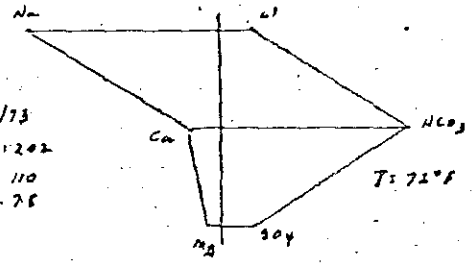
#213 (ALL)



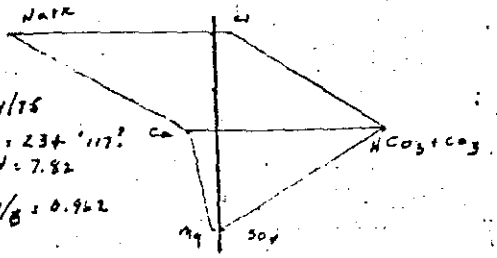
5/24/73
TDS: 206
Ec: 110
PH: 7.4
T: 70°F



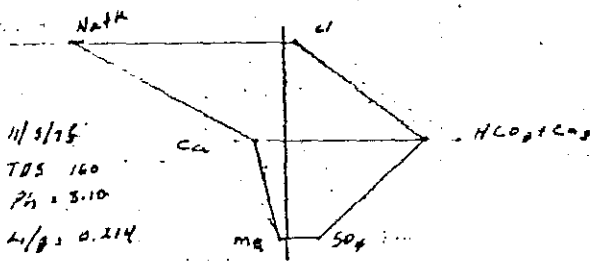
7/28/49
TDS: 199
Ec: 164
T: 81°F



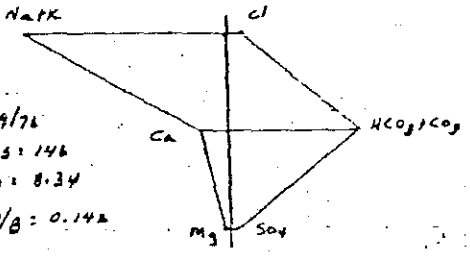
5/24/73
TDS: 202
Ec: 110
PH: 7.8
T: 72°F



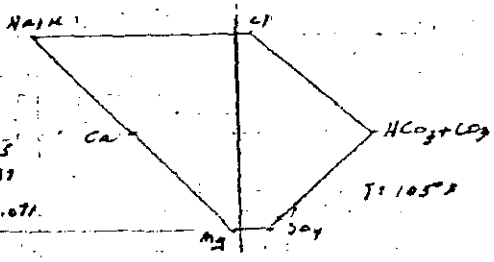
9/24/75
TDS: 234 (117?)
PH: 7.82
Li/B: 0.962



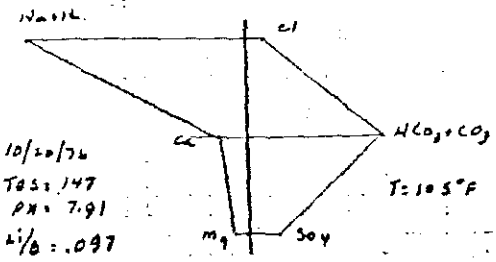
11/5/75
TDS 160
PH: 8.10
Li/B: 0.214



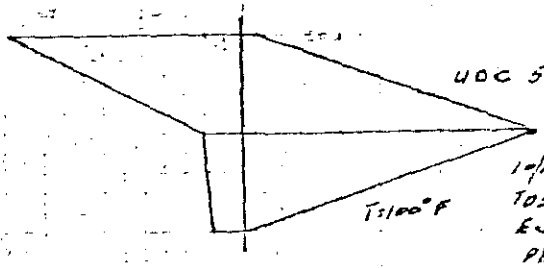
11/29/76
TDS: 146
PH: 8.34
Li/B: 0.142



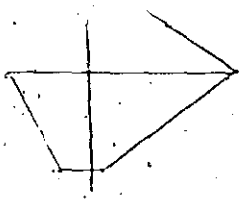
4/19/76
TDS: 145
PH: 7.83
Li/B: 0.071
T: 105°F



10/20/76
TDS: 147
PH: 7.91
Li/B: .097
T: 105°F



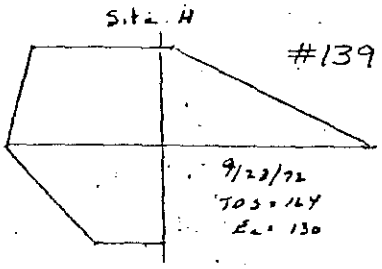
10/6/71
TDS: 186.2
Ec: 119
PH - 8.2



TDS: 105
Ec: 80

Site H

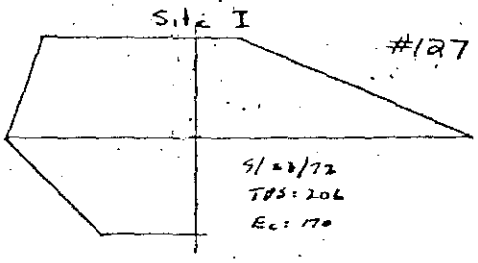
#139



9/23/72
TDS: 164
Ec: 130

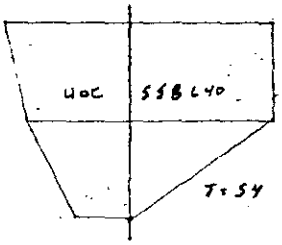
Site I

#127



9/23/72
TDS: 206
Ec: 170

#216

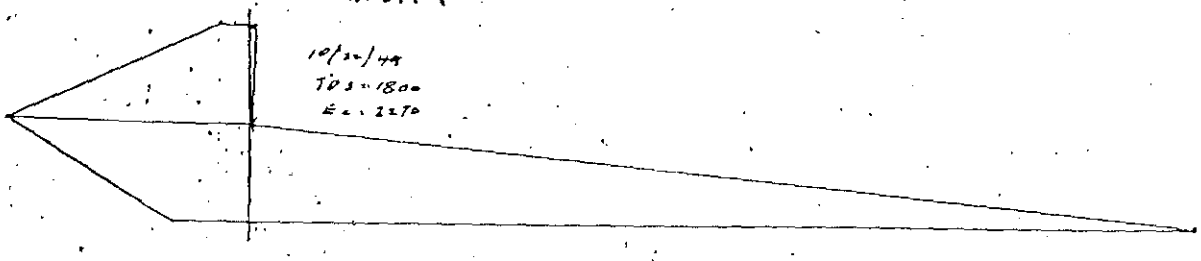


10/15/71
TDS: 152.1
Ec 220
PH: 8.5

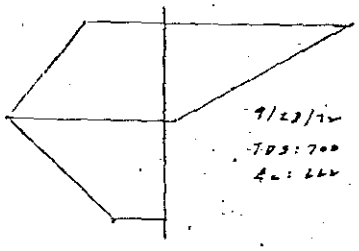
SULPHUR CREEK

Scale 1" = 5 meq/Lt.

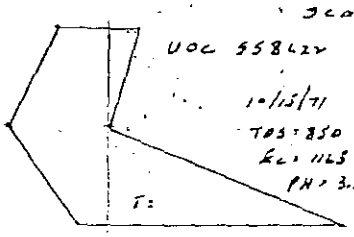
Site E #219



Site F #140



Scale 1" = 10 meq/l

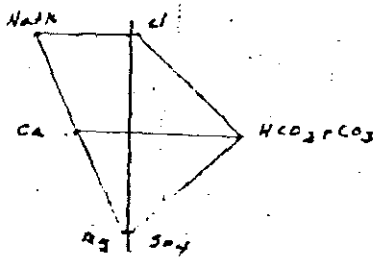


#141

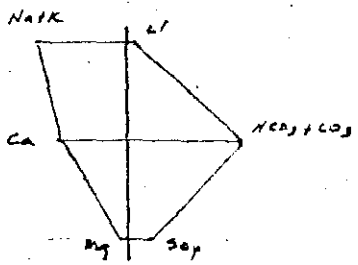
T 20N R 4E Sec 24, 21

1" = 1.0 meq/l

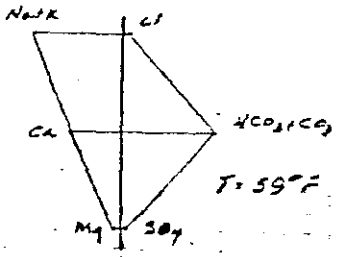
#230 A. (ALL)



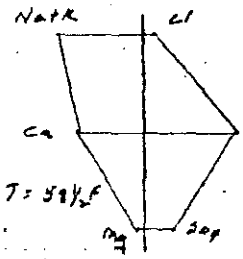
/14/75
S: 160
H: 7.67
i/B: 0.113



11/4/75
TDS: 78
pH: 8.18
Li/B: .091



1/22/76
DS: 85
H 7.76
i/B: 0.071



10/22/76
TDS: 106
pH: 8.01
Li/B: 0.77

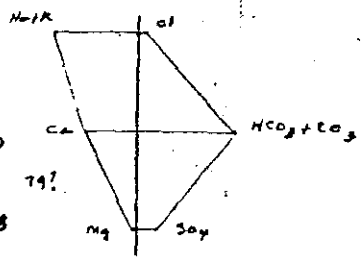
Valle [illegible] No 2

T 20N R 5E Sec 19, 333

#232A (ALL)

Scale 10"

1" = 1.0 meq/l

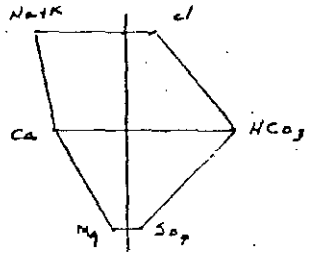


'5

H: 7.50

S: 158 79?

B: .38

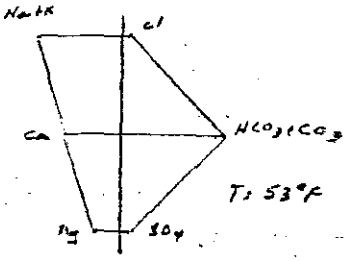


11/6/75

pH 7.32

TDS = 88

Li/B = 0.143



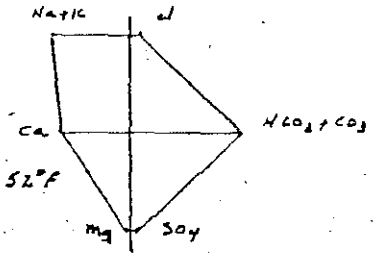
/76

110

8.10

: 0.13

T: 53°F



T: 52°F

10/22/76

TDS = 103

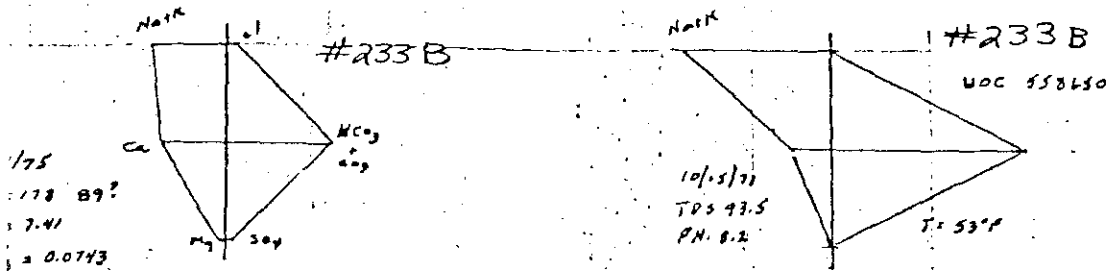
PH = 7.47

Li/B = 0.36

DIG. WELL

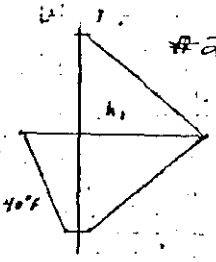
35-57-27 - 10C-28-45

1" = 1.0 meq/L



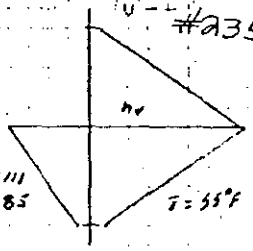
/75
178 89?
7.41
= 0.0743

#235A



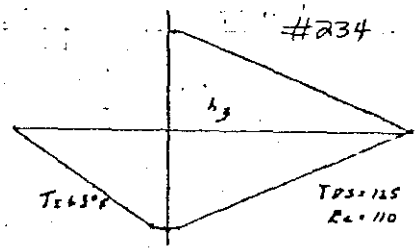
7/4/79
TDS = 103
E_c = 80
T = 40°F

#235



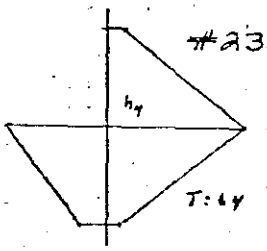
TDS = 111
E_c = 85
T = 55°F

#234



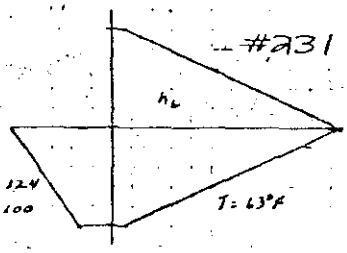
T = 63°F
TDS = 125
E_c = 110

#233



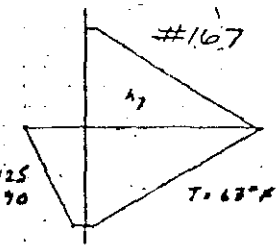
TDS = 90
E_c = 85
T = 64

#231



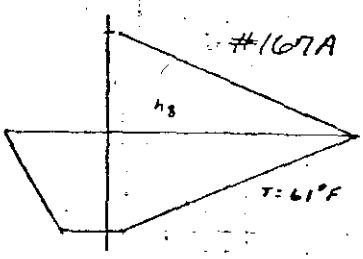
TDS = 124
E_c = 100
T = 63°F

#167



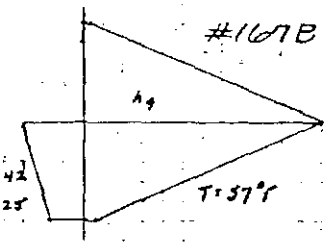
TDS = 125
E_c = 90
T = 63°F

#167A



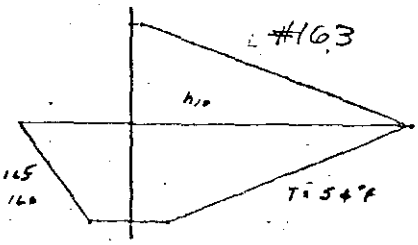
TDS = 142
E_c = 110
T = 61°F

#167B



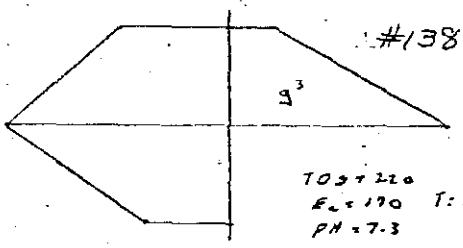
TDS = 142
E_c = 125
T = 57°F

#163



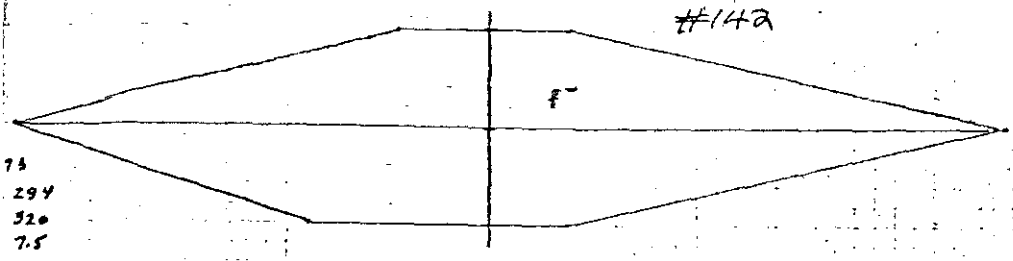
T = 165
E_c = 160
T = 54°F

#138



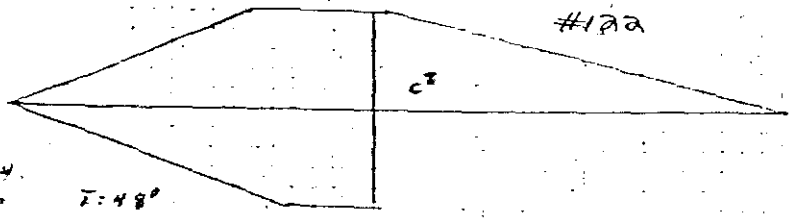
TDS = 220
E_c = 170
T = 54°F
PH = 7.3

#142



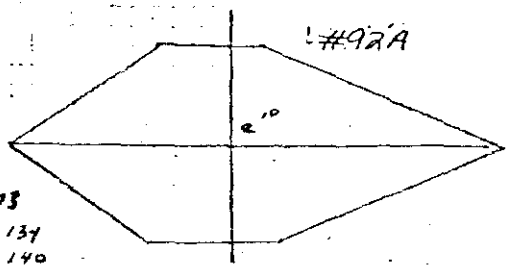
7/
294
320
7.5

#122



4/8/73
TDS = 204
E_c = 22
PH = 7..
T = 48°

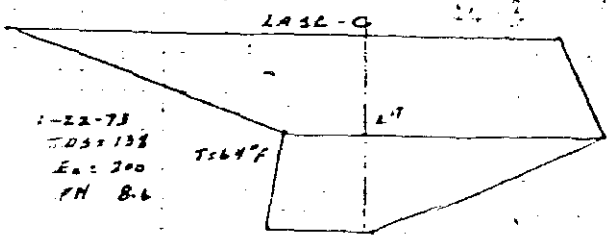
#92A



5/8/73
TDS = 134
E_c = 140
PH = 7.1

LASL-G

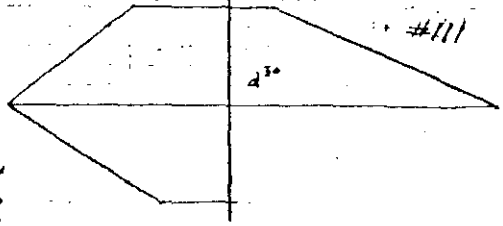
#211



-22-73
TDS = 138
E_c = 200
PH 8.6
T = 64°F

Test Hole Fenton Lake

#111

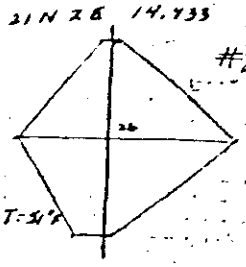


10/9/73
TDS = 114
E_c = 160
PH = 7.0

Scale 1" = 1 mile

21N 2E 14.435

#243

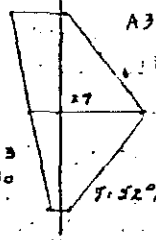


/14/74
DS=332
C=570
H=7.1
T=51°F

22N 3E 22.111

A3

#245



3/7/74
TDS=263
EC=430
PH=7.4
T=52°F

22N 5E 1.322

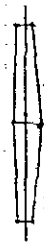
B2

#247A

3/7/74
TDS=124
EC=141
PH=7.8
T=64°F

#246

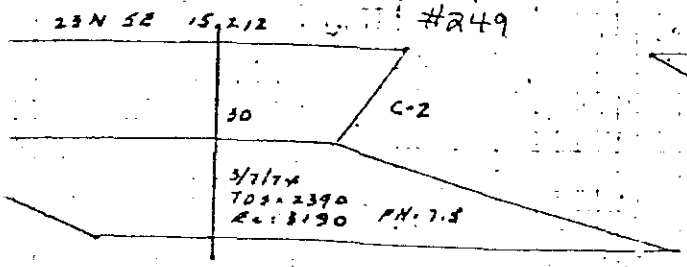
B2



6/19/74
TDS=112
EC=120
PH=6.8
T=61°F

23N 5E 15.212

#249

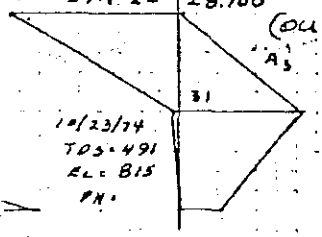


3/7/74
TDS=2390
EC=3190
PH=7.5

24N 2W 28.100

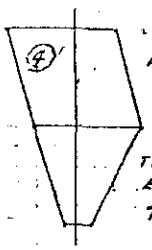
(OUT OF AREA)

A3



10/23/74
TDS=491
EC=815
PH=

#8



TDS=421
EC=642
T=80°F

#2

TDS=265
EC=367
T=67°F

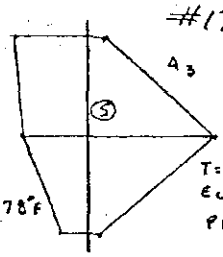
#3

TDS=249
EC=352
PH=7.4
T=55°F

#5

TDS=255
EC=348
PH=7.5
T=61°F

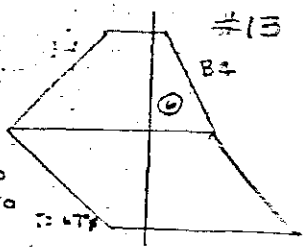
#12



T=78°F

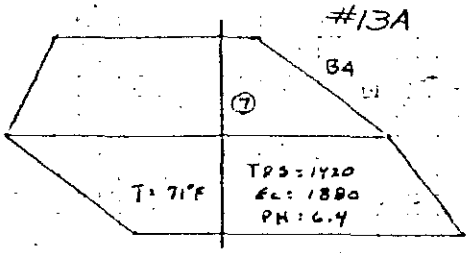
T=548
EC=749
PH=6.6

#13



780
1050
T=67°F

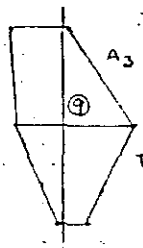
#13A



T=71°F

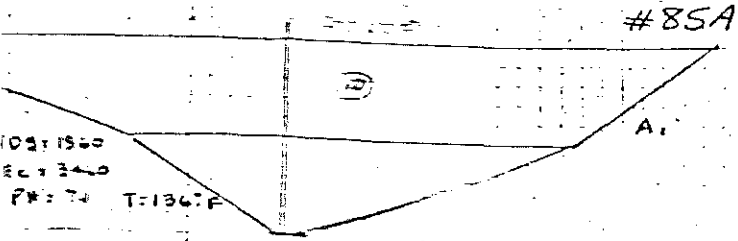
TDS=1720
EC=1880
PH=6.4

#20



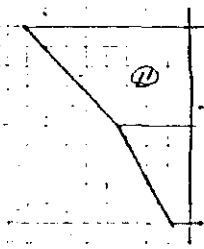
TDS=382
EC=490
PH=7.9
T=63°F

#85A



DS=1560
C=3440
H=7.4
T=136°F

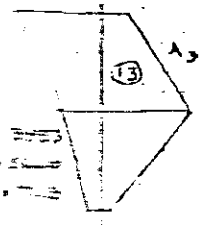
#86



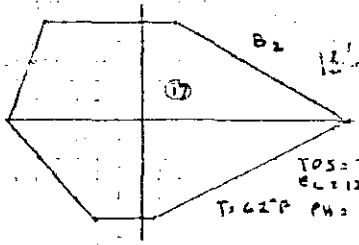
A1?

