# HAWAII GEOTHERMAL RESOURCE

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## Assessment Program

DIRECT HEAT RESOURCE ASSESSMENT; PHASE II

YEAR I

FINAL REPORT

FEBRUARY 1, 1979 TO JANUARY 31, 1980



Hawaii Institute of Geophysics

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FINAL REPORT

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#### Abstract

During 1979 reconnaissance field surveys were conducted on the islands of Hawaii, Maui, and Oahu with the objective of confirming groundwater chemical data and geophysical data compiled during the preliminary regional assessment of Phase I of the Direct Heat Resource Assessment Program.

The exploration techniques applied include (1) groundwater chemistry, (2) mercury-radon surveys, (3) isotopic composition of groundwaters, (4) time domain electromagnetics, and (5) Schlumberger resistivity surveys. The results of these surveys can be classified as follows: (1) Hawaii: Kailua-Kona, strong geochemical anomalies; Kawaihae, strong geophysical anomalies, moderate to strong geochemical anomalies; Hualalai northwest rift, weak geochemical and moderate geophysical anomalies; South Point, moderate to weak geophysical anomalies; Hualalai southeast rift, weak geophysical anomalies; Keaau, weak geophysical and geochemical anomalies; (2) Maui: Haiku-Paia, strong geochemical anomalies; Iuhaina, weak geochemical and geophysical anomlies; (3) Oahu: Lualualei, moderate to strong geochemical and geophysical anomlies; Waimanalo-Maunawili, insufficient data.

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#### I. INTRODUCTION

The Geothermal Resource Assessment Program at the Hawaii Institute of Geophysics is presently conducting a geothermal reconnaissance study throughout the State of Hawaii. The objectives of this exploration program, carried out under the sponsorship of the U.S. Department of Energy Western States Cooperative Direct Heat Resources Assessment Program, is to identify areas within the State which may have sufficient geothermal potential to justify their development as a source of direct or industrial process heat.

The initial phase of the assessment program was oriented toward the compilation of existing geological, geochemical and geophysical data on the major islands in the Hawaiian chain. Upon completion of the data gathering work, twenty separate areas in Hawaii were identified as having potential for the existence of a geothermal resource (Thomas et al., 1979).

The areas identified are presented in Table 1 and their locations in Figure 1. Each area was given a rating according to a preliminary assessment of its geothermal potential and to the likelihood of its being developed. The former assessment was made on the basis of the magnitude and areal extent of the various geochemical and geophysical anomalies identified as well as the age of most recent volcanism; the assessment of the potential for development was made on the basis of an area's proximity to population centers and industrial users as well as the probability for favorable or adverse zoning regulations.

Subsequent to the initial regional assessment, the current investigation has been directed toward verification of the preliminary data set compiled during Phase I and toward area-specific field exploration of several of the more promising of the identified potential geothermal sites. The targets of

## Table 1

## Summary of Potential of Survey Areas<sup>†</sup>

Location		High Temp. Resource*	Low Temp. Resource*	Probability for Development*				
Hawai	i							
1.	Puna (S.E. Rift, Kilauea)	1	1	3				
2.	Ka'u (S.W. Rift, Kilauea)	2	1	5 7				
3.	South Point	3	2	3				
4.	Hualalai-North Kona	5	- 3	1				
5.	Kawaihae	5	3	1				
6.	Keaau	6	4	1				
7.	Kohala	7	5	8				
Maui								
8.	Haleakala-Southwest Pift	<b>2</b> ·	0	-				
9	Haleakala-Fact Rift	2	2	5				
10.	Haiku-Paia	2	2	6				
11	Lahaina-Kaananali	5	2	3				
12.	Olowalu-Ilkumehama	4	2	1				
13	Honokawai	5	L (	2				
	nonokawat	J	4	2				
0ahu								
14.	Waimanalo	7	6	1				
15.	Lualualei	8	4	⊥ 1				
16.	Honolulu Volcanic Series	8	7	2				
17.	Haleiwa	9	7	2 3				
18.	Laie	9	7	3				
19.	Pearl Harbor	10	9	1				
			-	-				
Kauai								
20.	Post erosional volcanic serie	s 10	8	5				

This summary is based on data available up to January, 1980. \*1 = highest potential; 10 = lowest potential

Figure 1



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this phase of work were chosen on the basis of the potential for the existence of a resource and potential for near term development; the areas selected for immediate exploration are located on Hawaii, where the highest potential for thermal resources exists, as well as on Maui and Oahu, where there is currently a greater potential market for geothermal energy.