TDS=580
EC=1340
PH=8.0
T=63°F

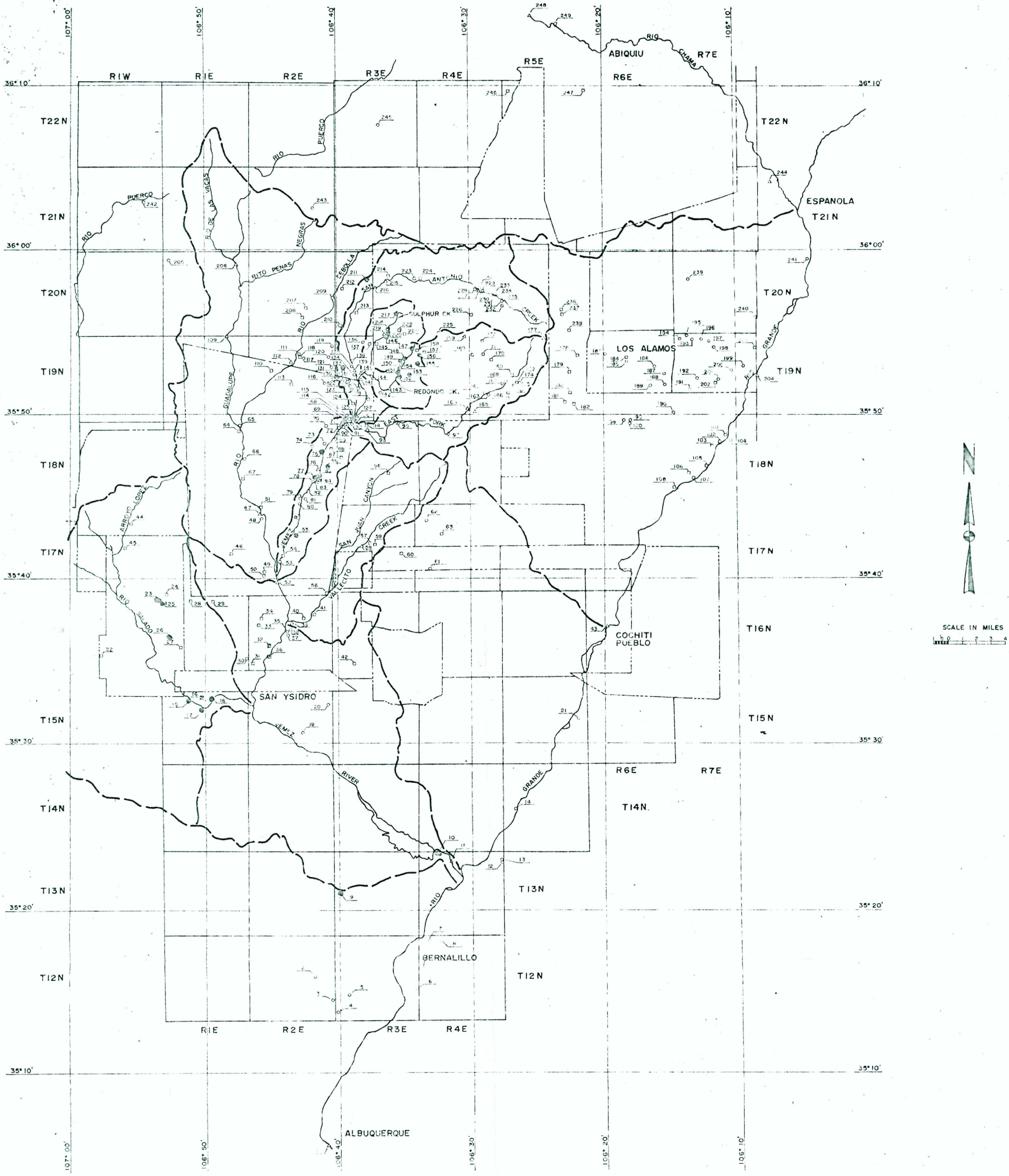
#91



#115



TDS=728
EC=1210
T=62°F PH=6.9



LEGEND

- WELL
- SPRING
- SURFACE FLOW
- WATERSHED BOUNDARY
- DATA POINT
- SODIUM CATION WITH:
  - CHLORIDE ANION (MAJOR)
  - SULPHATE ANION (MAJOR)
  - CHLORIDE-SULPHATE MIXTURE

PLATE III

MAP SHOWING AREAS OF PREDOMINANTLY SODIUM ION WATERS

PREPARED FOR

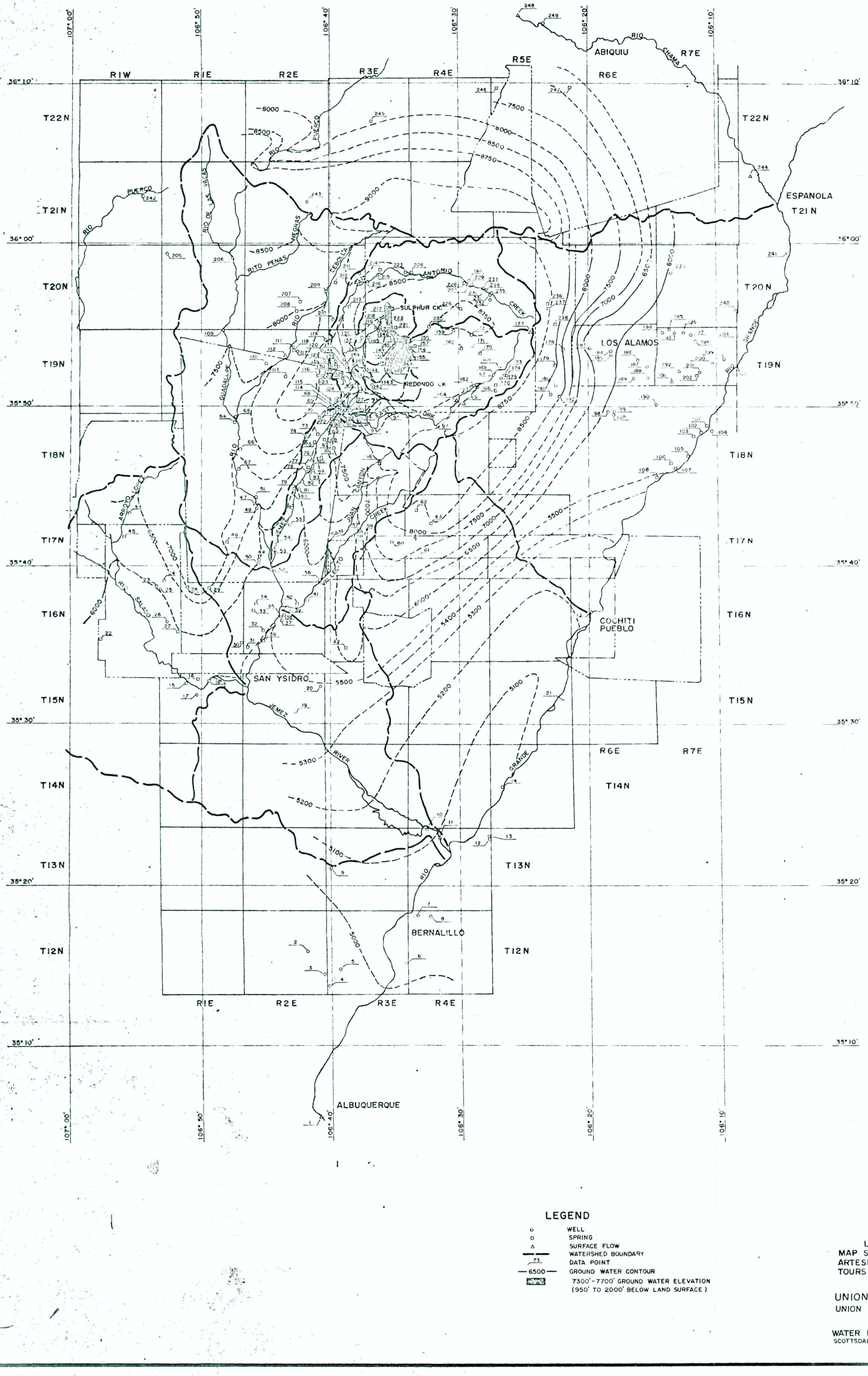
UNION GEOTHERMAL DIVISION
UNION OIL COMPANY OF CALIFORNIA

BY

WATER RESOURCES ASSOCIATES, INC.
SCOTTSDALE ARIZONA

JANUARY 1977

REVISED 3/23/77



LEGEND

- WELL
- SPRING
- SURFACE FLOW
- WATERSHED BOUNDARY
- 73 — DATA POINT
- 6500 — GROUND WATER CONTOUR
- 7300'-7700' GROUND WATER ELEVATION (950' TO 2000' BELOW LAND SURFACE)

PLATE I

LOCATION MAP AND MAP SHOWING WATER-TABLE AND ARTESIAN-PRESSURE-SURFACE CONTOURS FOR GROUND WATER

PREPARED FOR

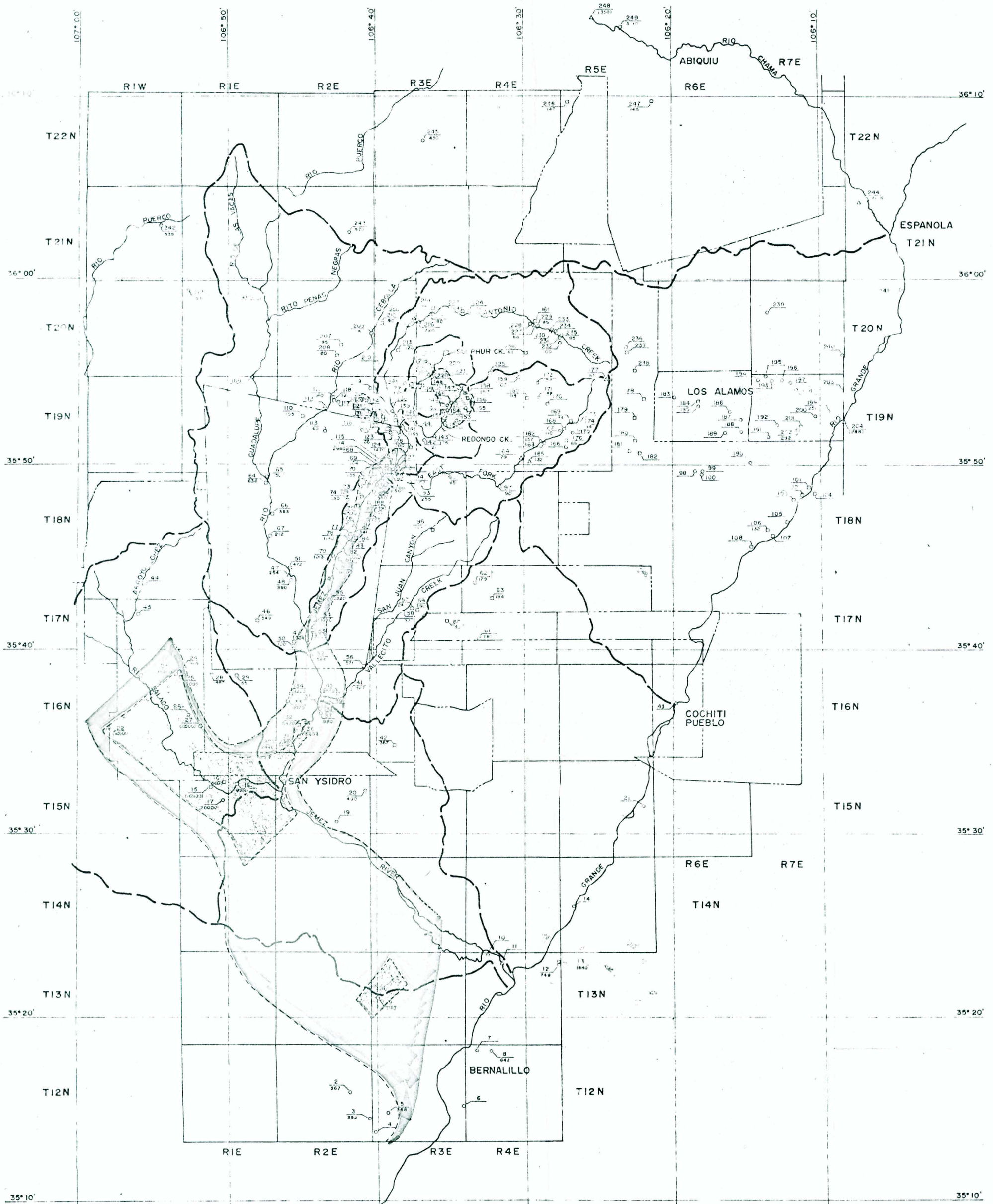
UNION GEOTHERMAL DIVISION
UNION OIL COMPANY OF CALIFORNIA

BY

WATER RESOURCES ASSOCIATES, INC.
SCOTTSDALE ARIZONA

JANUARY 1977

REVISED 3/23/77



LEGEND

- WELL
- SPRING
- SURFACE FLOW
- WATERSHED BOUNDARY
- DATA POINT
- CONDUCTIVITY (MICROMHOS)
- 1000-5000 MICROMHOS
- OVER 5000 MICROMHOS

PLATE II

MAP SHOWING DISTRIBUTION OF DISSOLVED SOLIDS AS MEASURED BY CONDUCTIVITY

PREPARED FOR

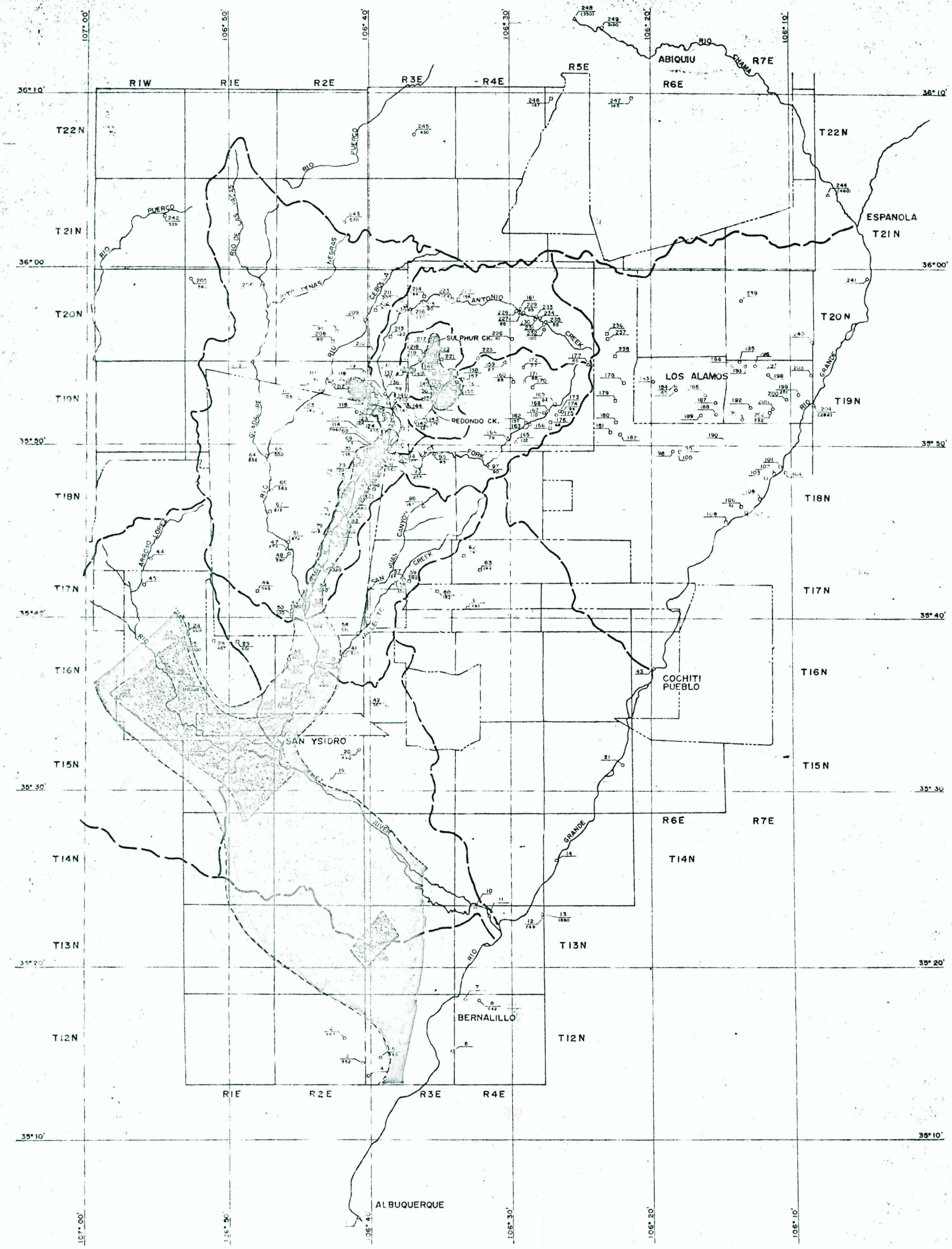
UNION GEOTHERMAL DIVISION
UNION OIL COMPANY OF CALIFORNIA

BY

WATER RESOURCES ASSOCIATES, INC.
SCOTTSDALE ARIZONA

JANUARY 1977

REVISED 4/18/77



LEGEND

- WELL
- SPRING
- SURFACE FLOW
- WATERSHED BOUNDARY
- 73 DATA POINT
- 865 CONDUCTIVITY (MICROMHOS)
- 1000-5000 MICROMHOS
- OVER 5000 MICROMHOS

PLATE II

MAP SHOWING DISTRIBUTION OF DISSOLVED SOLIDS AS MEASURED BY CONDUCTIVITY

PREPARED FOR

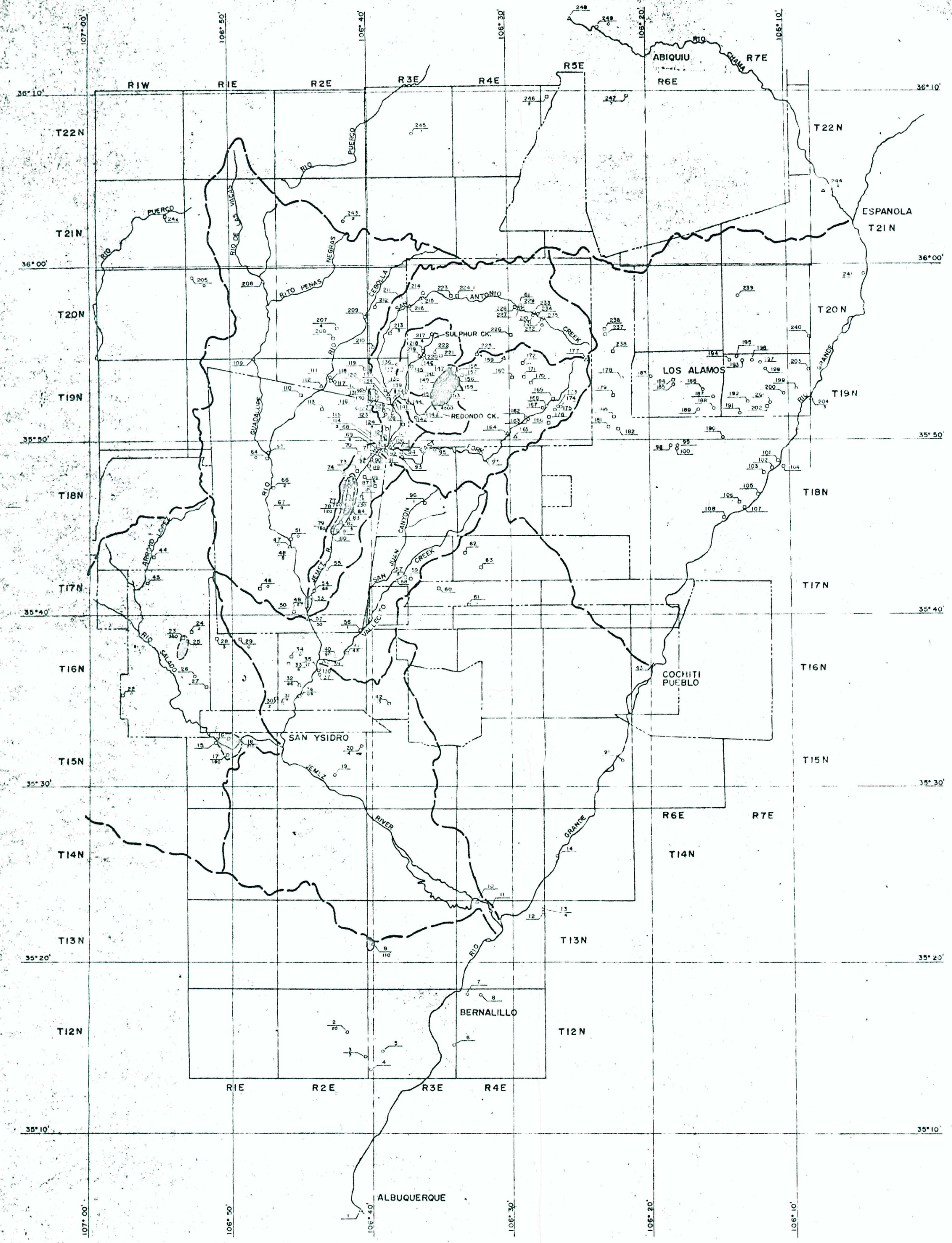
UNION GEOTHERMAL DIVISION
UNION OIL COMPANY OF CALIFORNIA

BY

WATER RESOURCES ASSOCIATES, INC.
SCOTTSDALE ARIZONA

JANUARY 1977

REVISED 3/23/77



LEGEND

- WELL
- SPRING
- SURFACE FLOW
- WATERSHED BOUNDARY
- DATA POINT
- ARSENIC IN PPB.
- 100 TO 500 PPB
- OVER 500 PPB
- OVER 4000 PPB FROM DEEP WELLS

PLATE IV

MAP SHOWING AREAS OF CONCENTRATION OF ARSENIC TRACE ELEMENT WATERS

PREPARED FOR

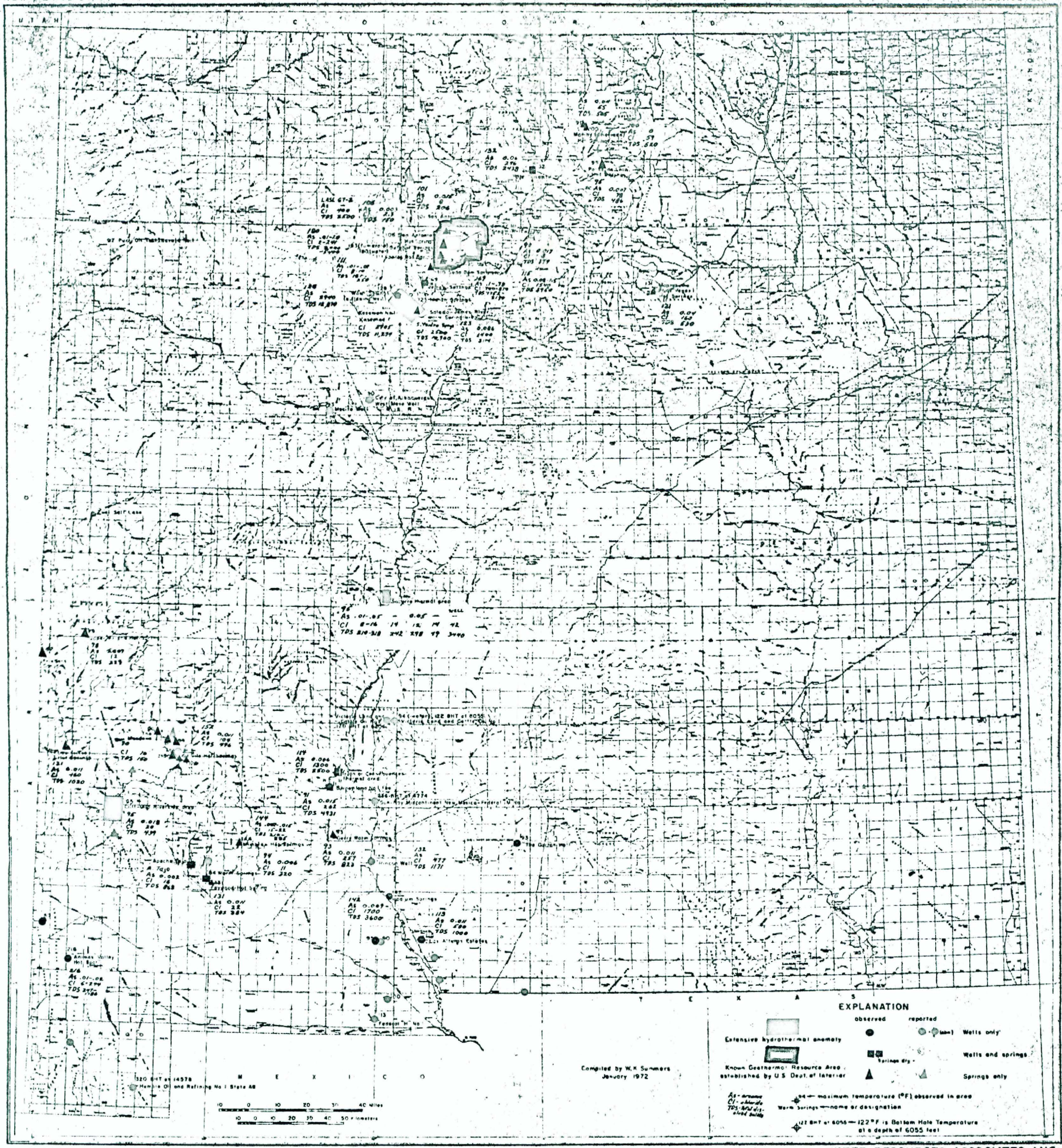
UNION GEOTHERMAL DIVISION
UNION OIL COMPANY OF CALIFORNIA

BY

WATER RESOURCES ASSOCIATES, INC.
SCOTTSDALE ARIZONA

JANUARY 1977

REVISED 3/23/77

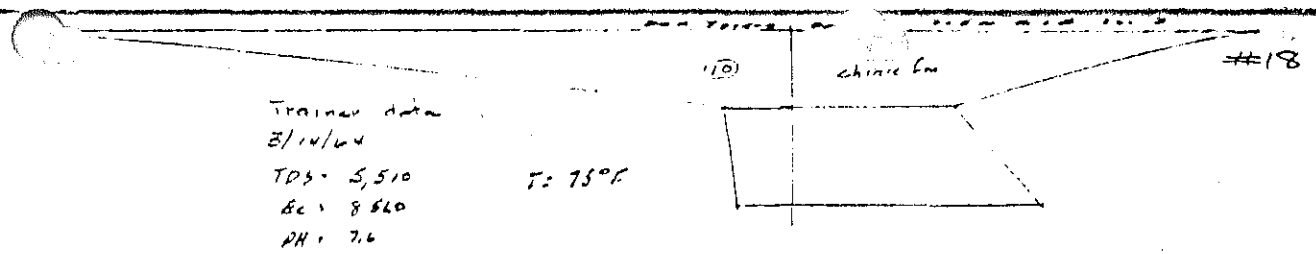


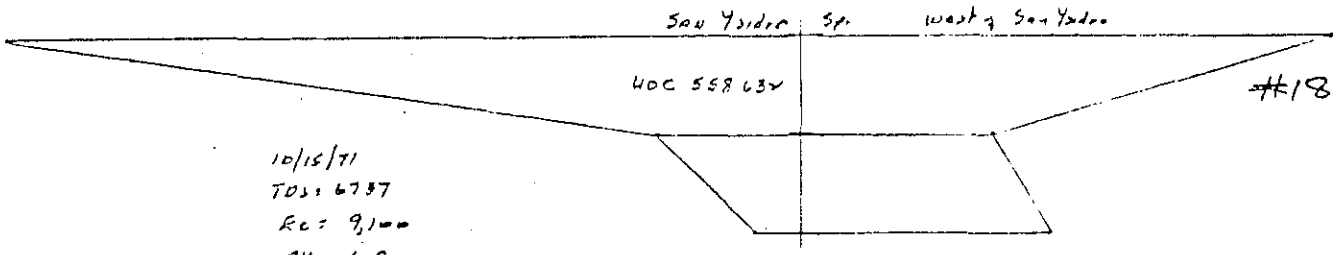
GEOTHERMAL RESOURCES OF NEW MEXICO

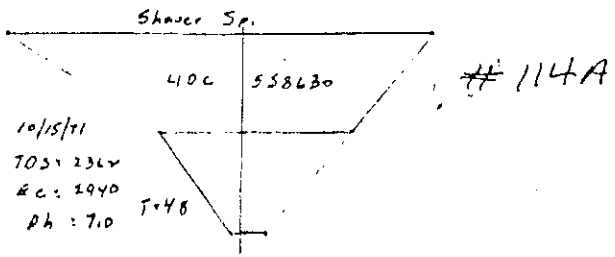
WATER RESOURCES ASSOCIATES, INC.
SCOTTSDALE ARIZONA
MARCH 1977
PLATE V

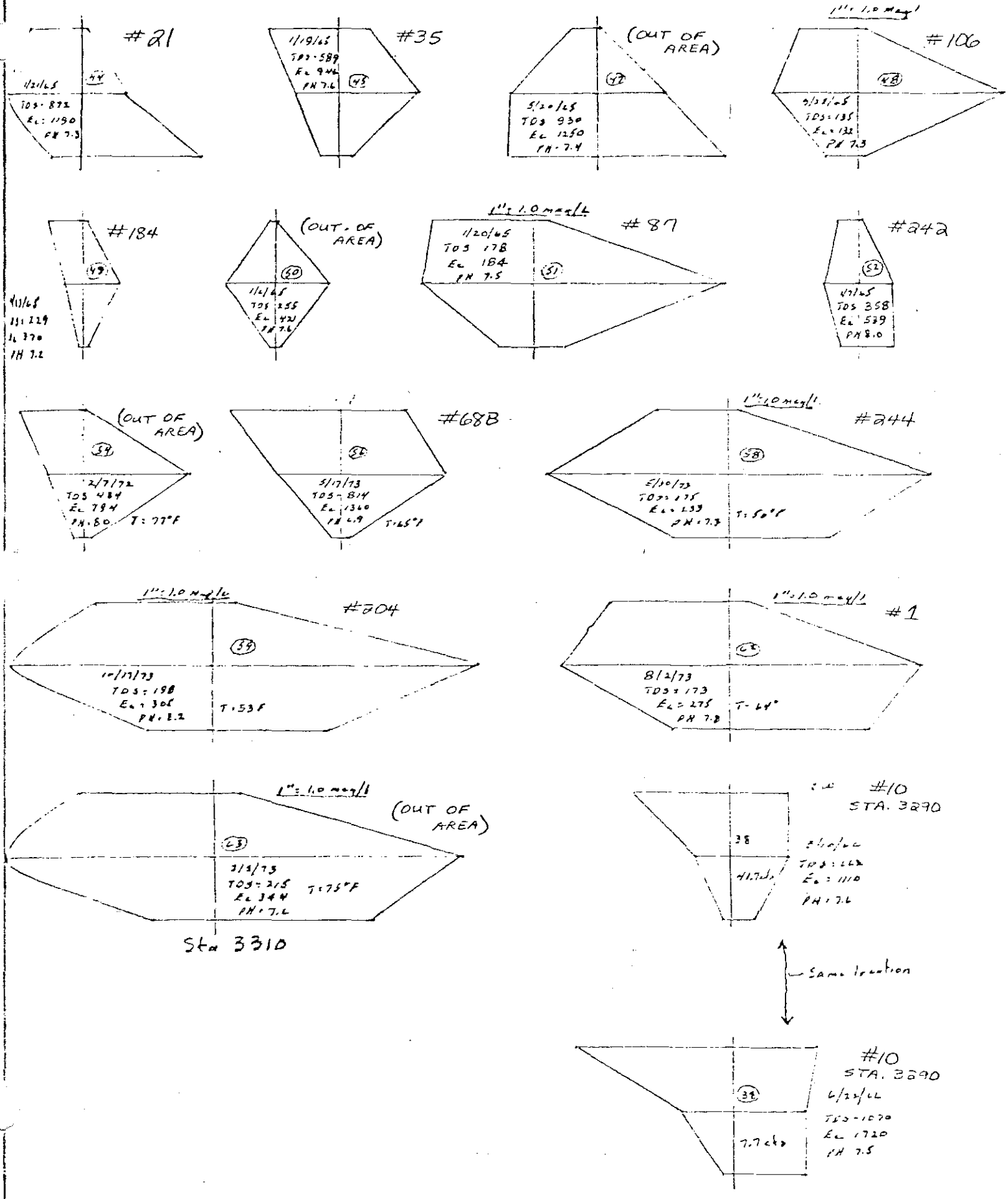
APPENDIX III

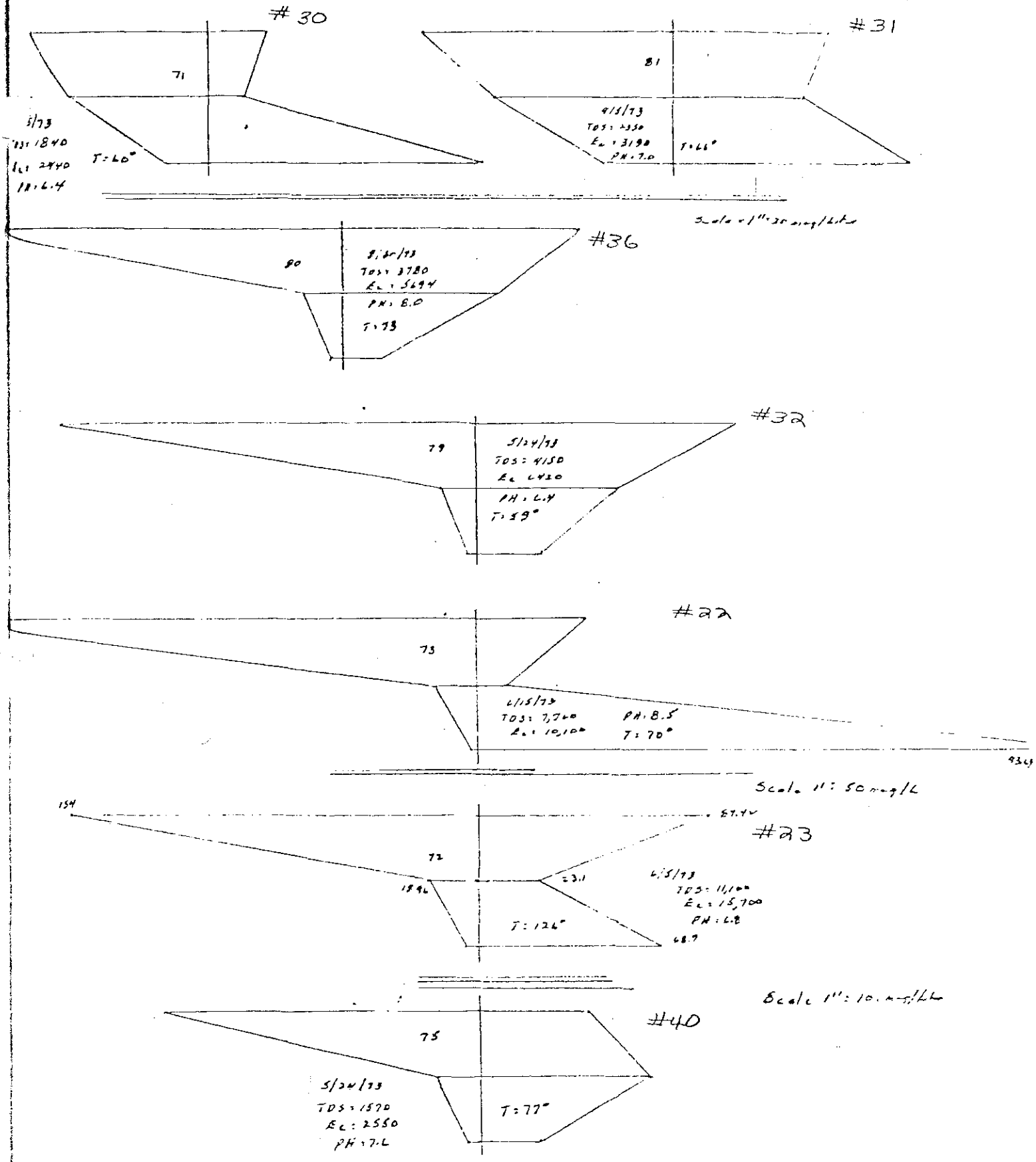
Chemical Diagrams


(10)
chimney Cr
#18
Trainer data
8/14/64
TDS = 5,510
Ec = 8 660
pH = 7.6
T = 75°F

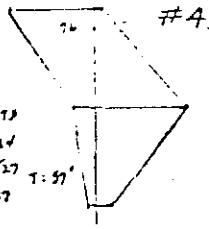

San Ysidro Sp.
west of San Ysidro
40C 558 63W
#18
10/15/71
TDS = 6737
Ec = 9,100
pH = 6.8


Shaver Sp.
40C 558630
#114A
10/15/71
TDS = 2360
Ec = 2940
pH = 7.0
T=48


#21
1/21/65
TDS: 872
EL: 1190
PH 7.3
#35
1/19/65
TDS: 589
EL 944
PH 7.6
(OUT OF AREA)
5/20/65
TDS 930
EL 1250
PH 7.4
1" = 1.0 mi
#106
9/25/65
TDS: 135
EL: 132
PH 7.3
#184
9/11/68
TDS: 229
EL 370
PH 7.2
(OUT OF AREA)
1/4/65
TDS 255
EL 422
PH 7.6
1" = 1.0 mi
#87
1/20/65
TDS 178
EL 184
PH 7.5
#242
4/7/65
TDS 358
EL 529
PH 8.0
(OUT OF AREA)
2/7/72
TDS 484
EL 794
PH 8.0
T: 77°F
#68B
5/17/73
TDS 814
EL 1360
PH 6.9
T: 65°F
1" = 1.0 mi
#244
5/30/73
TDS: 175
EL: 139
PH: 7.3
T: 56°F
1" = 1.0 mi
#204
10/17/73
TDS: 198
EL: 305
PH: 8.2
T: 53°F
1" = 1.0 mi
#1
8/2/73
TDS: 173
EL: 275
PH 7.8
T: 64°
1" = 1.0 mi
(OUT OF AREA)
3/3/73
TDS: 215
EL 344
PH: 7.6
T: 75°F
Sta 3310
#10
STA. 3290
38
41.7 cfs
TDS: 662
EL: 1110
PH: 7.6
Same location
#10
STA. 3290
6/22/66
TDS: 1070
EL 1720
PH 7.5
38
7.7 cfs

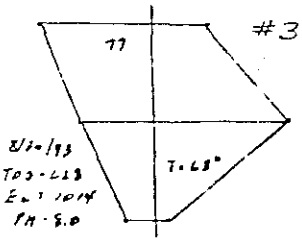

#30
71
T: 60°
#31
81
4/5/73
TDS: 4350
Ec: 3190
PH: 7.0
T: 66°
Scale 1" = 30 mg/L
#36
80
3/27/73
TDS: 3780
Ec: 5694
PH: 8.0
T: 73
#32
79
3/24/73
TDS: 4150
Ec 6420
PH: 6.4
T: 59°
#22
73
4/15/73
TDS: 7,740
Ec: 10,100
PH: 8.5
T: 70°
Scale 1": 50 mg/L
#23
72
4/5/73
TDS: 11,100
Ec: 15,700
PH: 6.8
T: 126°
#40
75
3/24/73
TDS: 1570
Ec: 2550
PH: 7.6
T: 77°

#41



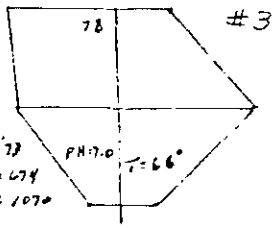
9/24/73
TDS: 324
E_c: 627
PH: 7.7

#38



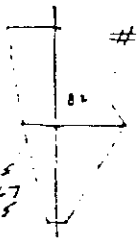
8/20/73
TDS: 628
E_c: 1014
PH: 8.0

#33



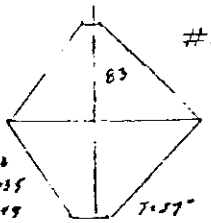
5/24/73
TDS: 674
E_c: 1070

#42



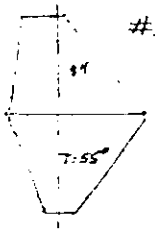
6/5/73
TDS: 245
E_c: 367
PH: 7.5

#46



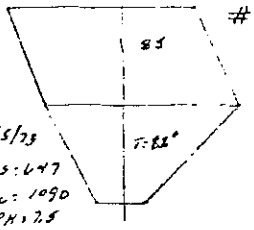
8/31/73
TDS: 335
E_c: 549
PH: 8.0

#51



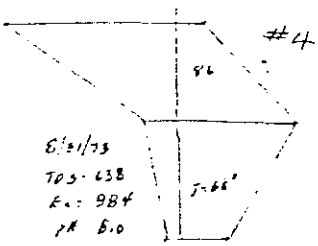
11/6/73
TDS: 294
E_c: 472
PH: 8.2

#54



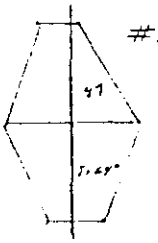
10/5/73
TDS: 647
E_c: 1090
PH: 7.5

#49



8/31/73
TDS: 638
E_c: 984
PH 8.0

#56

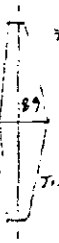


11/6/73
TDS: 344
E_c: 571
PH: 7.4

#57

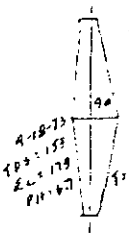
10/2/73
TDS: 205
E_c: 341
PH: 7.6

#60



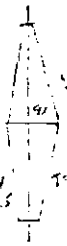
9/18/73
TDS: 159
E_c: 182
PH: 6.8

#62



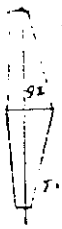
9/18/73
TDS: 153
E_c: 179
PH: 6.7

#63



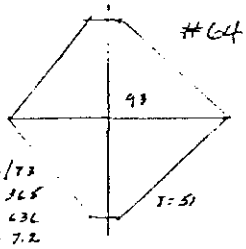
8/15/73
TDS: 161
E_c: 194
PH: 7.5

#61



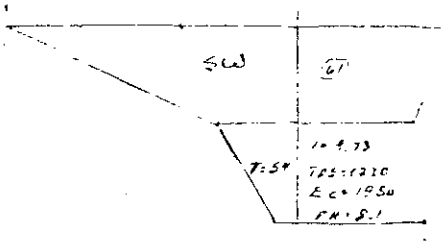
8/22/73
TDS: 155
E_c: 161
PH: 7.6

#64

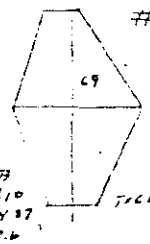


10/30/73
TDS: 365
E_c: 631
PH: 7.2

#10

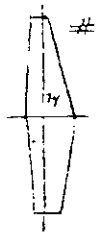


#28



5/23/73
TDS: 310
E_c: 487
PH 7.6

#187

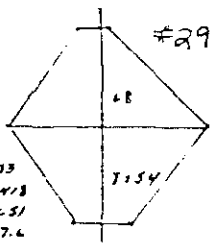


4/13/45
TDS: 123
E_c: 194
PH 7.4

#202

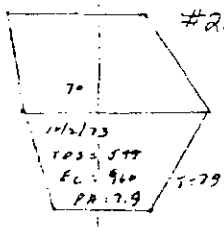
9/23/45
TDS: 183
E_c: 292
PH: 7.1

#29



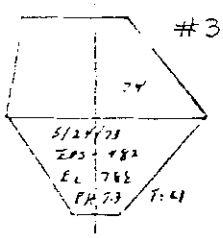
5/23/73
TDS: 478
E_c: 651
PH: 7.6

#24



10/2/73
TDS: 577
E_c: 960
PH: 7.9

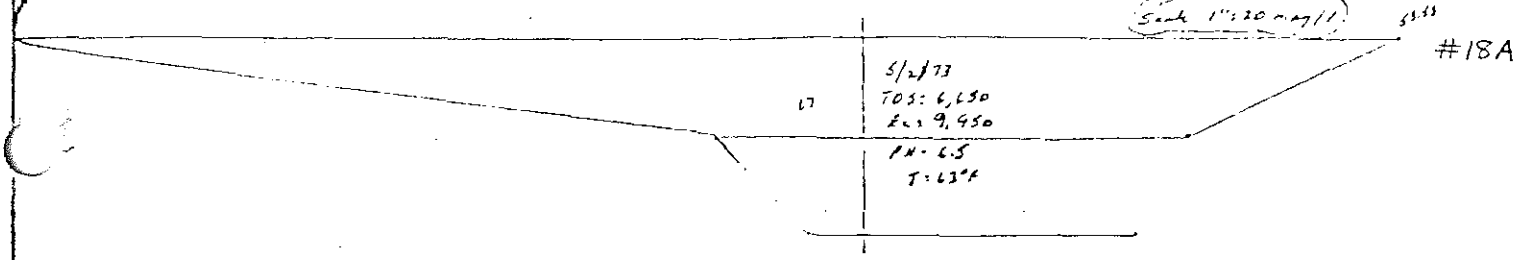
#34

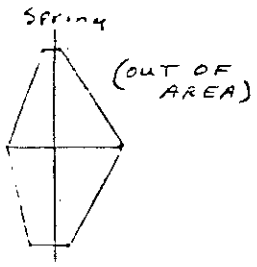


5/24/73
TDS: 482
E_c: 762
PH 7.3

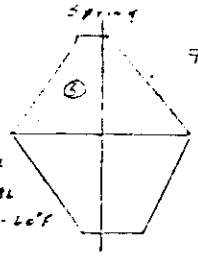
Scale 1" = 20 ft

#18A





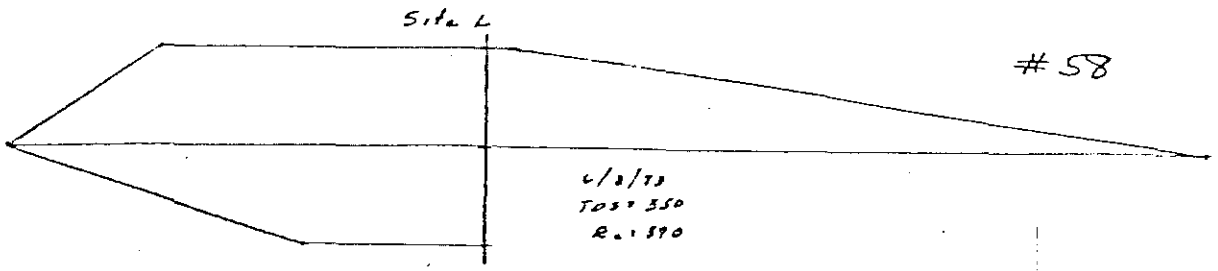
(OUT OF AREA)

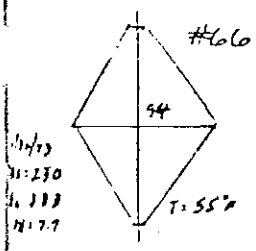


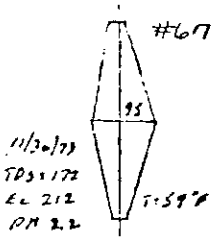
#45

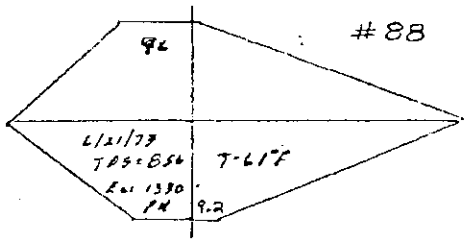
Yellowstone Creek

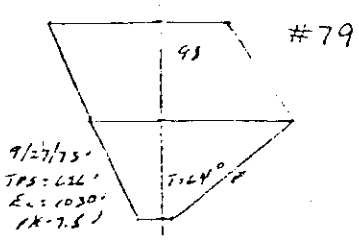
1" = 1.0 meq/Lt

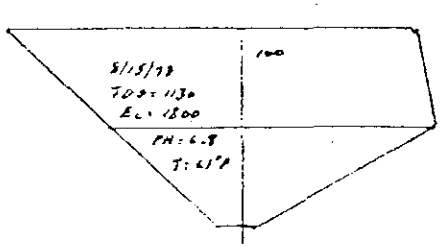


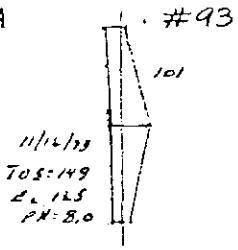

#66
94
T: 55°F

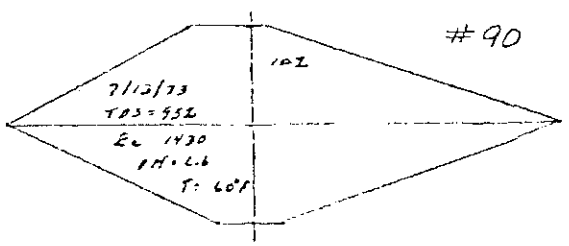

#67
95
11/30/73
TDS: 172
EC 212
PH 8.2
T: 59°F

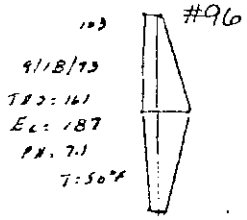

#88
92
6/21/73
TDS: 856
EC: 1330
PH 9.2
T: 67°F

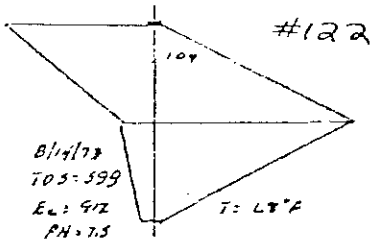

#79
93
9/27/73
TDS: 624
EC: 1030
PH: 7.5
T: 64°F

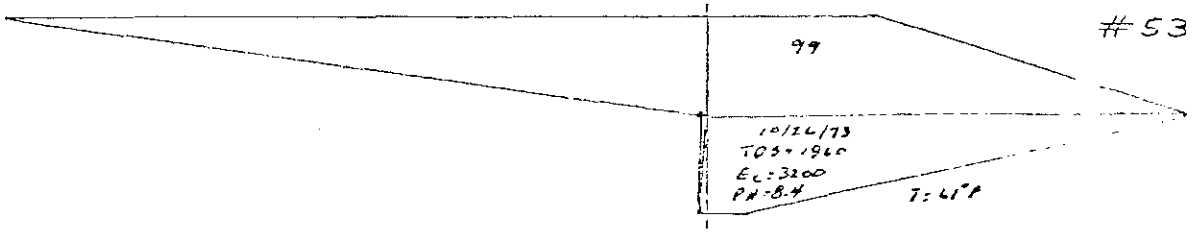

#115A
100
5/15/73
TDS: 1130
EC: 1800
PH: 6.8
T: 61°F

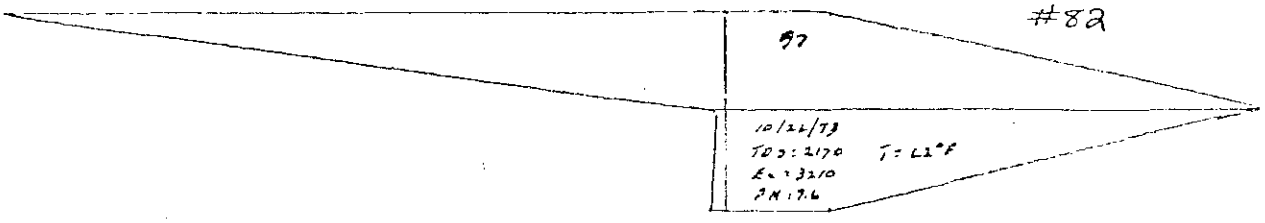

#93
101
11/16/73
TDS: 149
EC 125
PH: 8.0

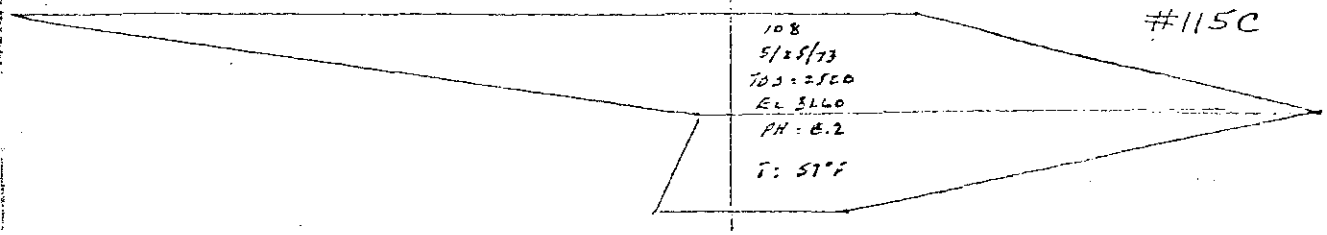

#90
102
7/13/73
TDS: 952
EC 1430
PH: 6.6
T: 60°F


103
#96
9/18/73
TDS: 161
EC: 187
PH: 7.1
T: 50°F


#122
104
8/14/73
TDS: 599
EC: 912
PH: 7.5
T: 68°F

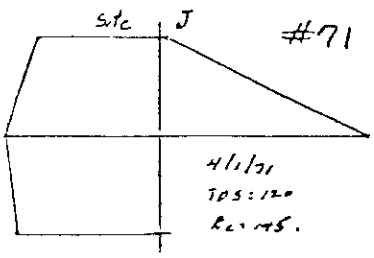

#53
99
10/24/73
TDS: 1960
EC: 3200
PH: 8.4
T: 61°F

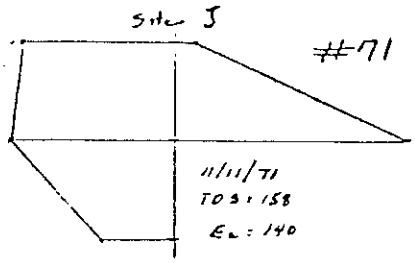

#82
97
10/24/73
TDS: 2170
EC: 3210
PH: 7.6
T: 62°F

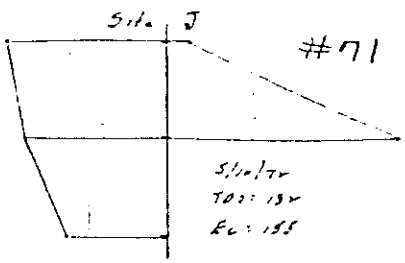

#115C
108
5/25/73
TDS: 2520
EC 3140
PH: 8.2
T: 57°F

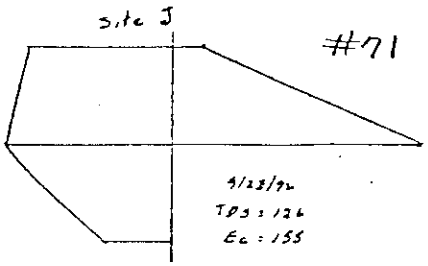
James River

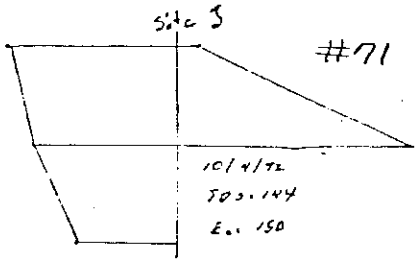
Scale 1" = 1 mile/Lr.

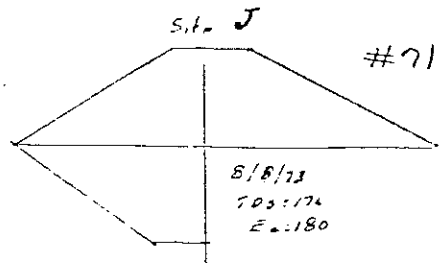


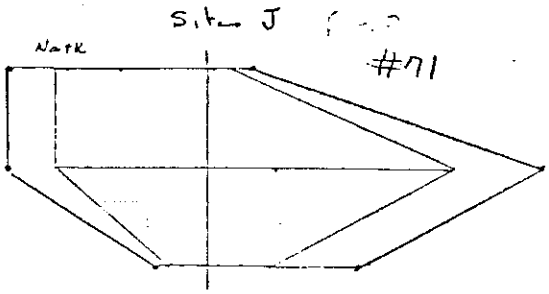








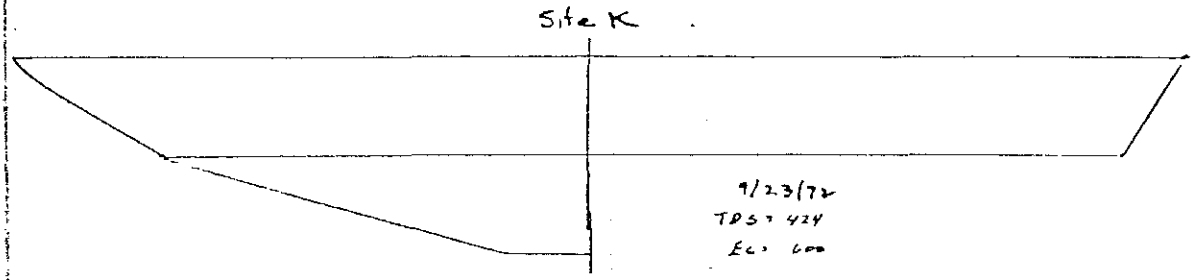


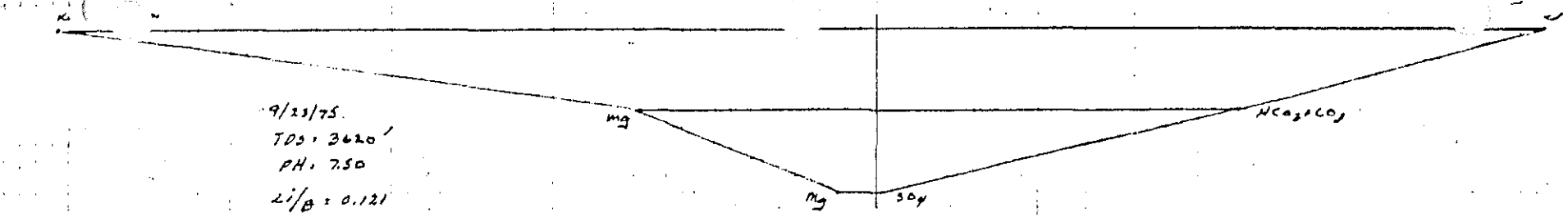


Average 17 cfs.

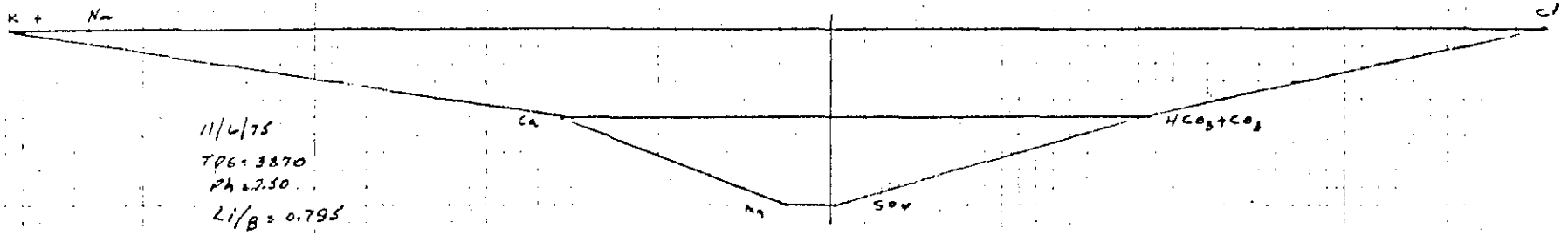
Max Conc : Min Flow = 7 cfs

Min Conc : Max Flow 52 cfs

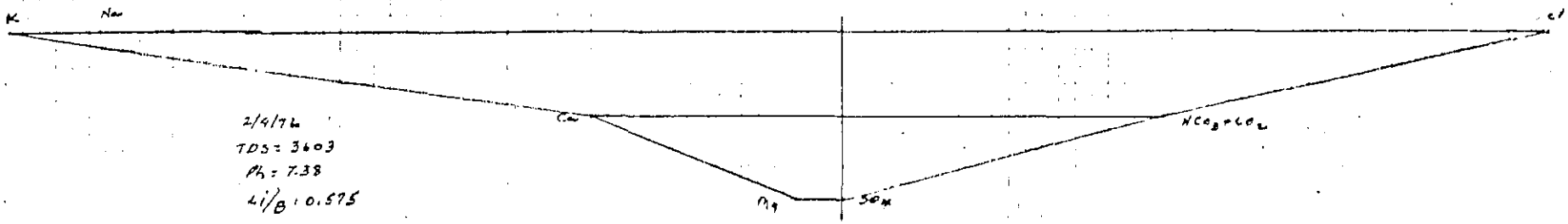




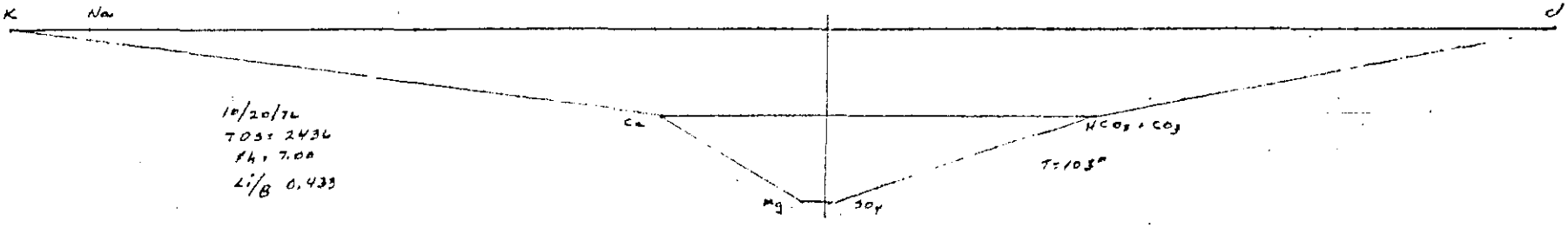
9/23/75
TDS: 3620
PH: 7.50
Li/B = 0.121



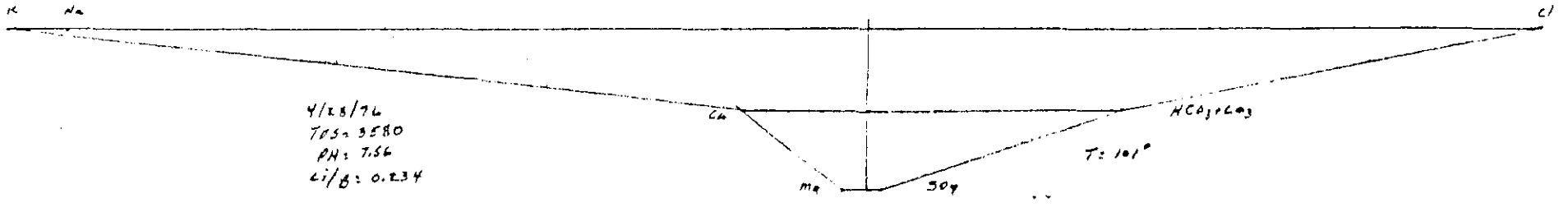
11/6/75
TDS: 3870
PH: 7.50
Li/B = 0.795



2/4/76
TDS: 3603
PH: 7.38
Li/B: 0.575



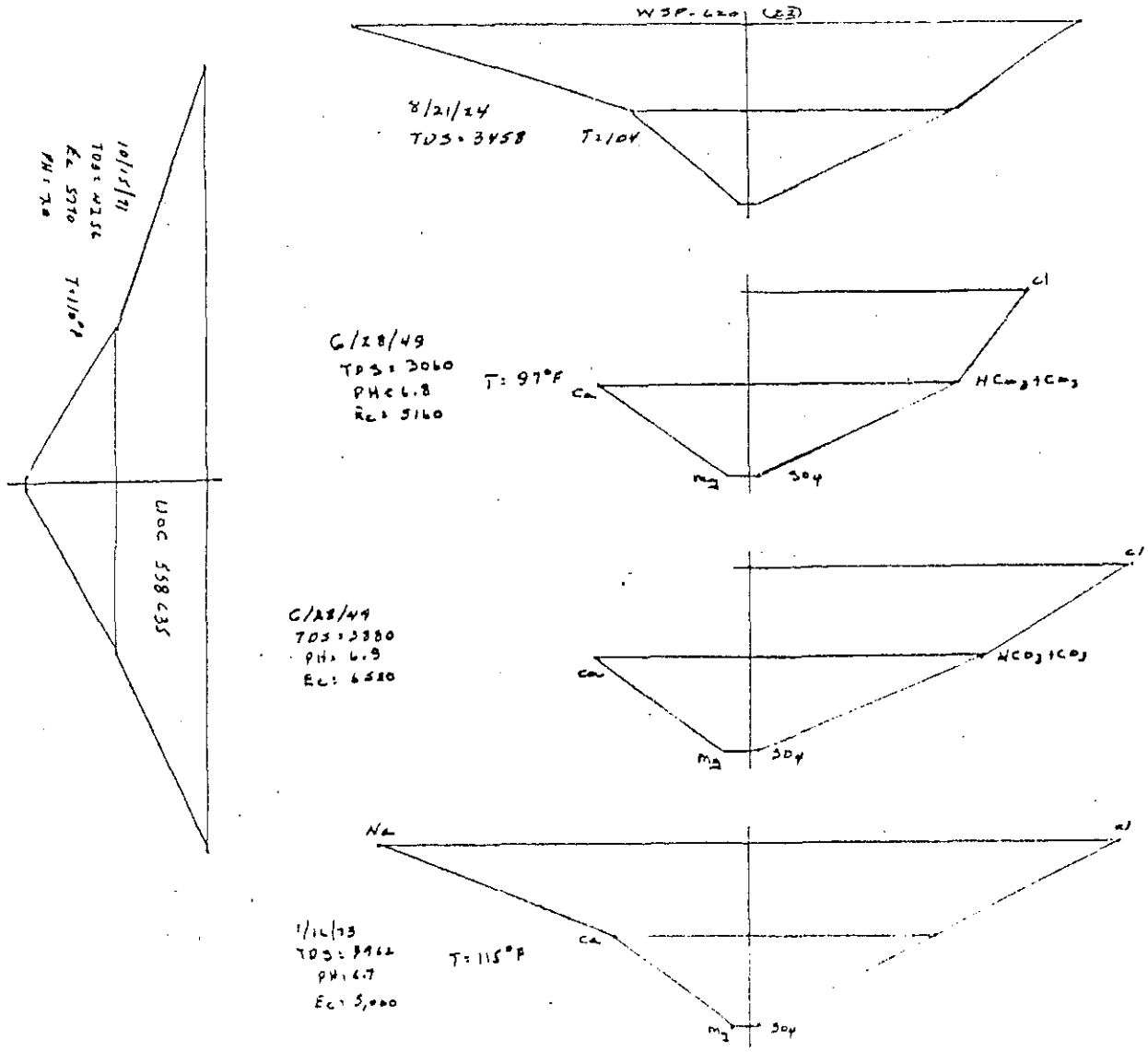
10/20/76
TDS: 2436
PH: 7.00
Li/B 0.433
T: 103°



4/28/76
TDS: 3580
PH: 7.56
Li/B: 0.234
T: 101°

T 18 N R 2 E Sec 14 - #15 (ALL)

11: 10 mg/l (A)



Soda Dam Springs

#75 (ALL)

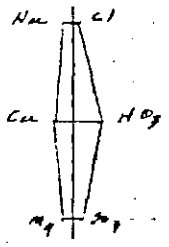
Scale 1" = 20 mEq/L

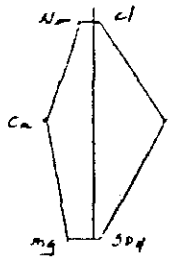
A.

Trainer report

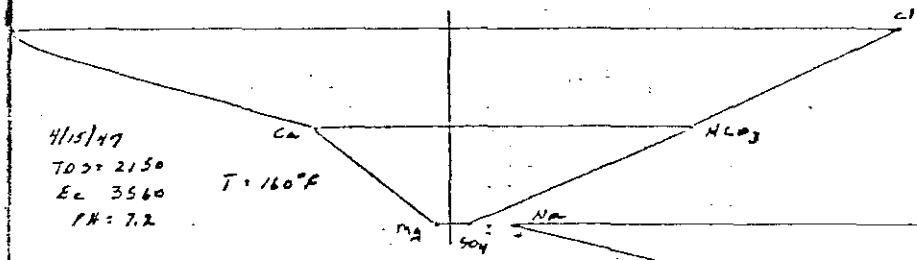
#77 (ALL)

4/15/47
TDS = 1530
Ec = 1840

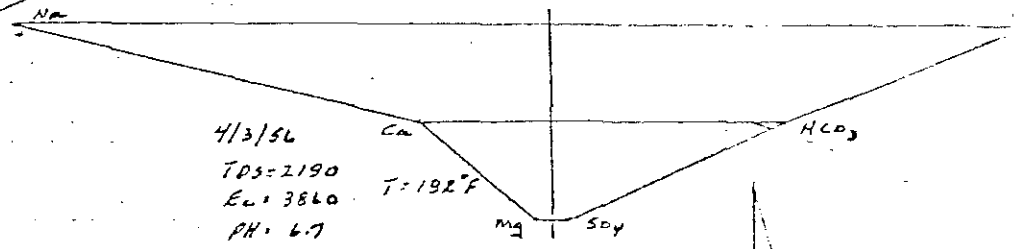




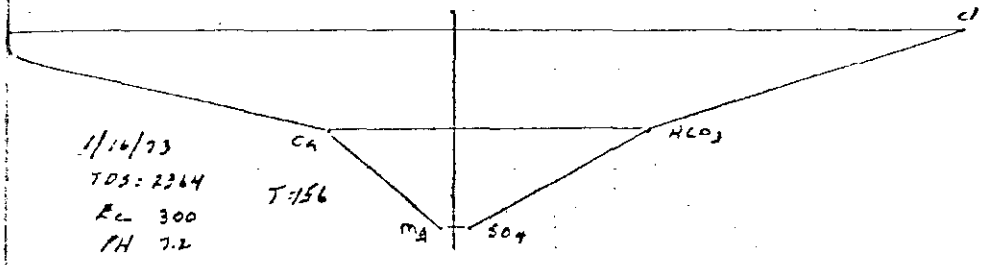
4/15/47
TDS = 2700
Ec = 3510



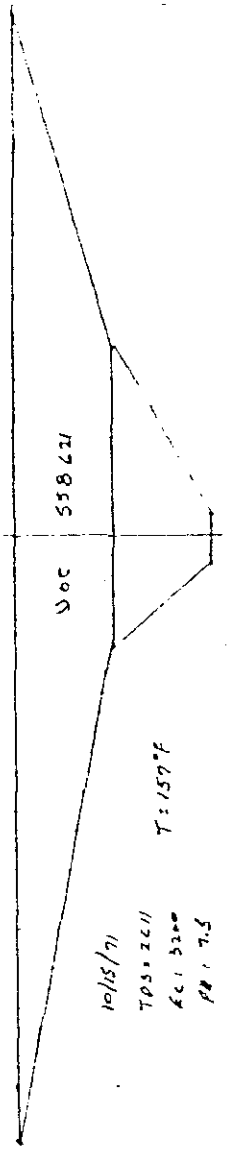
4/15/47
TDS = 2150
Ec 3560
PH = 7.2
T = 160°F



4/3/56
TDS = 2190
Ec = 3860
PH = 6.7
T = 192°F

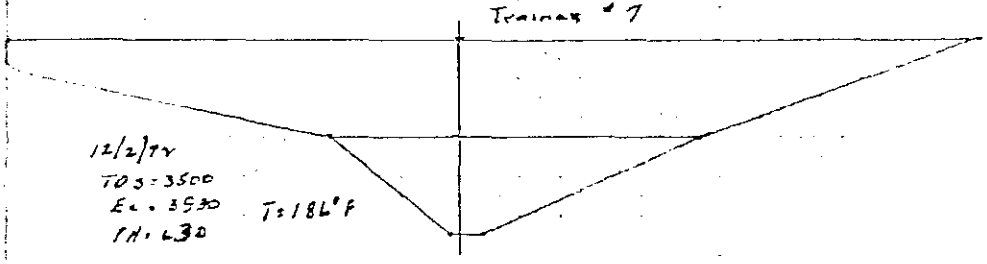


1/16/73
TDS = 2364
Ec 300
PH 7.2
T = 156

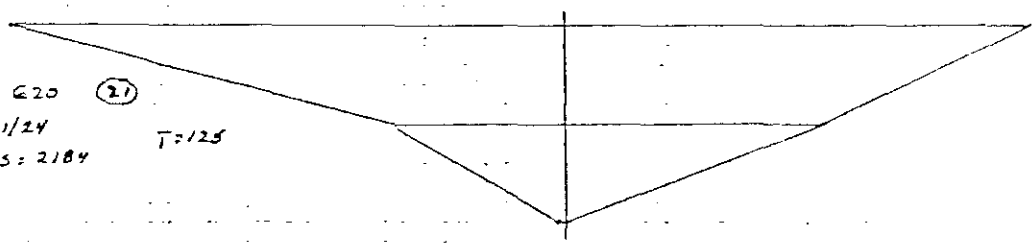


10/15/71
TDS = 2611
Ec = 3200
PH = 7.5
T = 157°F

Trainer #7



12/2/74
TDS = 3500
Ec = 3930
PH = 6.30
T = 186°F

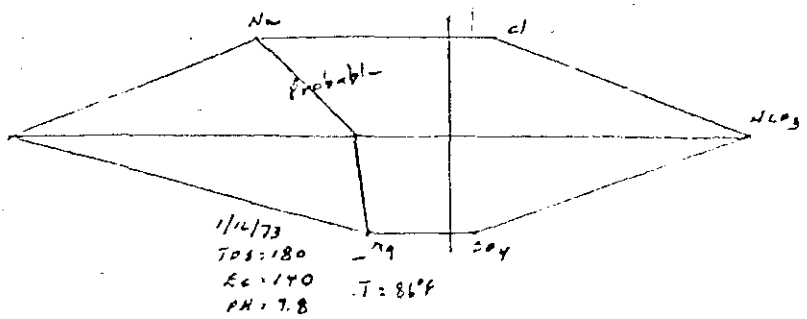


WSP G20 (21)
8/21/24
TDS = 2184
T = 125

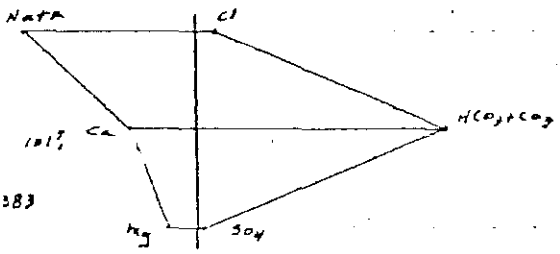
T 18 N R 3 E Sec 4.144

1" = 1 mag 11

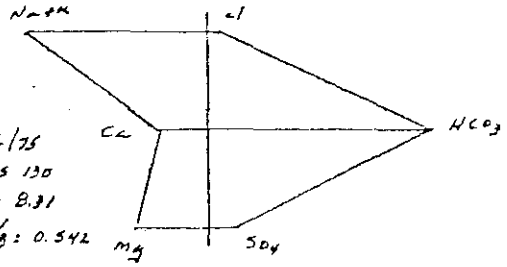
#94 (ALL)



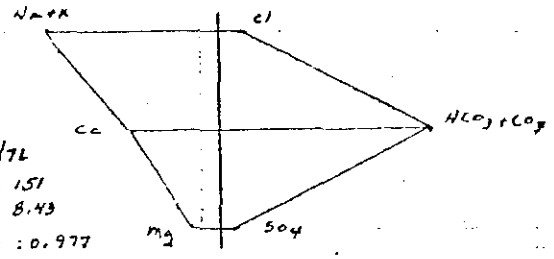
1/16/73
TDS: 180
Ec: 170
PH: 7.8
T: 86°F



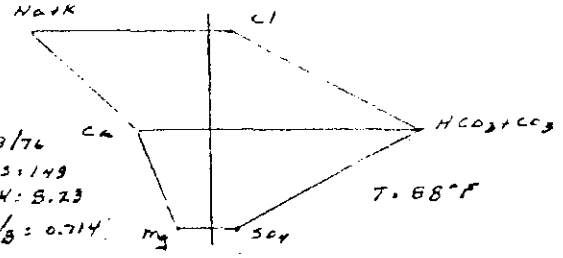
1/8/75
TDS: 202
PH: 7.88
Li/B: 0.383



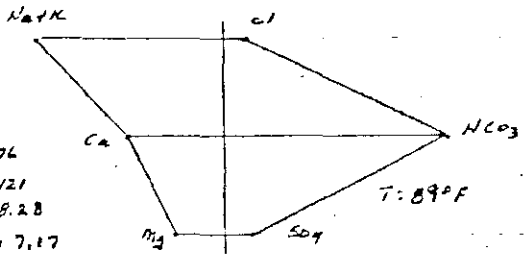
11/6/75
TDS 130
PH- 8.31
Li/B: 0.542



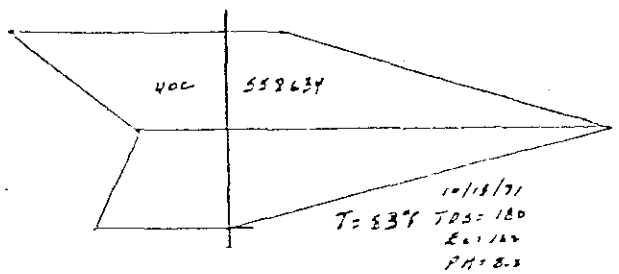
1/29/76
TDS 151
PH 8.43
Li/B: 0.977



4/19/76
TDS: 149
PH: 8.23
Li/B: 0.714
T: 68°F



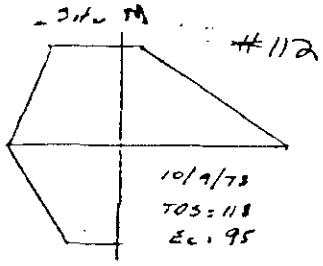
4/20/76
TDS: 121
PH 8.28
Li/B: 1.17
T: 89°F

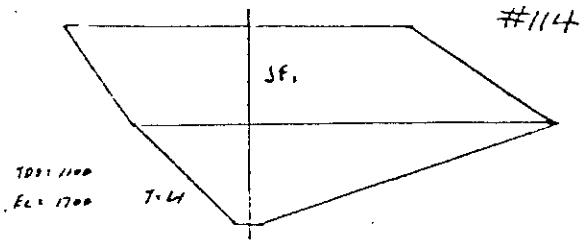


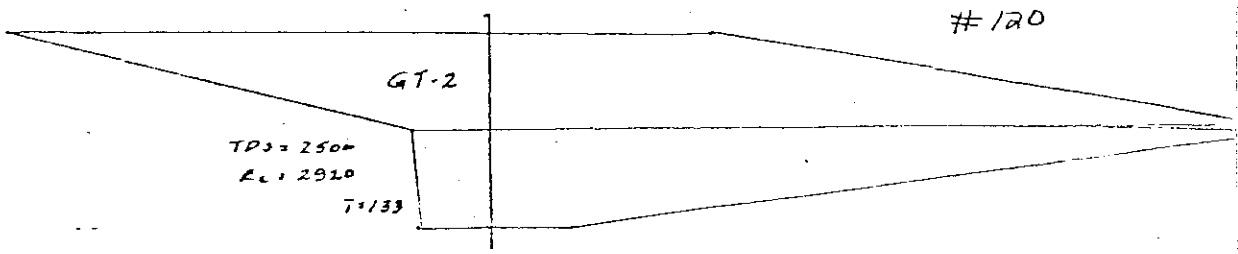
10/15/71
T: 83°F TDS: 180
Ec: 162
PH: 8.3

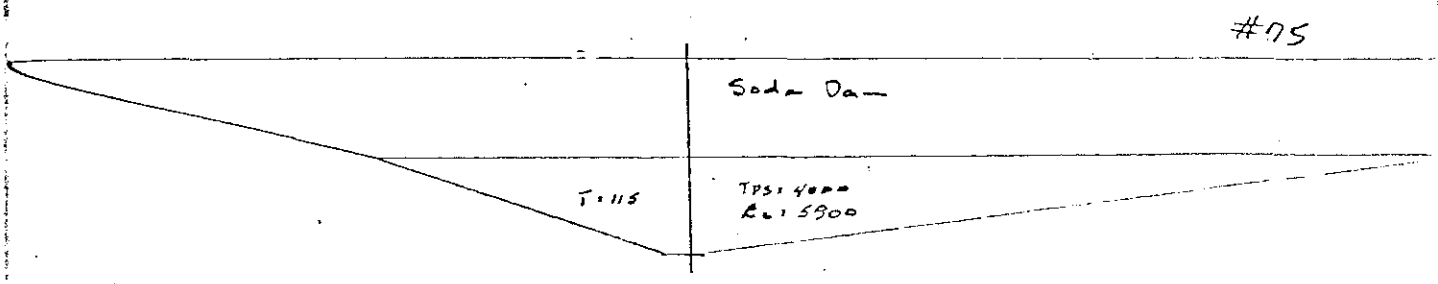
Fenton Lake

Scale 1" = 1.0 mag/int.




#114
SF.
TDS: 1100
EC: 1700
T: 44

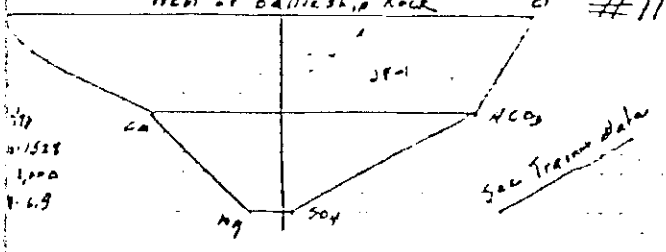

#120
GT-2
TDS = 2500
EC = 2920
T: 133


#75
Soda Dam
T: 115
TDS: 4000
EC: 5900

Misc Springs

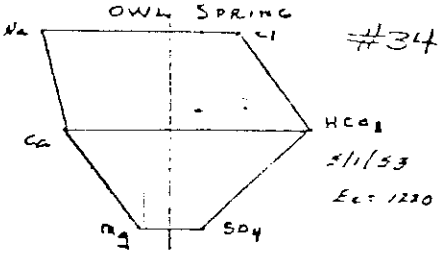
Scale 1" = 16 meq/L

West of Battleship Rock #114



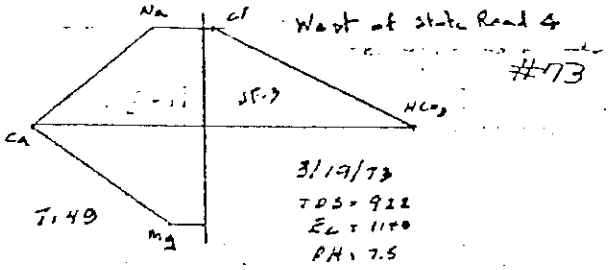
TDS = 1528
EC = 1,900
PH = 6.9

OWL SPRING #34



5/1/53
EC = 1230

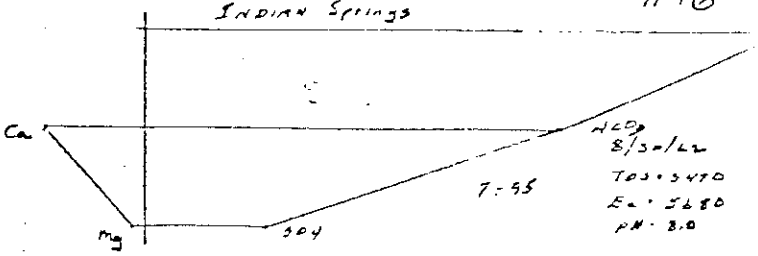
West of State Road 4 #73



T: 49

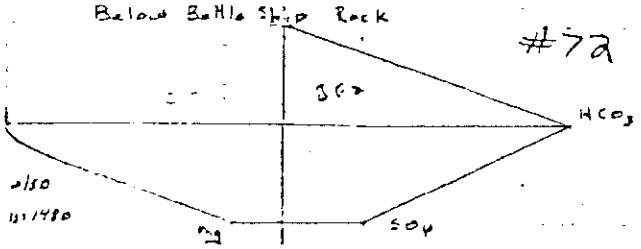
3/19/73
TDS = 922
EC = 1170
PH = 7.5

INDIAN SPRINGS #16



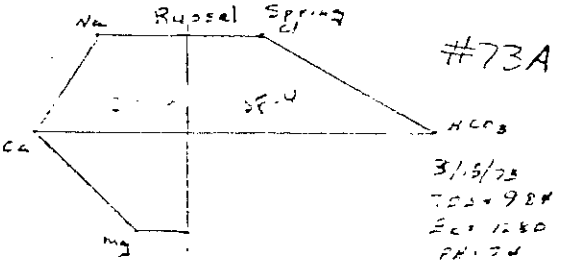
8/30/62
TDS = 3470
EC = 5680
PH = 8.0

Below Battleship Rock #72



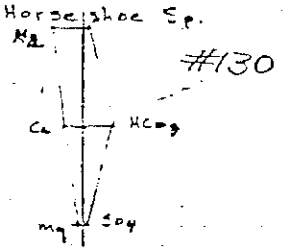
2/50
EC = 1480

Russel Spring #73A



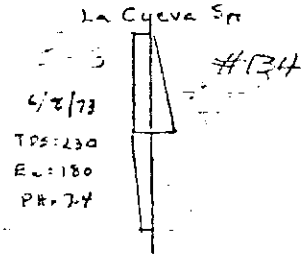
3/15/73
TDS = 984
EC = 1280
PH = 7.4

Horseshoe Sp. #130



11/23/72
TDS = 249
EC = 200
PH = 7.6

La Cueva Sp #134

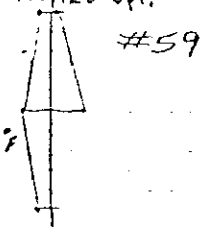


6/7/73
TDS = 230
EC = 180
PH = 7.4

West Side of Creek #139

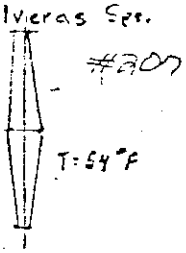
4/20/73
TDS = 210
EC = 130
PH = 7.4
T: 68°F

Palo Sp. #59



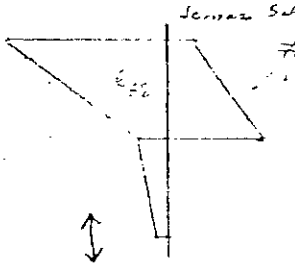
6/8/73
TDS = 104
EC = 180
T: 65°F
PH = 7.8

Calveras Spr. #307



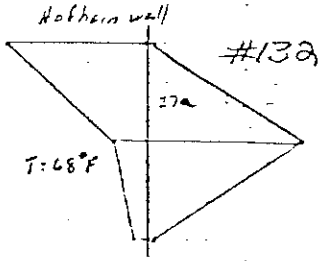
1/17/73
TDS = 102
EC = 95
PH = 7.9
T: 54°F

Jemez School #50



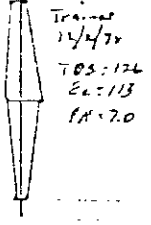
8/21/73
TDS = 466
EC = 780
PH = 7.8

Hofheim wall #132



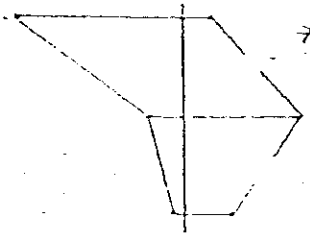
8/14/73
TDS = 452
EC = 880
PH = 7.5
T: 68°F

calaveras Spr. #307



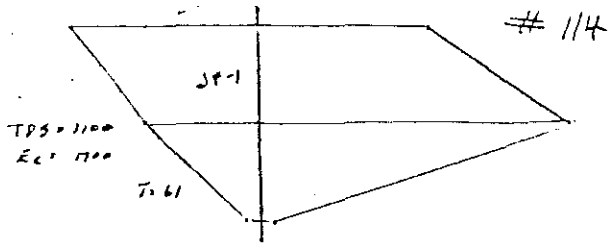
Trainer
12/4/72
TDS = 174
EC = 113
PH = 7.0

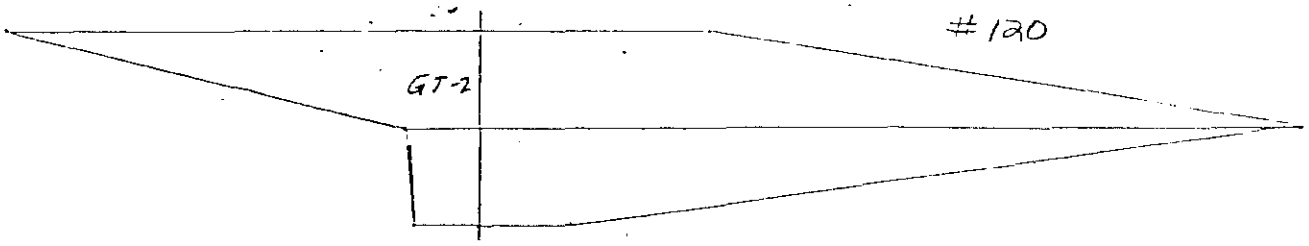
Jemez School Spring #50

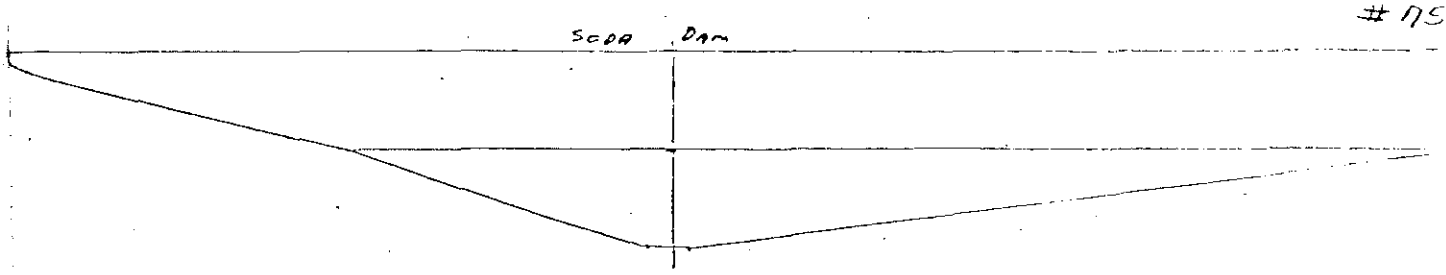


Trainer Site 9
8-21-73
TDS 438
EC = 1,000
PH = 7.6

Scale 1" = 10. May/Lk

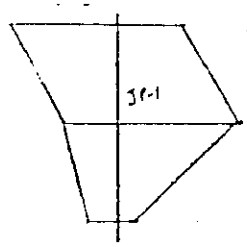




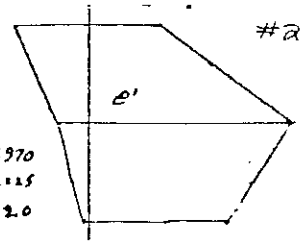


Misc Wells

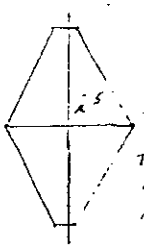
Scale 1" = n miles/in.



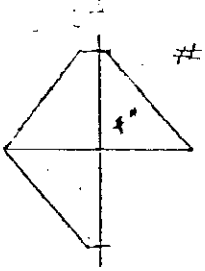
1967
TDS: 597
Ec: 980



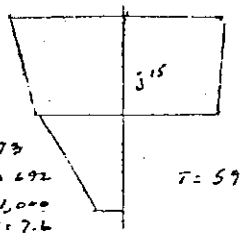
TDS = 2970
Ec = 2225
PH: 8.0



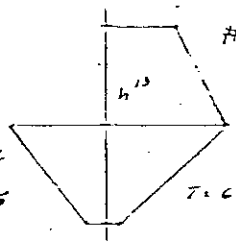
TDS = 522
Ec = 350
PH: 7.2



4/1/73
TDS 402
Ec 580
PH: 7.6

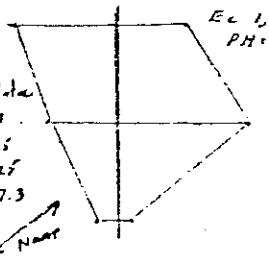


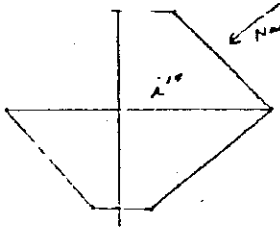
4/8/73
TDS = 492
Ec 1,000
PH: 7.6
T: 59°



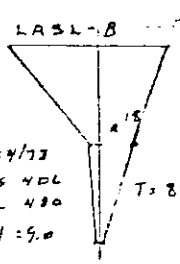
10/14/54
Ec 995
T: 62°F

3.1 & 12 Trainer data
4/27/73
TDS = 625
Ec = 925
PH: 7.3

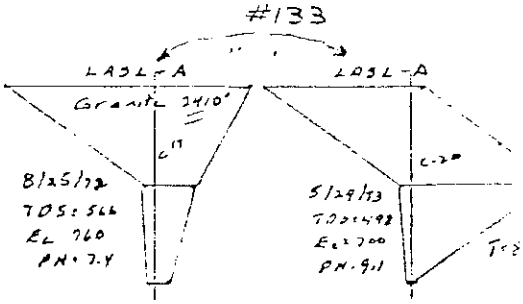




4/1/54
TDS:
Ec 1140

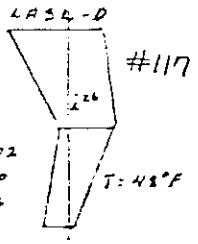


5/24/73
TDS 401
Ec 480
PH: 9.0
T: 88

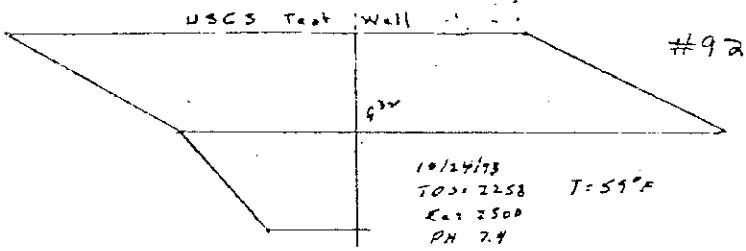


8/25/72
TDS: 566
Ec 760
PH: 7.4

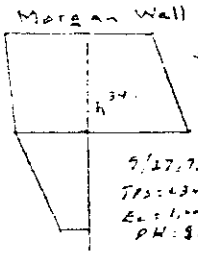
5/29/73
TDS: 492
Ec: 700
PH: 9.1



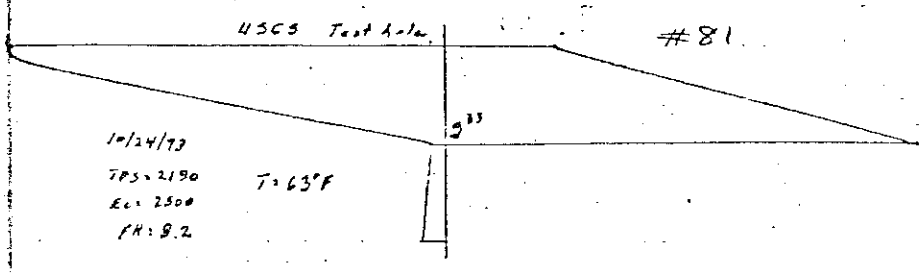
1/22/73
TDS: 272
Ec: 400
PH: 8.6
T: 48°F



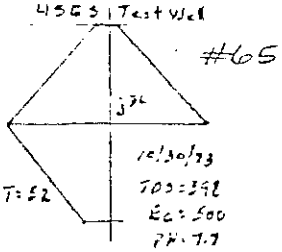
10/24/73
TDS: 2258
Ec: 2500
PH 7.4
T: 59°F



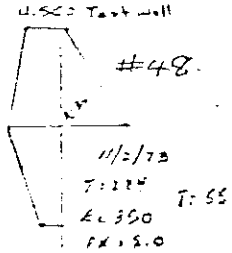
9/27/73
TDS: 434
Ec: 1,000
PH: 8.1
T: 64°F



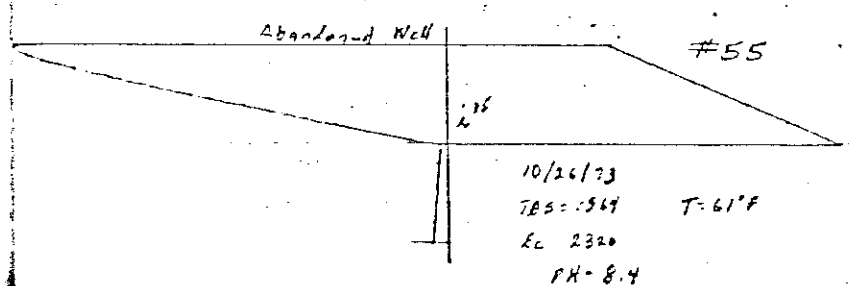
10/24/73
TDS: 2190
Ec: 2500
PH: 8.2
T: 63°F



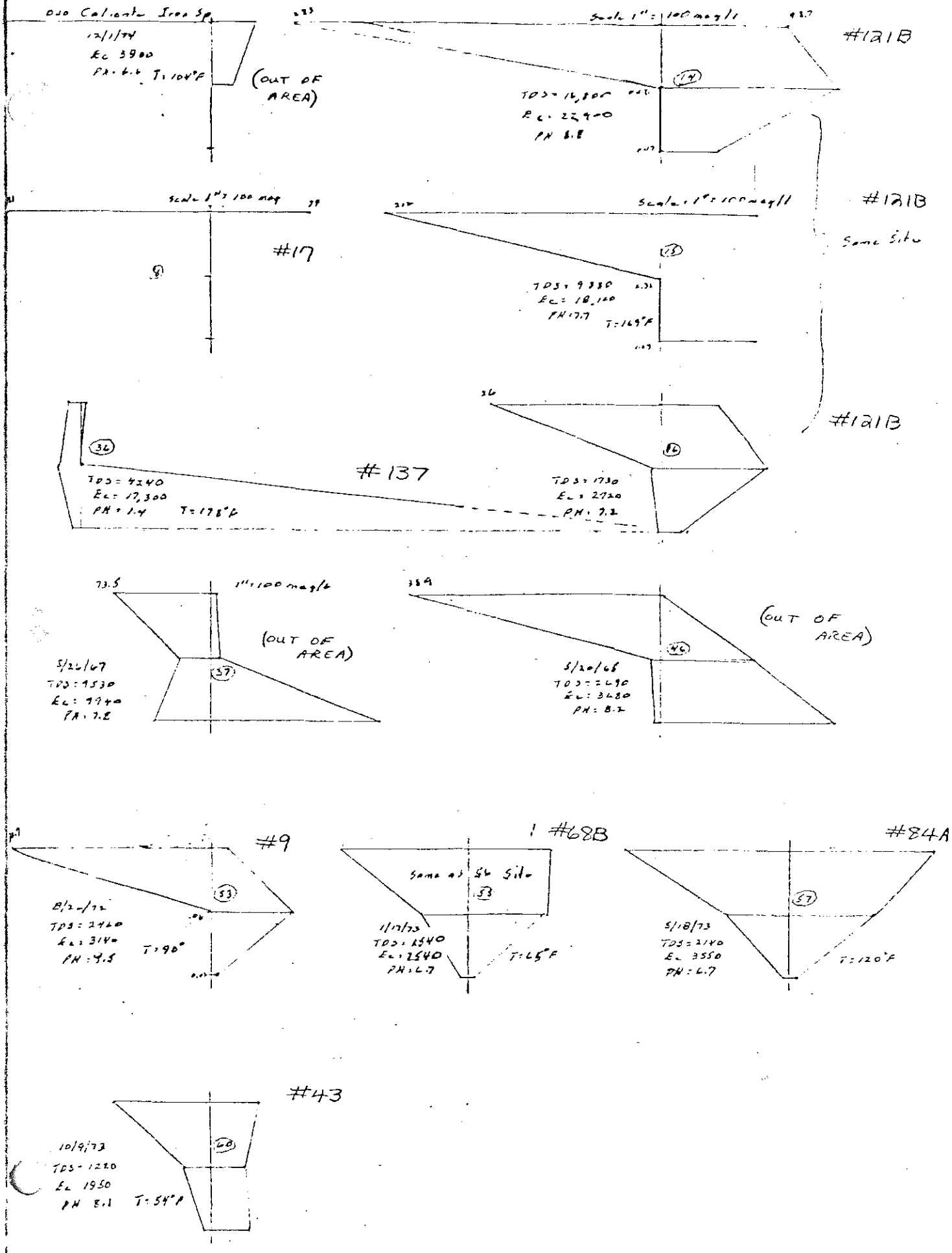
10/30/73
TDS: 398
Ec: 500
PH: 7.7
T: 52

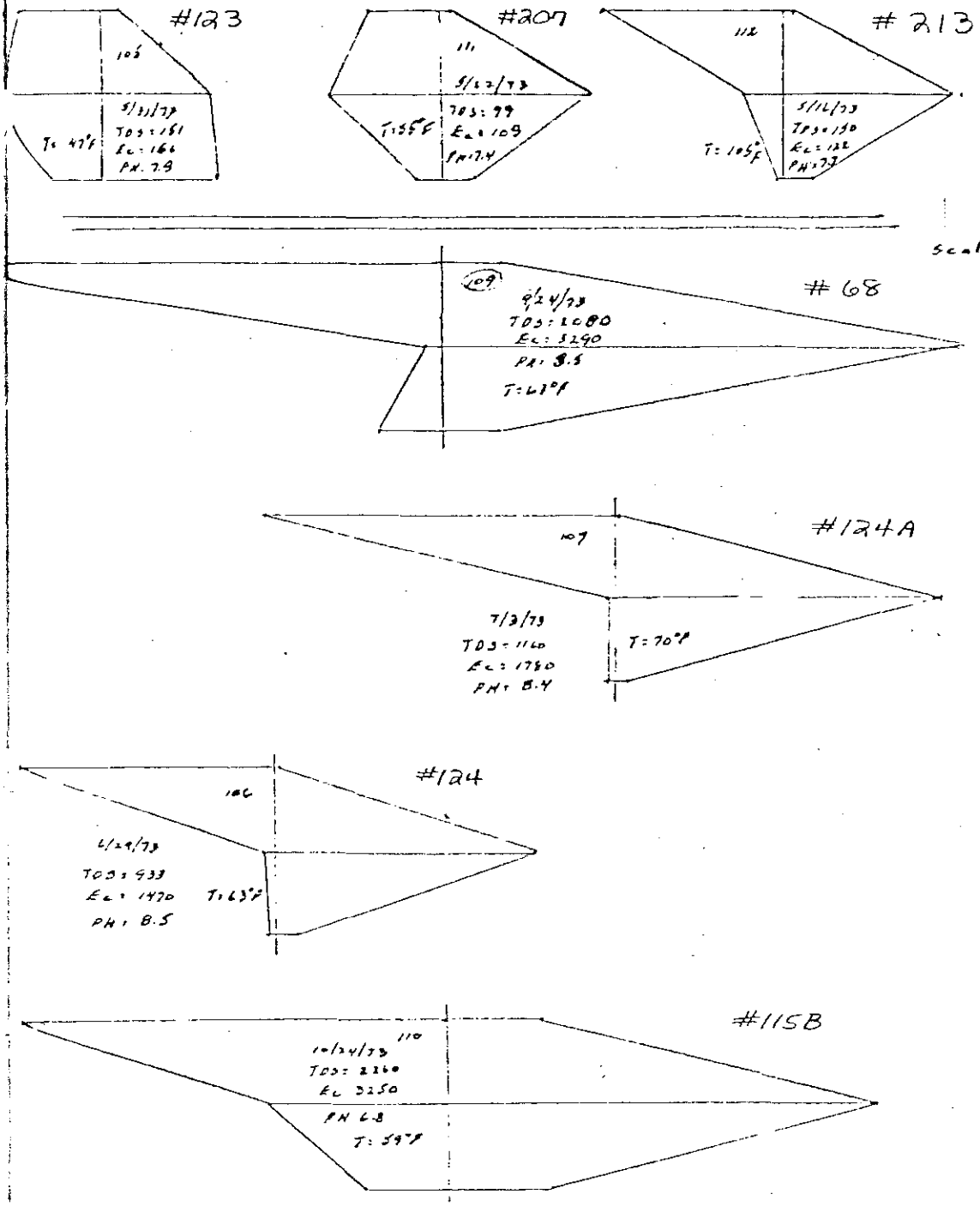


11/2/73
T: 55
Ec 350
PH: 8.0



10/26/73
TDS: 569
Ec 2320
PH: 8.4
T: 61°F

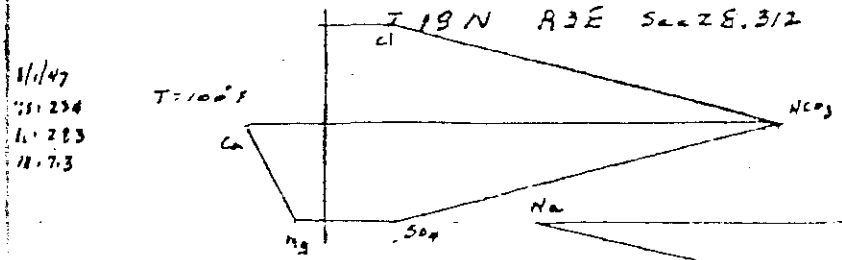

Duo Caliente Iron Sp
12/1/74
Ec 3900
PH 6.6 T: 104°F
(OUT OF AREA)
Scale 1": 100 mg/l
#121B
TDS = 16,800
Ec = 22,900
PH 6.8
#17
Scale 1" = 100 mg/l
Scale 1" = 100 mg/l
#121B
Some Site
TDS = 9330
Ec = 18,100
PH 7.7
T: 169°F
#121B
#137
TDS = 4240
Ec = 17,300
PH = 1.4
T: 178°F
TDS = 1730
Ec = 2720
PH: 7.2
1" = 100 mg/l
(OUT OF AREA)
5/26/67
TDS = 9530
Ec = 9940
PH: 7.2
(OUT OF AREA)
5/20/68
TDS = 2490
Ec = 3480
PH: 8.2
#9
8/2-/72
TDS = 2460
Ec = 3140
PH: 7.5
T: 90°
#68B
Same as 56 Site
1/17/73
TDS = 1540
Ec = 2540
PH: 6.7
T: 65°F
#84A
5/18/73
TDS = 2140
Ec 3550
PH: 6.7
T: 120°F
#43
10/9/73
TDS = 1220
Ec 1950
PH 8.1
T: 54°F


#123
105
5/31/79
TDS: 181
Ec: 164
PH: 7.9
T: 47°F
#207
111
5/12/79
TDS: 99
Ec: 109
PH: 7.4
T: 55°F
#213
112
5/14/79
TDS: 150
Ec: 122
PH: 7.3
T: 105°F
scale 1" = 10 miles/L.I.
#68
109
9/24/79
TDS: 2080
Ec: 3290
PH: 8.5
T: 61°F
#124A
107
7/3/79
TDS: 1160
Ec: 1750
PH: 8.4
T: 70°F
#124
106
6/29/79
TDS: 933
Ec: 1470
PH: 8.5
T: 63°F
#115B
110
10/24/79
TDS: 2260
Ec 3250
PH 6.8
T: 59°F

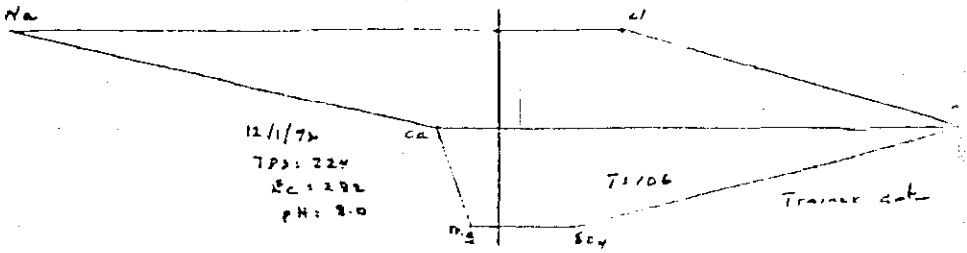
T 19 N R 3 E Sec 28.3/2

1" = 10 meq/L

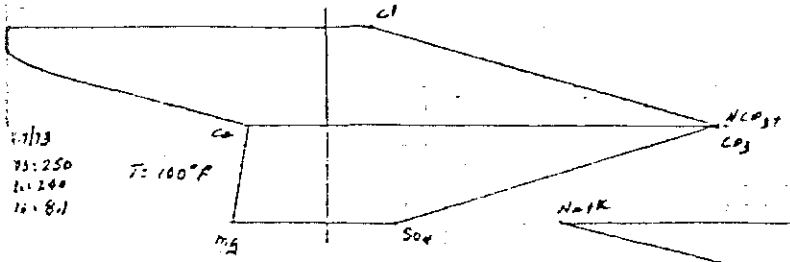
#128 (ALL)



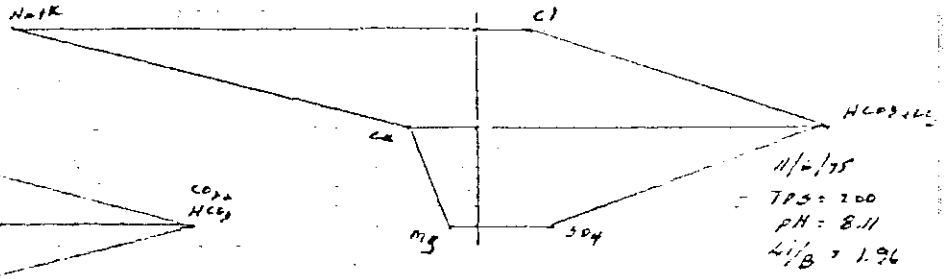
1/1/47
TDS: 234
EC: 283
pH: 7.3



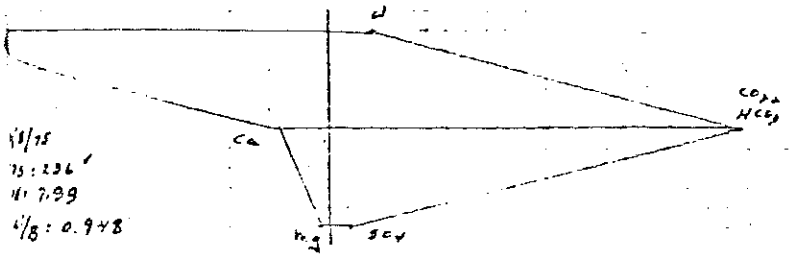
12/1/72
TDS: 224
EC: 282
pH: 8.0



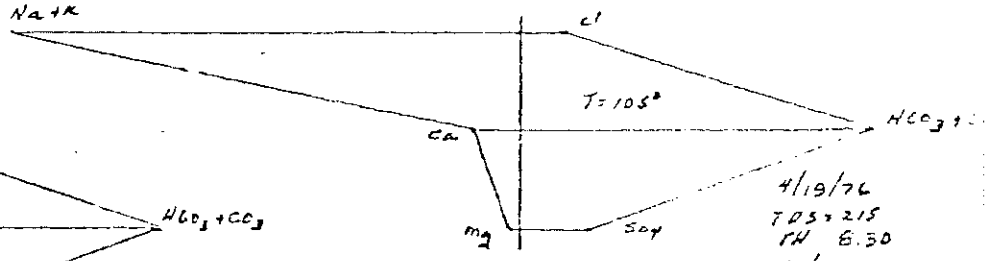
1/1/73
TDS: 250
EC: 240
pH: 8.1



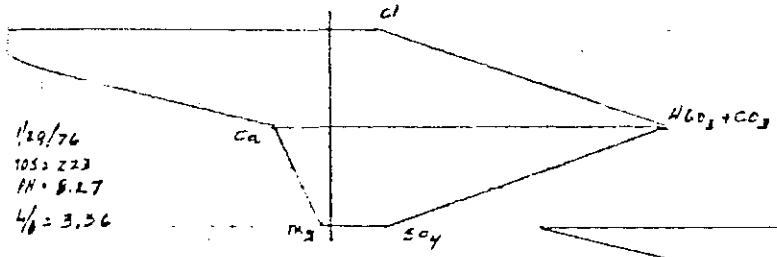
11/2/75
TDS: 200
pH: 8.11
Li/B = 1.96



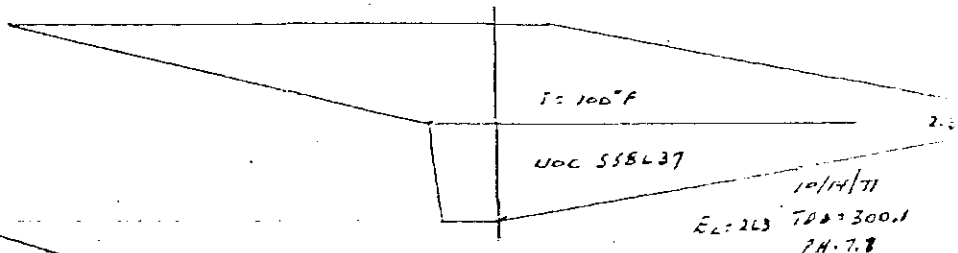
1/8/75
TDS: 236
pH: 7.99
Li/B: 0.948



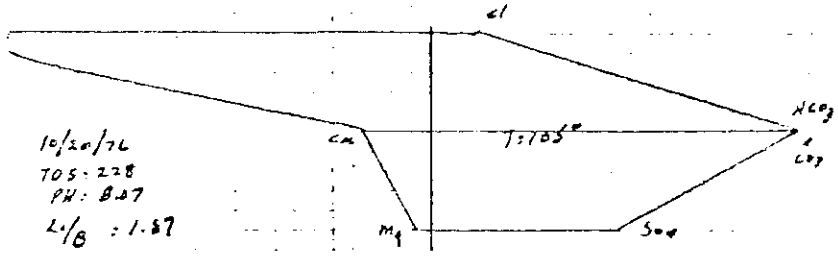
4/18/76
TDS = 215
pH 8.30
Li/B = 1.90



1/29/76
TDS: 223
pH = 8.27
Li/B = 3.56



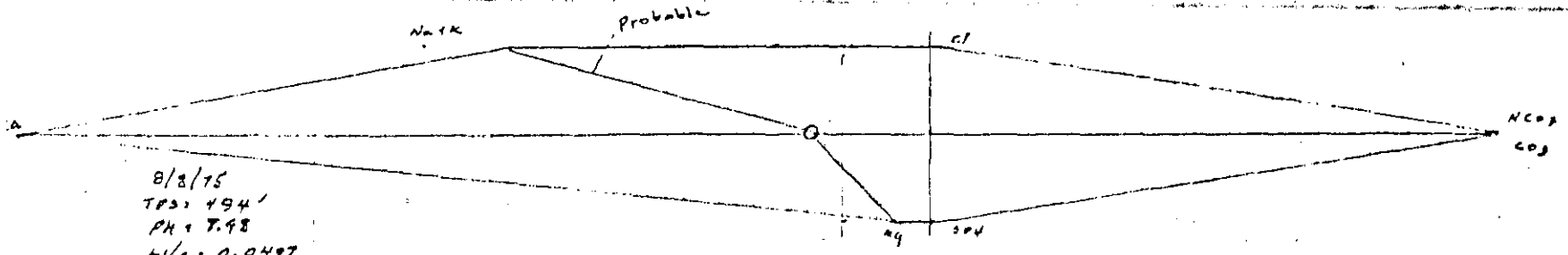
10/14/71
EC: 263 TDS = 300.1
pH = 7.8



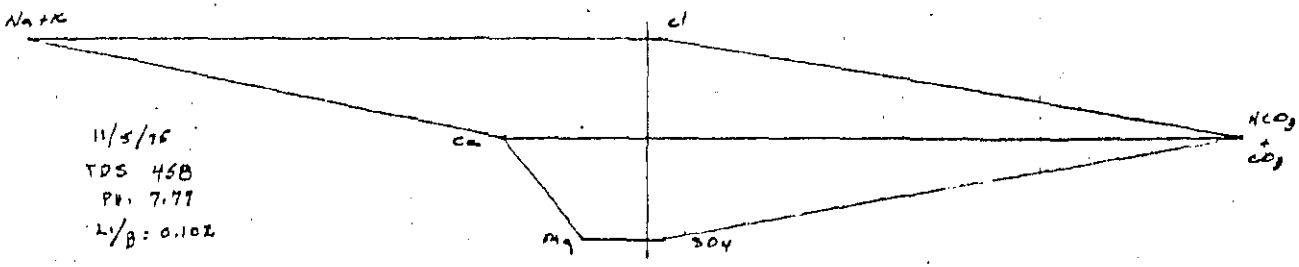
10/20/76
TDS: 228
pH: 8.07
Li/B = 1.87

T18N R3E Sec 17, SWSW

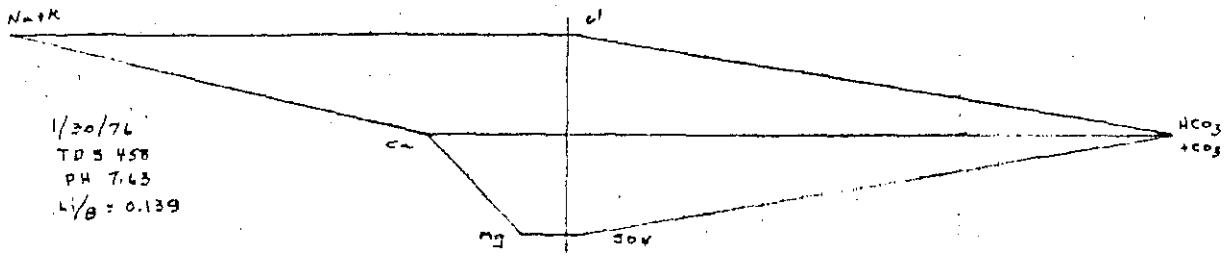
#13R (ALL)



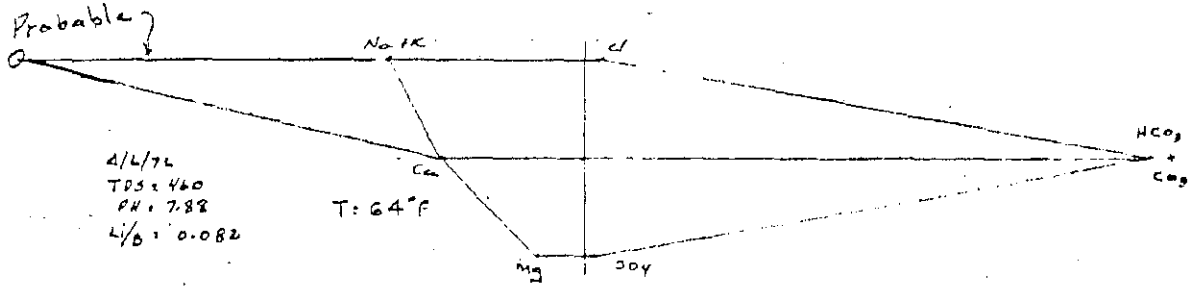
8/8/75
TDS: 494'
PH: 7.48
Li/B: 0.0497



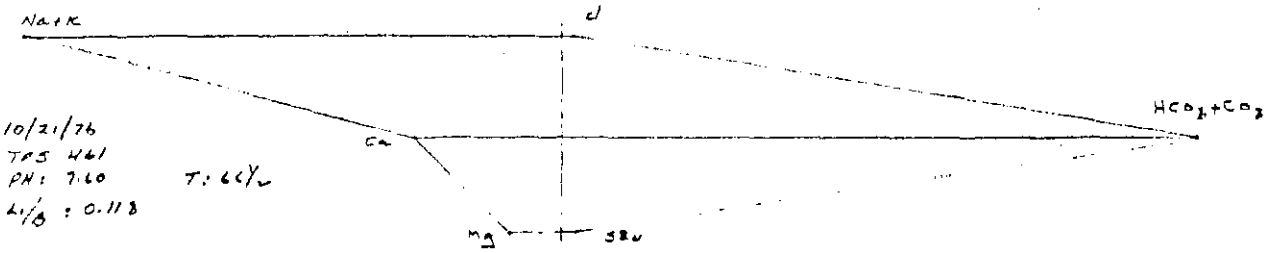
11/5/75
TDS 458
PH: 7.77
Li/B: 0.102



1/30/76
TDS 458
PH 7.63
Li/B: 0.139

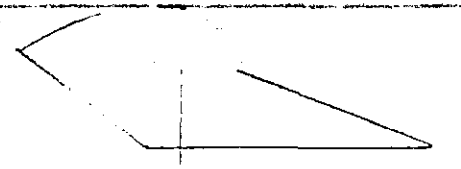


4/6/76
TDS: 460
PH: 7.88
Li/B: 0.082
T: 64°F



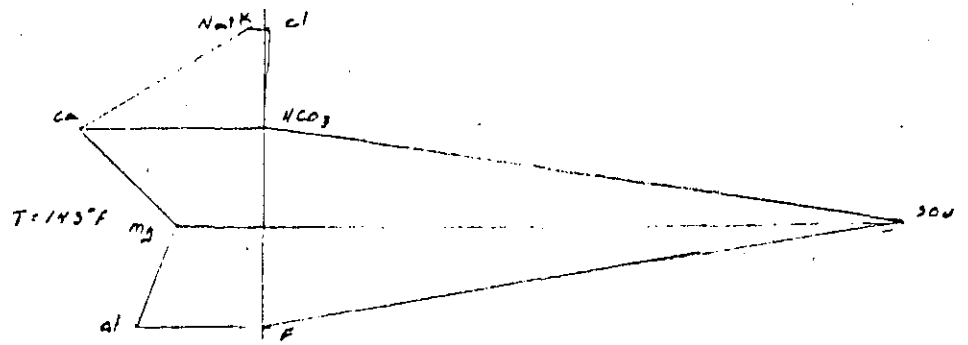
10/21/76
TDS 461
PH: 7.60
Li/B: 0.118
T: 66°F

8/31/49
TDS: 947
Ec: 1270
PH: 8.1

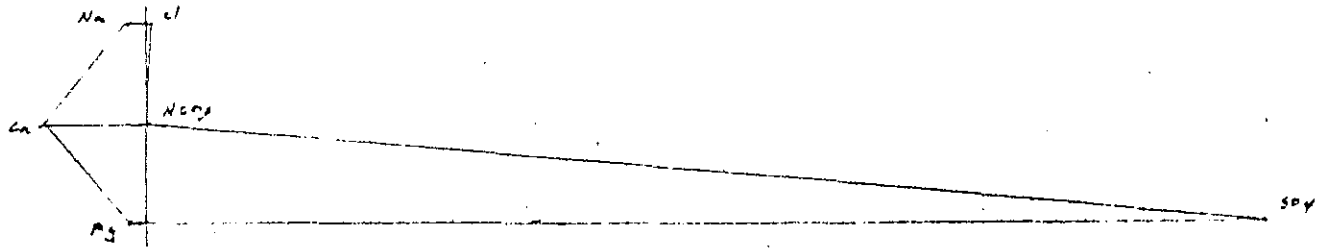


8/31/49
TDS: 2160
Ec: 4570
PH: 1.9

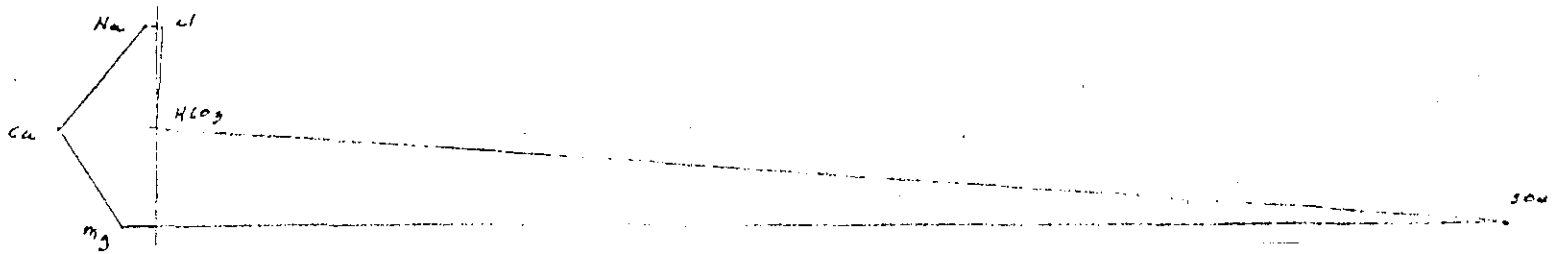
Tiraimar data.



8/31/49
TDS: 2740
Ec: 8510
PH: 1.6



8/31/49
TDS: 5160
Ec: 12,700
PH: 1.4

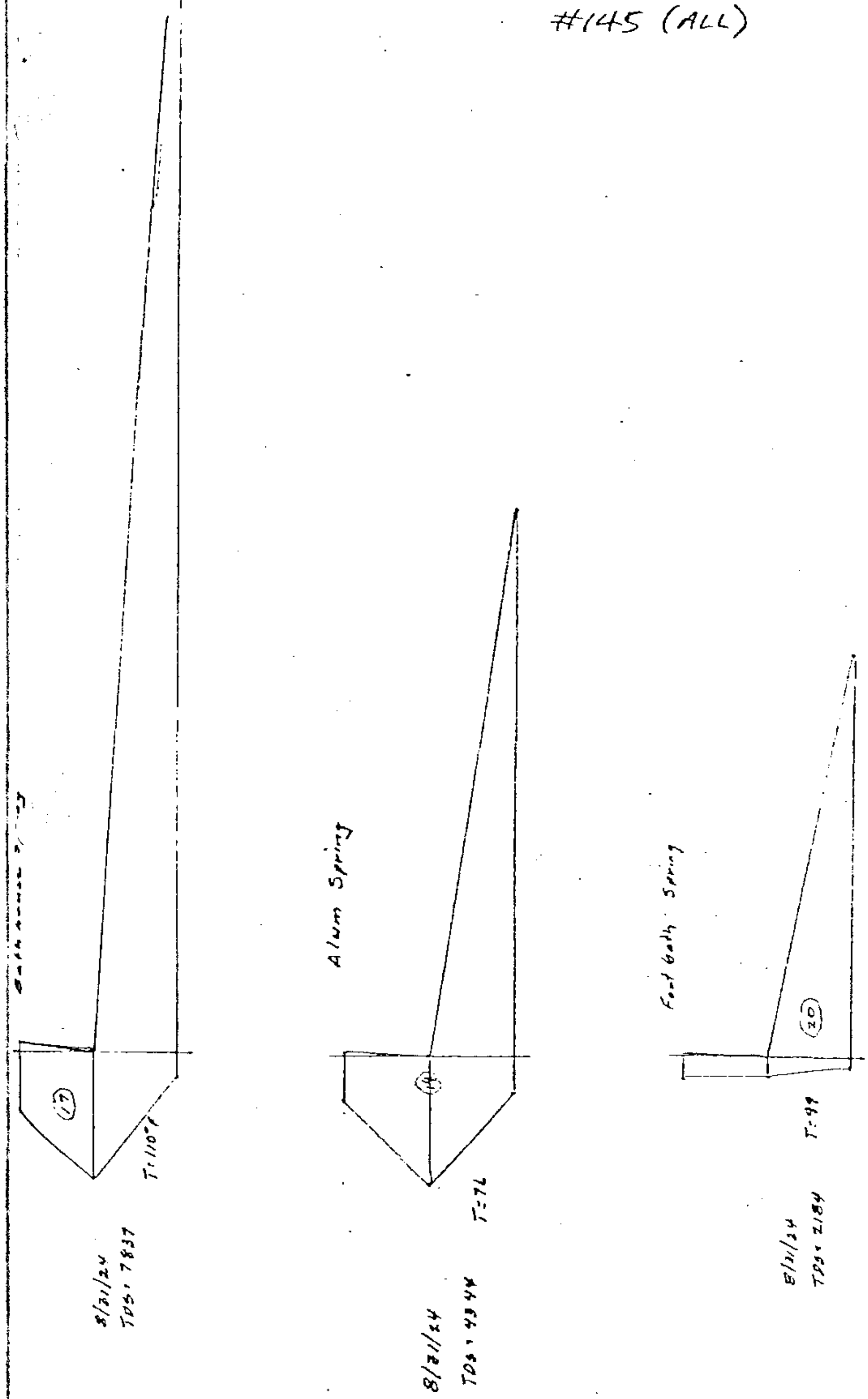


#145 (ALL)

(C)

#145 (ALL)

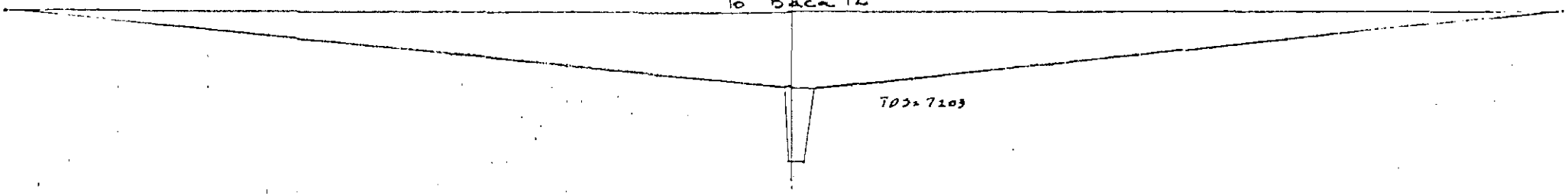
(C1)



R = injection Fluid.

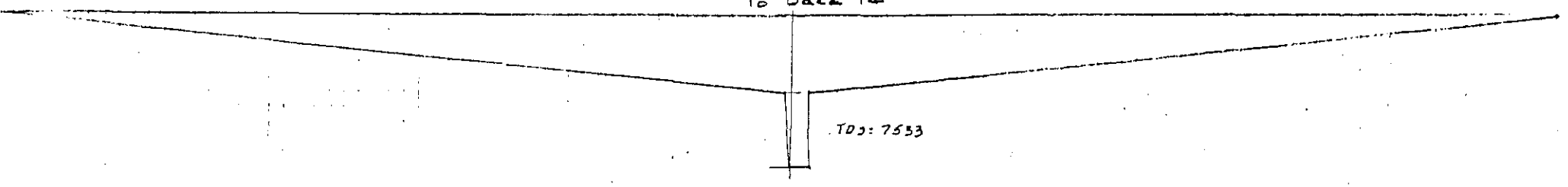
#152

To Baca 12



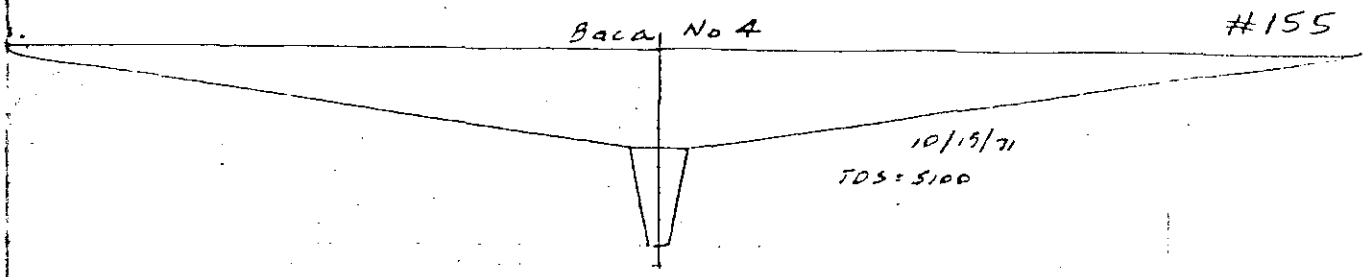
#151A

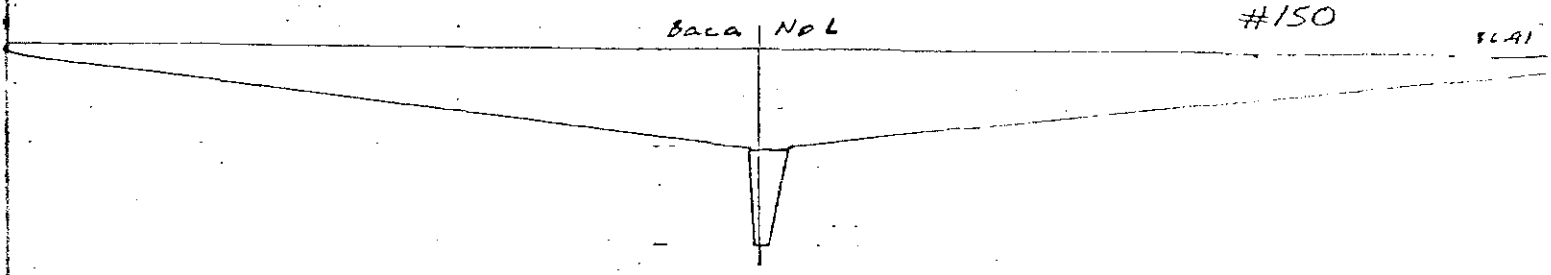
To Baca 14



Scale 1" = 20 meq/l

Fluid Production

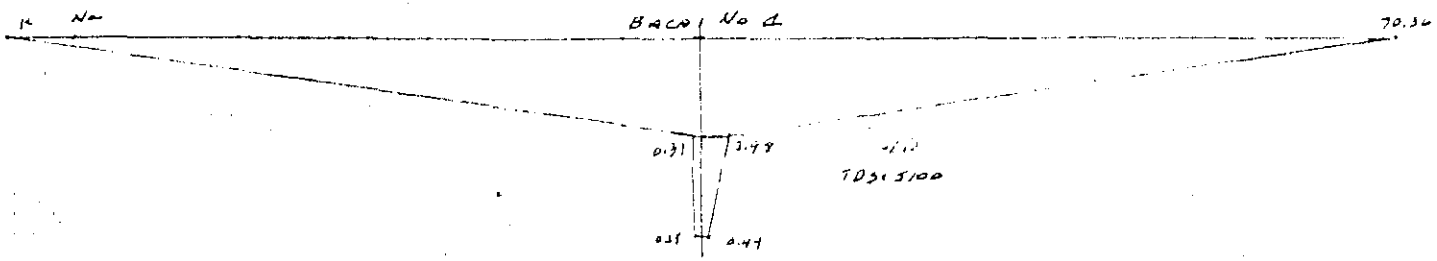




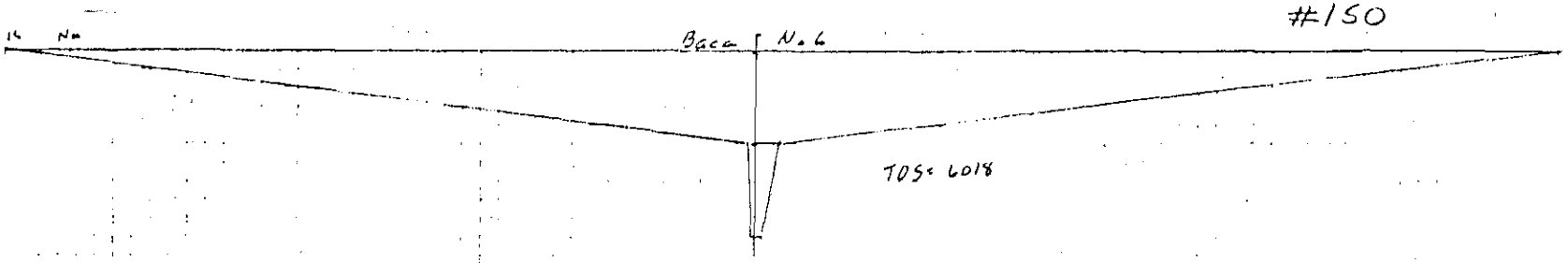
FLUID PRODUCTION

Scale 1": 20 mg/l

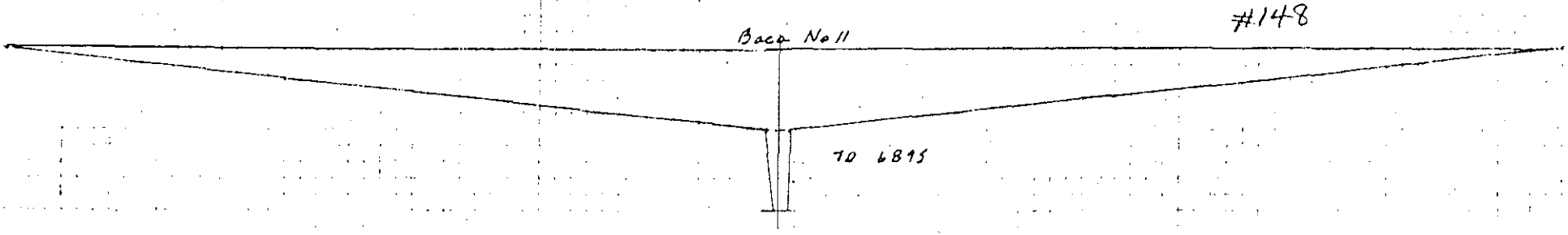
#155



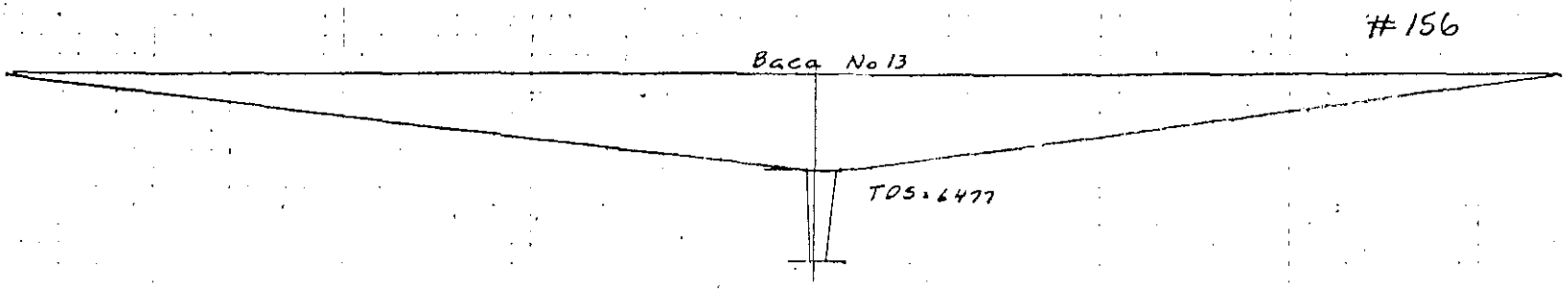
#150



#148



#156

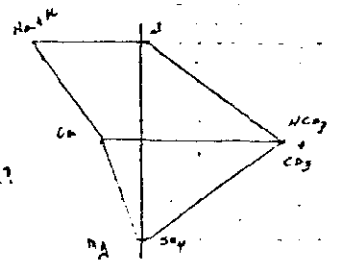


Dunnigan - Owner
T 19 N R 5E Sec 19, 134

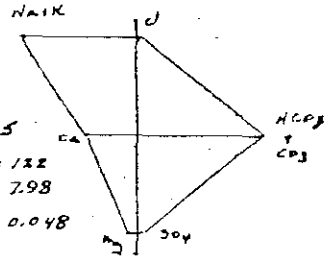
#168 (ALL)

Scale 1" = 1.0 meq/l.

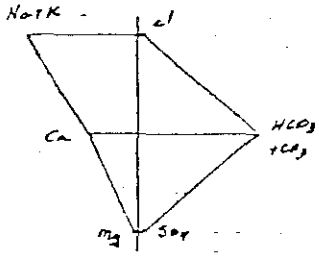
A3



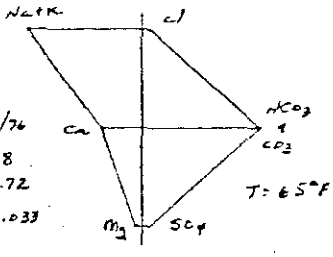
9/25/75
TDS: 164
pH: 7.70
Li/B: 0.364



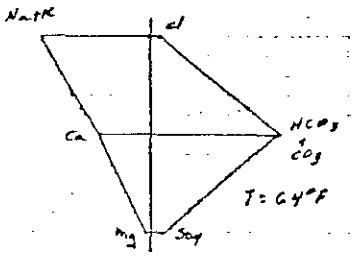
11/6/75
TDS: 122
pH: 7.98
Li/B: 0.048



11/30/76
TDS: 132
pH 8.11
Li/B: 0.036



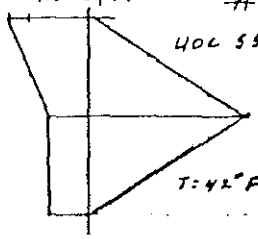
4/22/76
TDS: 118
pH: 7.72
Li/B: 0.033
T: 65°F



8/22/76
TDS: 129
pH 7.96
Li/B: 0.032
T: 64°F

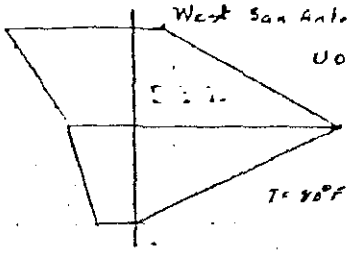
1" = 1.0 meq/l

West Medio Spr. #172



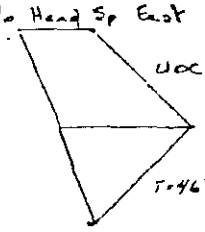
10/15/71
TDS: 111.2
Ec: 77
pH: 7.7

West San Antonio #214



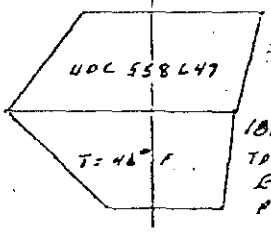
10/15/71
TDS: 167.7
Ec: 94
PH: 8.0

Redondo Head Sp East #158



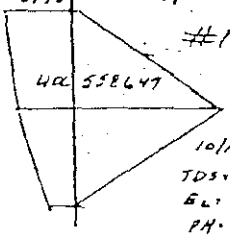
10/15/71
TDS: 50.3
Ec: 69
PH: 7.0

West Weathers Cr #165



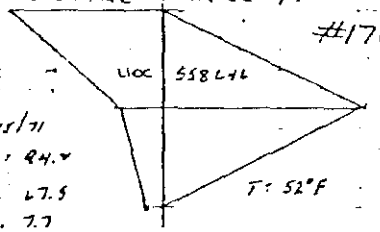
10/15/71
TDS: 108
Ec: 132
PH: 7.0

Cerro Pinon Spr #160



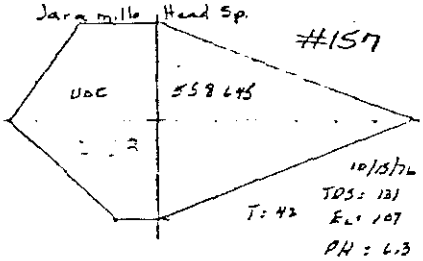
10/15/71
TDS: 89
Ec: 88
PH: 7.0
T: 44°F

Valle Grande Entrance Spr #176



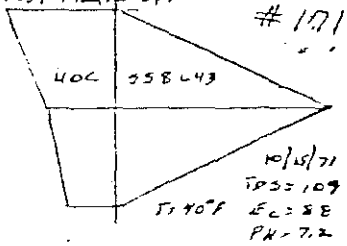
10/15/71
T: 44 RH: 47
47.5
7.7

Jaramillo Head Sp. #157



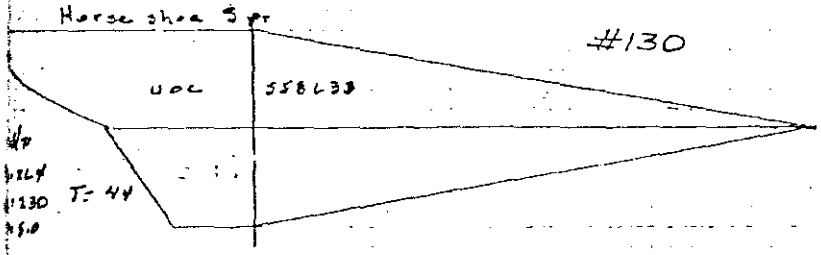
10/15/71
TDS: 131
Ec: 107
PH: 6.3

West Medio Spr. #171

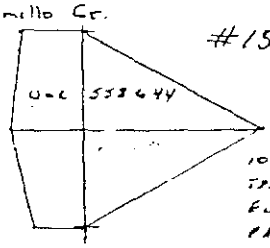


10/15/71
TDS: 109
Ec: 88
PH: 7.2

Horse shoe Spr #130

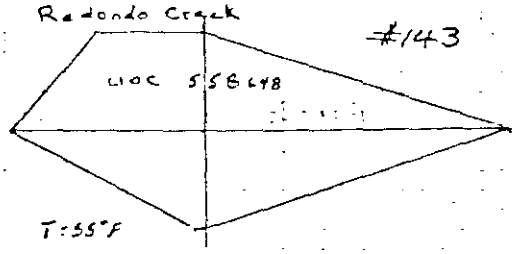


Jarmillo Cr. #159

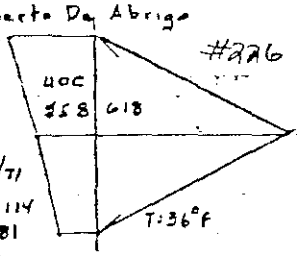


10/15/71
TDS 94
Ec 67
PH: 7.5

Redondo Creek #143

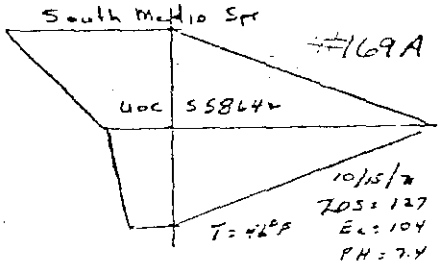


Puerto De Abrigo #226



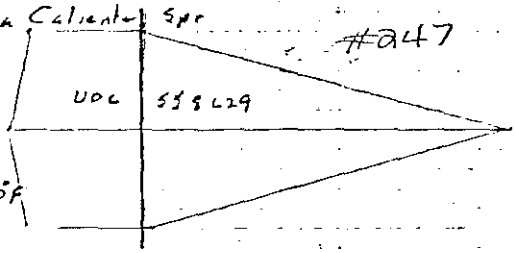
10/15/71
TDS: 114
Ec: 81
PH: 7.0

South Medio Spr #169A

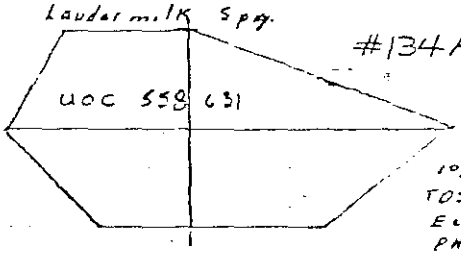


10/15/71
TDS: 127
Ec: 104
PH: 7.4

Agua Caliente Spr #247



Laudermilk Spg. #134A

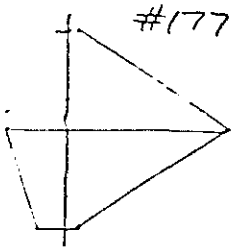


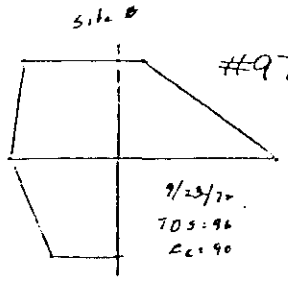
10/15/71
TDS 209
Ec: 180
PH: 7.6
T: 48°F

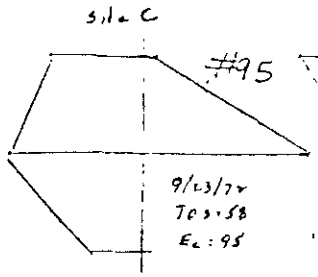
EAST FORK JEMEZ RIVER

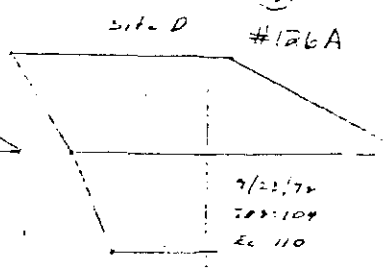
Scale 1" = 10' = 3.1 m

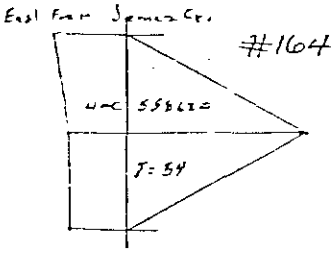
(A2)



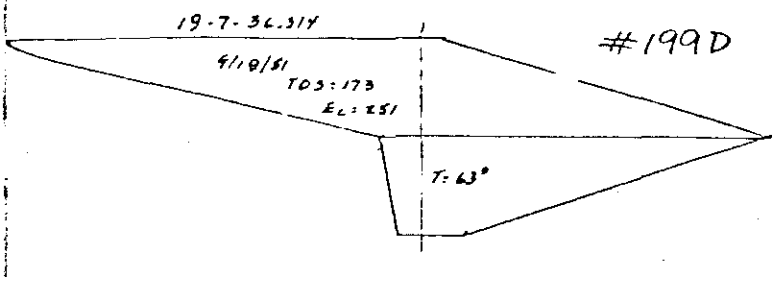


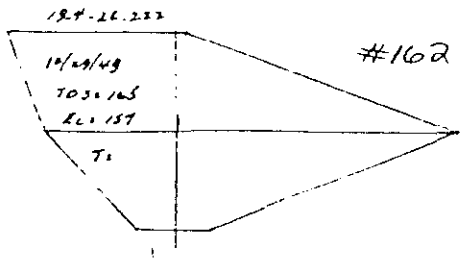


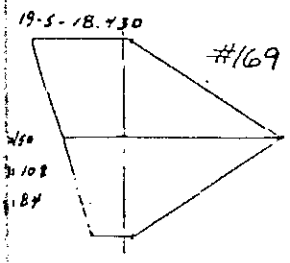


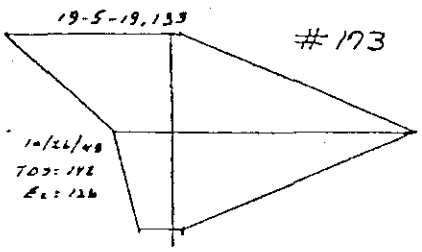


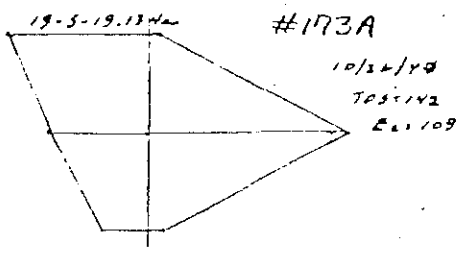
1" = 1.0 mi

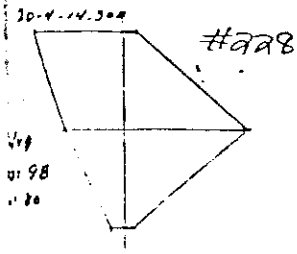

19-7-36.31Y
#199D
4/10/51
TDS: 173
EC: 251
T: 63°

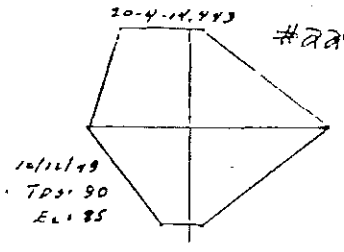

18Y-26.232
#162
10/29/49
TDS: 165
EC: 159
T:

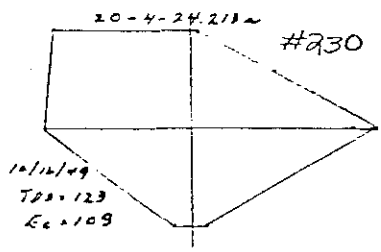

19-5-18.430
#169
4/50
108
184

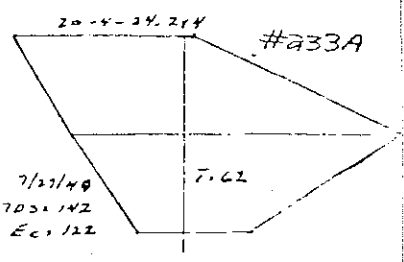

19-5-19.133
#173
10/22/49
TDS: 192
EC: 136

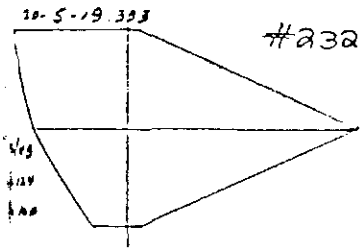

19-5-19.13Wa
#173A
10/22/49
TDS: 142
EC: 109

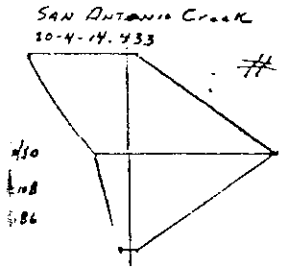

20-4-14.304
#228
4/49
98
80


20-4-14.443
#229
10/12/49
TDS: 90
EC: 85


20-4-24.213a
#230
10/12/49
TDS: 123
EC: 109


20-4-24.214
#233A
7/23/49
TDS: 142
EC: 122
T. 62


20-5-19.333
#232
4/49
114
100


SAN ANTONIO CREEK
20-4-14.433
#227
4/50
108
186

scale 1" = 1 mile

#196

4/1/52
TDS: 156
Ec: 173
T: 82

#198

4/4/52
TDS: 163
Ec: 169
T: 78

#197A

3/29/52
TDS: 223
Ec: 281
T: 85°

#199

5/14/52
TDS: 244
Ec: 383
T: 63°

#195

4/1/52
TDS: 139
Ec: 176
T: 78°

#193

4/7/51
TDS: 142
Ec: 177
T: 79

#199C

5/14/52
TDS: 152
Ec: 200
T: 58

#199B

5/14/52
TDS: 251
Ec: 379
T: 65°

#200A

5/14/52
TDS: 188
Ec: 293
T: 78

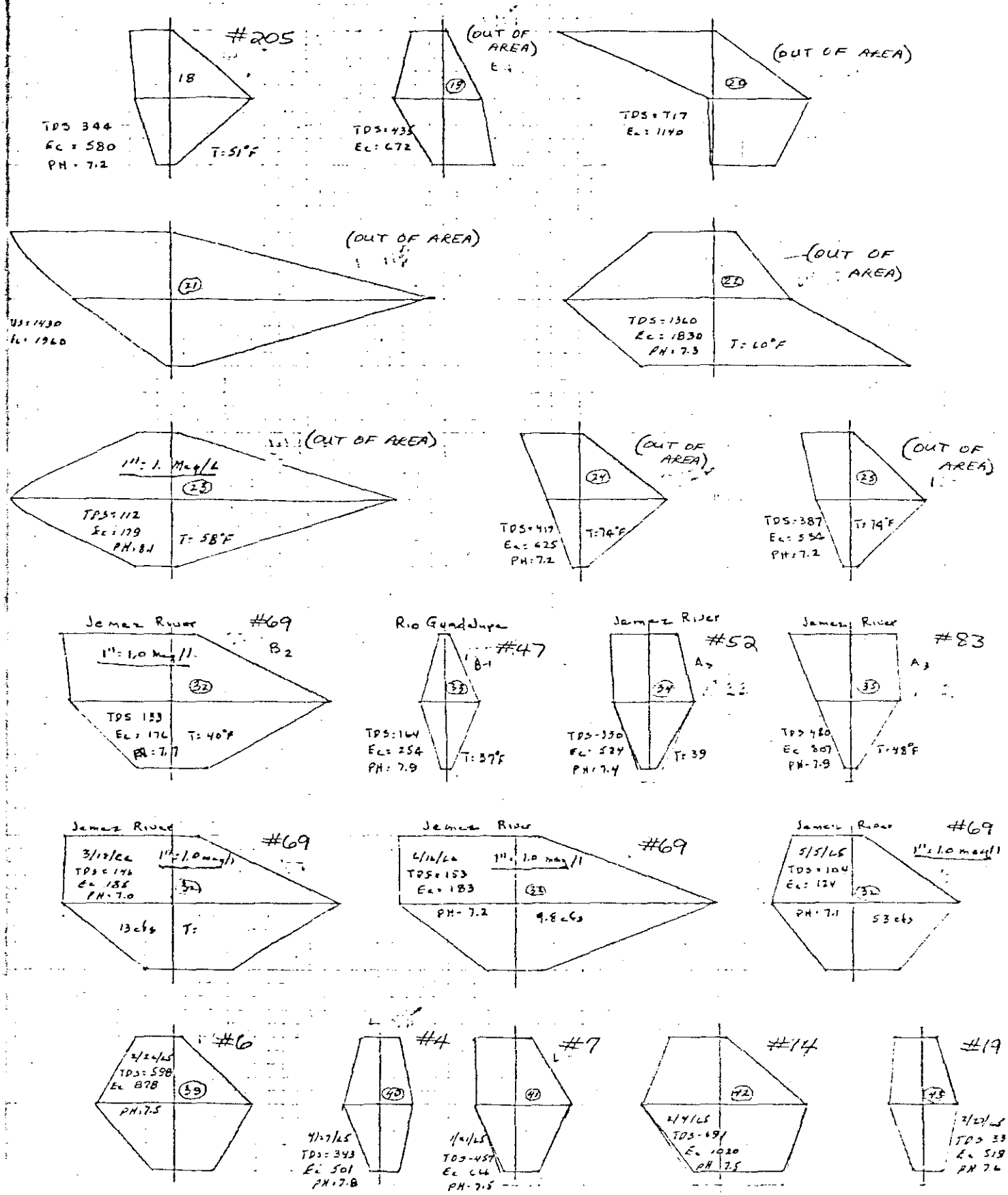
#201

T: 75°

5/14/52
TDS: 125
Ec: 151

#195

5/14/52
TDS: 192
Ec: 254
T: 62°


#205
18
TDS 344
Ec = 580
PH = 7.2
T: 51°F
(OUT OF AREA)
19
TDS: 435
Ec: 672
(OUT OF AREA)
20
TDS = 717
Ec: 1140
(OUT OF AREA)
21
TDS: 1430
Ec: 1960
(OUT OF AREA)
22
TDS: 1360
Ec: 1830
PH: 7.3
T: 60°F
1" = 1. Meq/L
23
TDS: 112
Ec: 179
PH: 8.1
T: 58°F
(OUT OF AREA)
24
TDS: 417
Ec: 625
PH: 7.2
T: 74°F
(OUT OF AREA)
25
TDS: 387
Ec: 554
PH: 7.2
T: 74°F
(OUT OF AREA)
Jemez River
#69
B2
1" = 1.0 Meq/L
32
TDS 153
Ec: 176
PH: 7.7
T: 40°F
Rio Guadalupe
#47
B-1
33
TDS: 164
Ec: 254
PH: 7.9
T: 37°F
Jemez River
#52
A2
34
TDS: 330
Ec: 524
PH: 7.4
T: 39
Jemez River
#83
A3
35
TDS 480
Ec 807
PH: 7.9
T: 48°F
Jemez River
#69
3/13/66
TDS = 176
Ec: 185
PH: 7.0
1" = 1.0 meq/l
34
13 eq's
T:
Jemez River
#69
6/12/66
TDS = 153
Ec: 183
1" = 1.0 meq/l
33
PH: 7.2
9.8 eq's
Jemez River
#69
5/5/66
TDS = 104
Ec: 124
1" = 1.0 meq/l
32
PH: 7.1
5.3 eq's
#6
3/24/66
TDS: 598
Ec 878
39
PH: 7.5
#4
40
4/27/66
TDS: 343
Ec 501
PH: 7.8
#7
41
1/21/66
TDS: 457
Ec 644
PH: 7.5
#14
42
2/4/66
TDS: 691
Ec 1020
PH 7.5
#19
43
3/23/66
TDS 330
Ec 518
PH 7.6

Misc. Springs

#208

B_{22}

T = 57°F

#212

f_{23}

1/17/73
TDS = 114
Ec = 90
PH = 7.8

T = 48°F

#118

h_{25}

T = 43°

1/28/73
TDS = 188
Ec = 120
PH = 6.7

#209

b_{28}

T = 48°F

9/13/73
TDS = 150
Ec = 105
PH = 7.3

#110

c_{29}

T = 55°F

9/13/73
TDS = 130
Ec = 105
PH = 7.3

#113

e_{31}

8/19/73
TDS = 143
Ec = 140
PH = 7.8

Sino Spring

#70

S6-4

TDS = 188
Ec = 135
PH = 7.4

Aqua Durma

#74

S-L

S5-5

T = 59

TDS = 178
Ec = 130
PH = 7.8

Near Battleship Rock

Scale 1" = 10 ma/Lt.

Trainer (8)

#114

19-3-3v

8/15/73
TDS = 1130
Ec = 1880
PH = 6.8

T = 64°

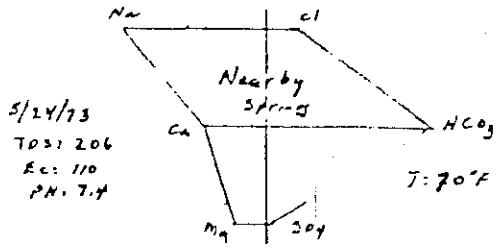
see Ghost ranch book

SAN MATEO ... AREA

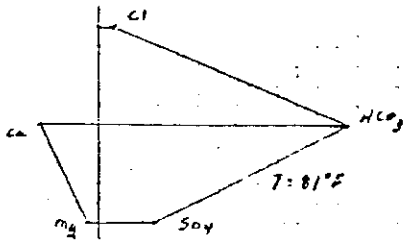
T 20N R 3E Sec 29, 12A

1" = 1.0 meq/l

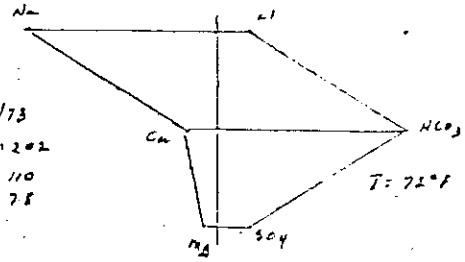
#213 (ALL)



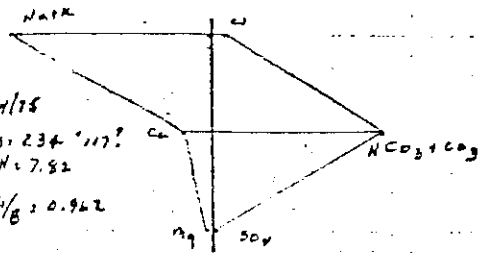
5/24/73
TDS: 206
Ec: 110
PH: 7.4
T: 70°F



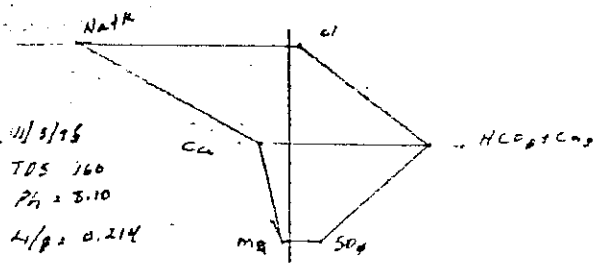
7/23/73
TDS: 199
Ec: 114
T: 81°F



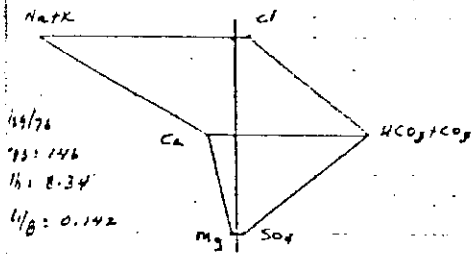
3/24/73
TDS: 202
Ec: 110
PH: 7.8
T: 72°F



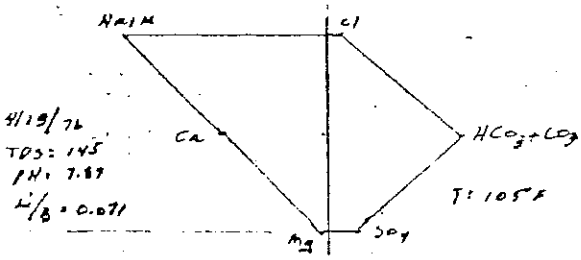
9/17/75
TDS: 234 °117?
PH: 7.82
Li/B: 0.962



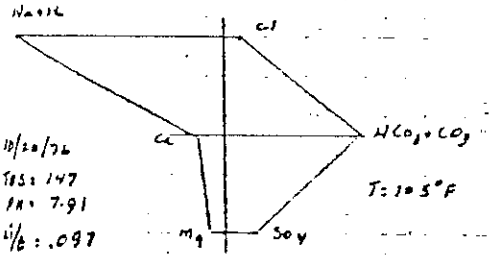
11/3/75
TDS 160
PH: 8.10
Li/B: 0.214



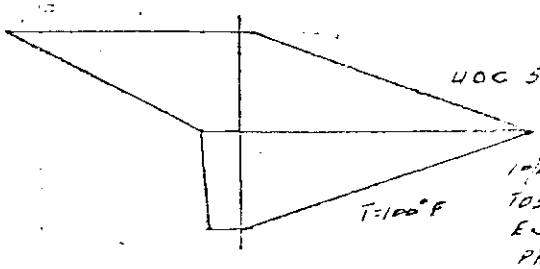
4/9/76
TDS: 146
PH: 8.34
Li/B: 0.142



4/19/76
TDS: 145
PH: 7.87
Li/B: 0.071
T: 105°F



10/20/76
TDS: 147
PH: 7.91
Li/B: .097
T: 105°F

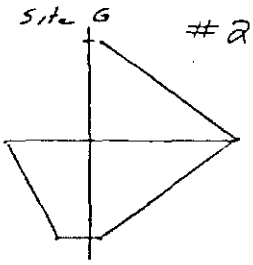


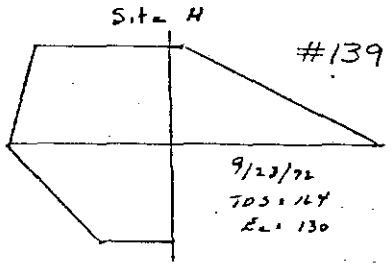
T: 100°F

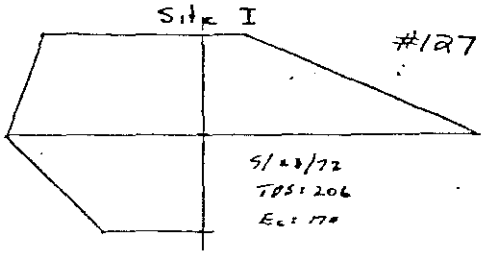
10/15/71
TDS: 186.2
Ec: 119
PH: 8.2

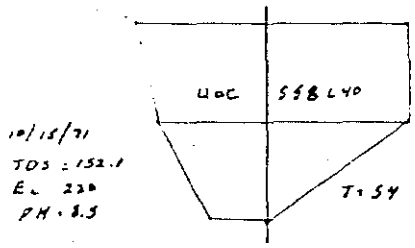
San Antonio Creek

Scale 1" = 1.0 mg/l





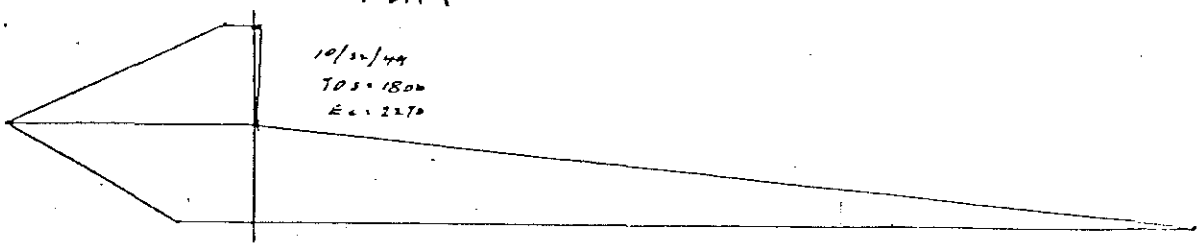




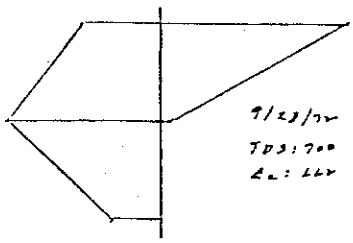
SULPHUR CREEK

Scale 1": 5 meq/Lt.

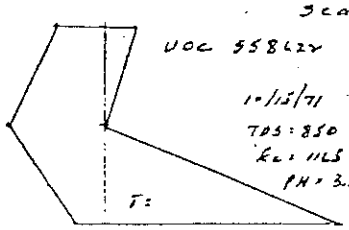
Site E #219



Site F #140



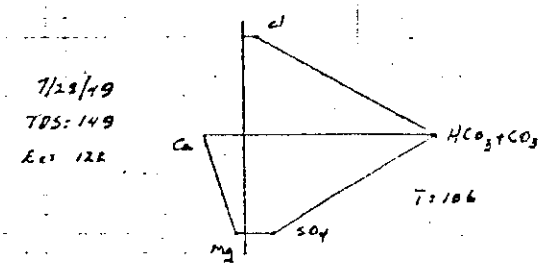
Scale 1": 10 meq/l



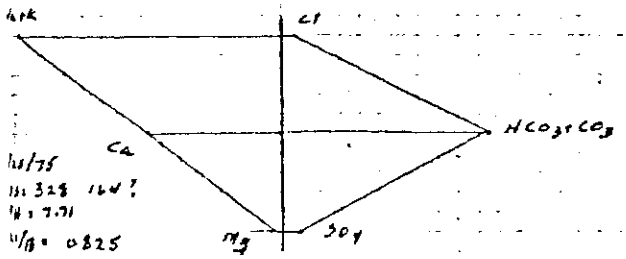
T 20 N R 4E Sec 18.111

1" = 1.0 meq/l

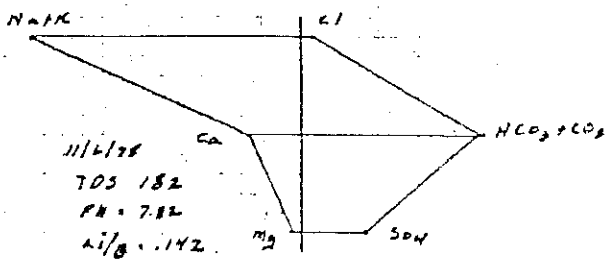
#224 (ALL)



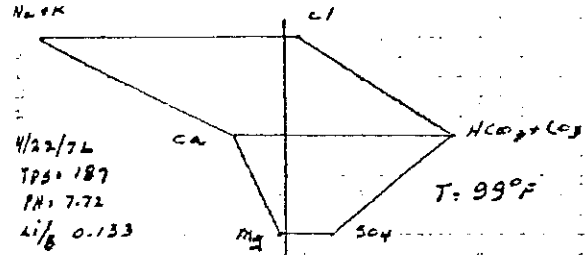
7/23/79
TDS: 149
Ec: 122
T: 106



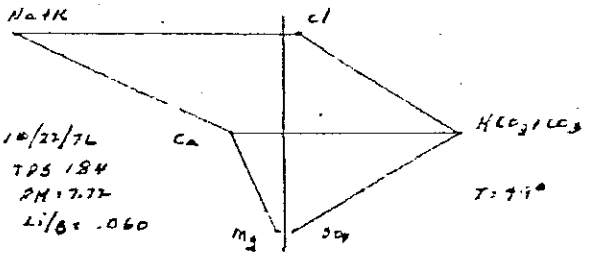
11/5/75
TDS: 328 164?
PH: 7.71
Li/B: 0825



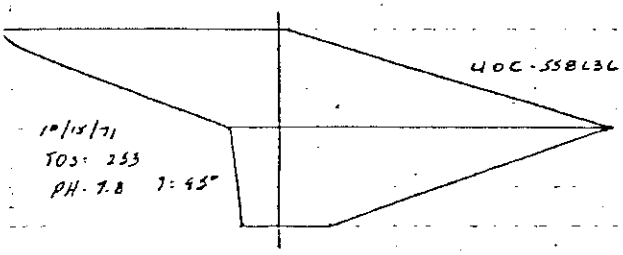
11/6/78
TDS 182
PH: 7.82
Li/B: .142



4/22/76
TDS: 187
PH: 7.72
Li/B 0.133
T: 99°F



10/22/76
TDS 184
PH: 7.72
Li/B: .060
T: 71°

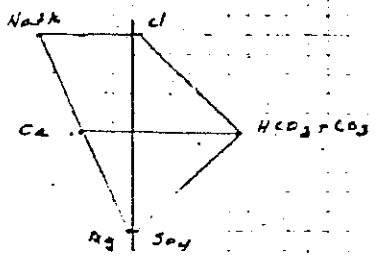


10/15/71
TDS: 253
PH. 7.8 T: 45°

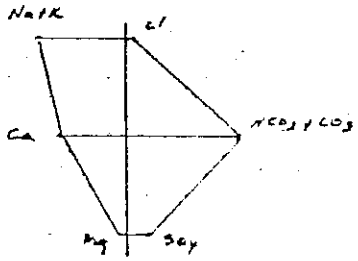
T 20N R 4E Sec 24, 21

#330A (ALL)

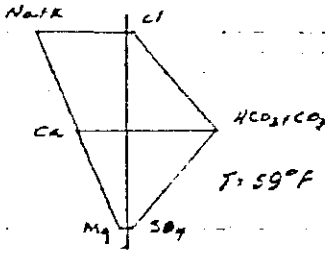
Scale 10x
1" = 1.0 meq/l



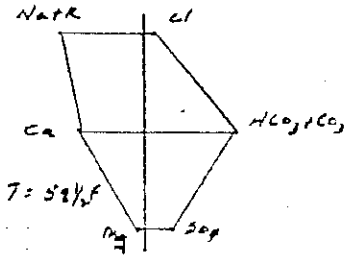
9/4/75
TDS: 160 ppm
pH: 7.47
Li/B = 0.113



11/4/75
TDS = 78
pH: 8.18
Li/B .091



11/22/76
TDS: 85
pH 7.76
Li/B = 0.071

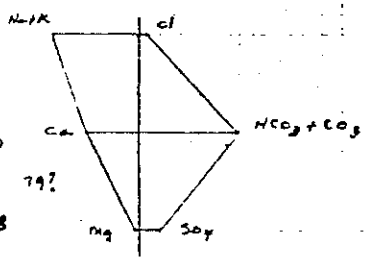


10/22/76
TDS: 106
pH = 8.01
Li/B = 0.39

T 20N R 5E Sec 19, 33B

1" = 1.0 meq/l

#232A (ALL)

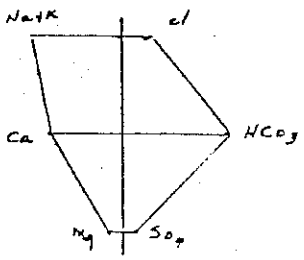


4/75

pH = 7.50

TDS = 158 79?

Li/B = .38

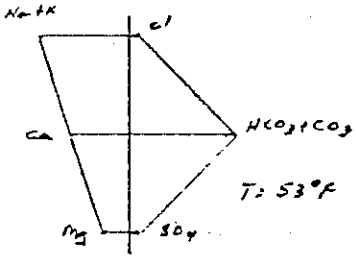


11/6/75

pH 7.32

TDS = 88

Li/B = 0.143



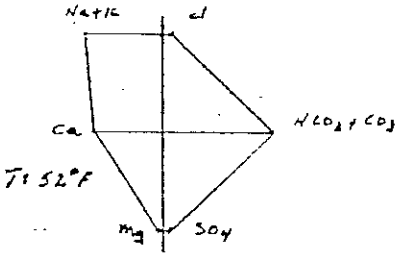
T = 53°F

12/76

Li = 110

B = 8.10

Li/B = 0.13



T = 52°F

10/22/76

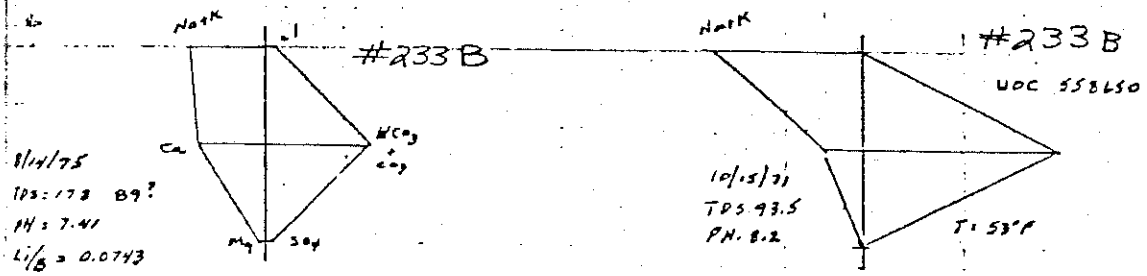
TDS = 103

PH = 7.47

Li/B = 0.36

35-57-27 -DDC-28-45

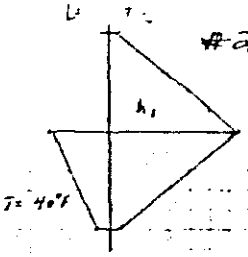
1": 1.0 meq/l.h



Thiele Wells

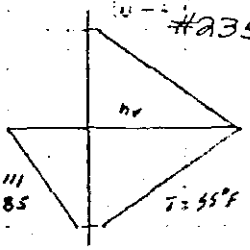
Scale 1" = 1.0 Megohms

#235A



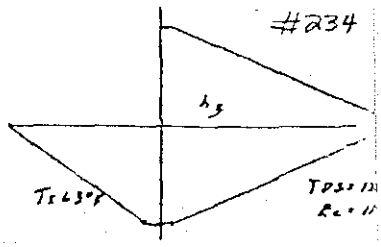
9/6/49
TDS: 103
R_c: 80
T: 40°F

#235



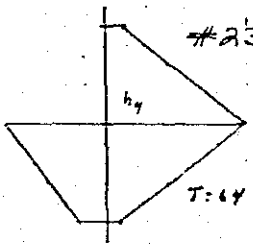
TDS: 111
R_c: 85
T: 55°F

#234



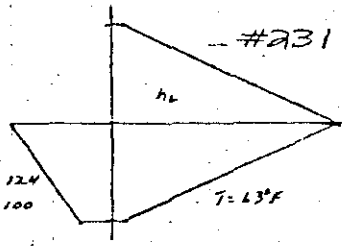
T: 63°F
TDS: 11
R_c: 11

#233



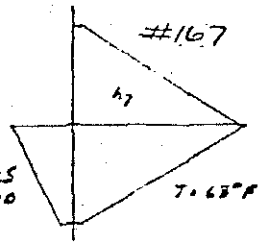
TDS: 90
R_c: 85
T: 64

#231



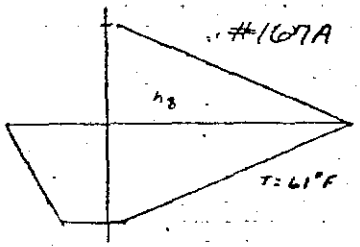
TDS: 124
R_c: 100
T: 63°F

#167



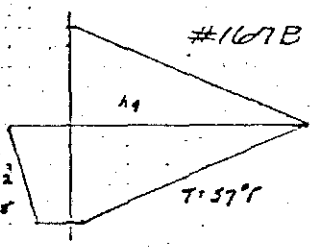
TDS: 125
R_c: 90
T: 68°F

#167A



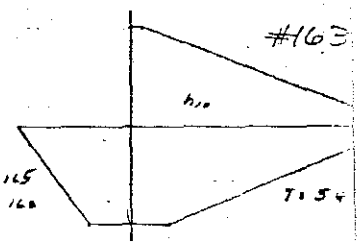
TDS: 192
R_c: 110
T: 61°F

#167B



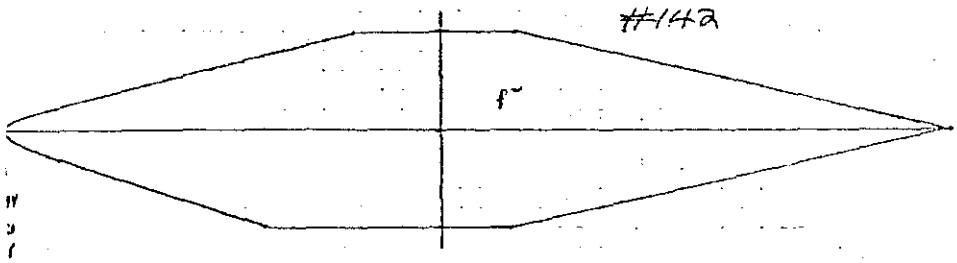
TDS: 142
R_c: 128
T: 57°F

#163



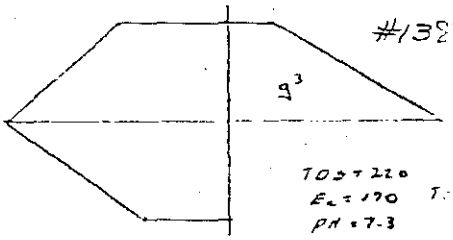
T: 165
R_c: 160
T: 5

#142



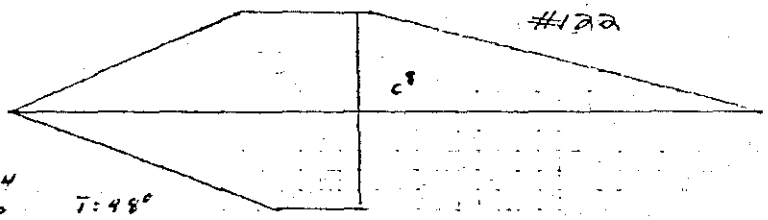
11
3
1

#138



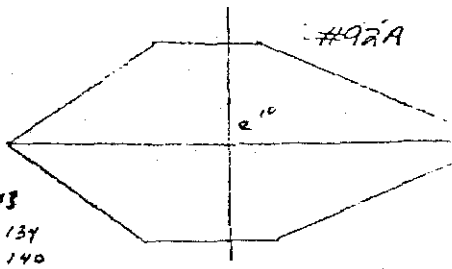
TDS: 220
R_c: 170
pH: 7-3

#122



1/73
TDS: 204
R_c: 220
pH: 7.5
T: 48°

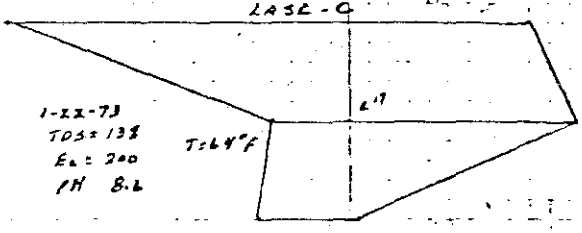
#92A



5/8/73
TDS: 134
R_c: 140
pH: 7.1

LASL-9

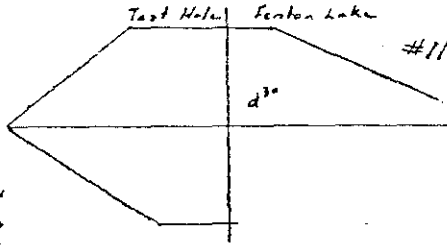
#211



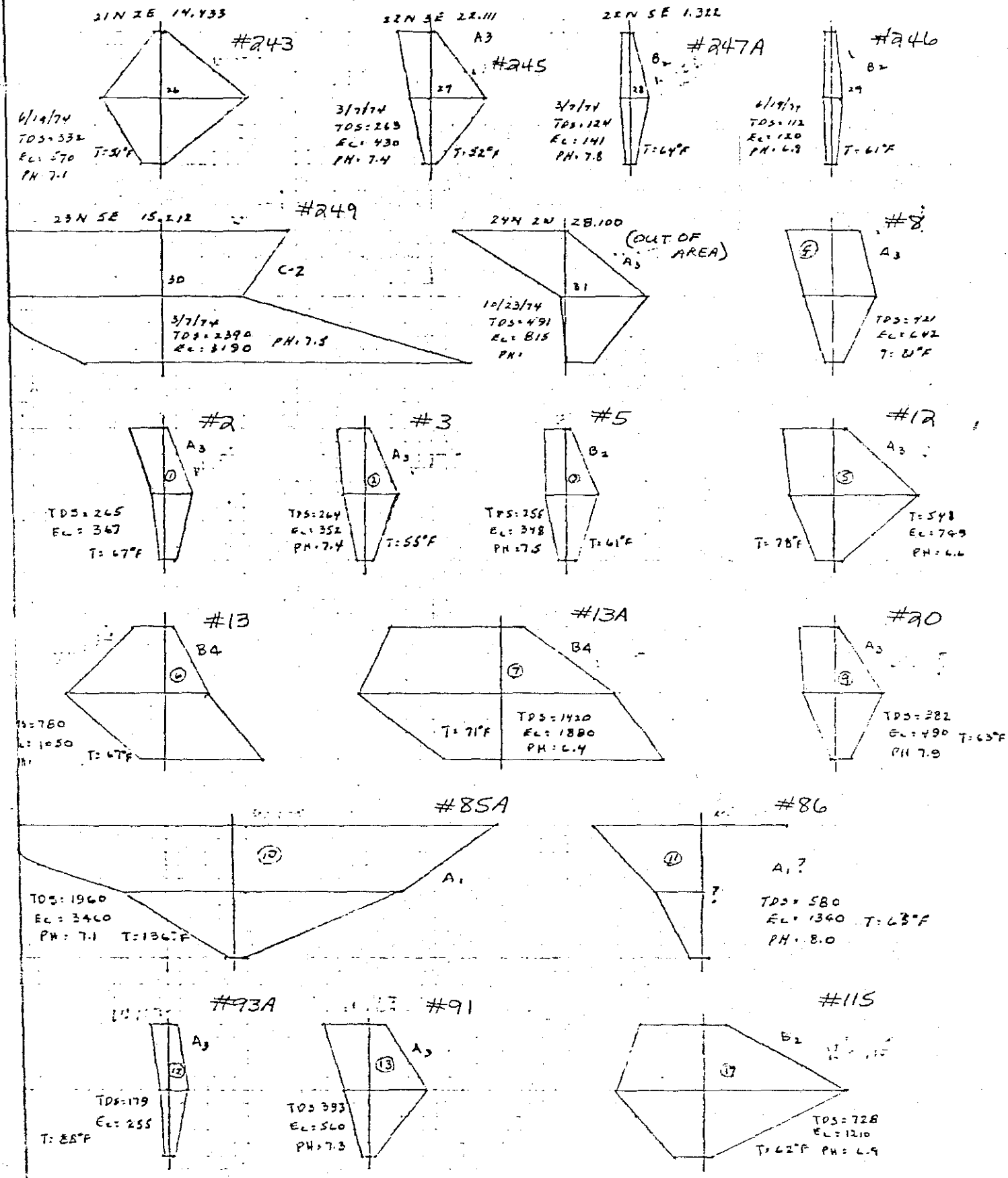
1-22-73
TDS: 138
R_c: 200
pH 8.6
T: 64°F

Test Hole Fenton Lake

#11



10/9/73
TDS: 164
R_c: 160
pH: 7.0


21N 2E 14.933
#243
6/14/74
TDS=332
EC=570
PH 7.1
T=51°F
22N 3E 22.111
A3
#245
3/7/74
TDS=263
EC=430
PH=7.4
T=52°F
22N 5E 1.322
#247A
3/7/74
TDS=124
EC=141
PH=7.8
T=64°F
#246
6/19/74
TDS=112
EC=120
PH=6.9
T=61°F
23N 5E 15.212
#249
C-2
3/7/74
TDS=2390
EC=3190
PH=7.5
24N 2W 28.100
(OUT OF AREA)
10/23/74
TDS=491
EC=815
#8
A3
TDS=721
EC=642
T=67°F
#2
A3
TDS=265
EC=367
T=67°F
#3
A3
TDS=264
EC=352
PH=7.4
T=55°F
#5
B2
TDS=258
EC=348
PH=7.5
T=61°F
#12
A3
T=78°F
T=548
EC=749
PH=6.6
#13
B4
TDS=780
EC=1050
T=67°F
#13A
B4
T=71°F
TDS=1420
EC=1880
PH=6.4
#20
A3
TDS=282
EC=490
T=63°F
PH 7.9
#85A
A1
TDS=1960
EC=3460
PH=7.1
T=136°F
#86
A1?
TDS=580
EC=1340
T=63°F
PH=8.0
#93A
A3
TDS=179
EC=255
T=65°F
#91
A3
TDS 393
EC=560
PH=7.3
#115
B2
TDS=728
EC=1210
T=62°F
PH=6.9