The field exploration program has attempted to apply a coordinated set of geophysical, geological, and geochemical exploration techniques to each of the chosen survey areas. In addition to confirming the initial Phase I data set, Phase II efforts are also directed toward developing a more complete understanding of the survey areas with which to interpret the identifed geochemical and geophysical anomalies. The techniques found to be most useful in our exploration efforts have been as follows: groundwater geochemistry, soil mercury and radon surveys, isotopic analysis of groundwaters and rainfall, Schlumberger resistivity soundings, and time domain electromagnetic surveys. The areas in which field surveys have been conducted are as follows:

> on Oahu: Lualualei Valley, Waimanalo-Maunawili; on Maui: Lahaina, Olomalu-Ukumehame, Haiku-Paia; on Hawaii: Kawaihae, Hualalai northwest rift, Kailua-Kona,

Keaau, Puna.

The locations of the survey areas are presented in Figures 2, 3, and 4. The area specific exploration work in Lualualei Valley has been completed and is described in Cox et al. (1979). The present interim report details the preliminary geophysical and geochemical surveys which have been completed to January, 1980 on each of the chosen study areas. Further surveys, both in more detail and utilizing other exploration techniques, are currently underway on the most prospective of the above areas.





Location of 1979 Survey Areas: Island of Hawaii

Location of 1979 Survey Areas: Island of Maui



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### Figure 4

#### **II. GEOCHEMICAL EXPLORATION PROGRAM**

The techniques employed in the geochemical exploration program consist of resampling and analysis of surface groundwater supplies, reconnaissance soil mercury and radon surveys, and isotopic analysis of rainfall and groundwaters. A brief discussion of the application of each of these techniques and a discussion of the data acquired for each location is presented. An assessment of the probability for the existence of a geothermal reservoir for each study area is also presented, however, it should be noted that, at this point, our interpretations are preliminary in nature and are subject to revision as continuing exploration work provides more complete data sets for each of the areas under study.

#### Groundwater Chemistry

Chemical analysis of groundwater from drilled wells and coastal springs has played an important role in the current geothermal investigations. The interpretation of groundwater data in terms of geothermal potential utilizes both the absolute ion concentrations (e.g.  $SiO_2$ ) as well as ratios of ions (e.g. Cl/Mg) (Cox and Thomas, 1979). In addition to providing information on geothermal potential, groundwater chemistry can provide considerable insight into the hydrogeology of each of the study areas.

Phase I of the assessment program relied heavily upon existing groundwater chemistry data; during the present stage of the survey, we have resampled many of the wells in each area of interest as well as other water sources for which no data previously existed.

The results of the chemical analyses of groundwaters which have been completed to date are presented in Appendices 1, 2, and 3. Although we do

not yet have sufficient data to draw up a detailed geochemical model of the study areas, we have been using Cl/Mg ion ratios as a qualitative indicator of areas in which geothermal fluids may be entering the near surface environment. Ratios of 15 or greater are considered to be a strong indication of thermally altered groundwater in Hawaii whereas ratios of 12-15 are classed as low order geothermal anomalies. (Unaltered groundwaters have ratios typically of the order of 3-8.) The wells for which these ratios are available are plotted for each area studied and will be discussed in more detail below.

#### Radon Surveys

Radon is a radioactive daughter product of naturally occurring uranium in rock and soil. Radon concentrations in ground gases were measured using alpha sensitive films buried to a depth of 30 to 40 centimeters in inverted plastic cups. It is believed that radon outgassing rates are significantly affected by thermally induced convection systems and by ground permeability. In Hawaii these are often associated with structures of volcanic origin. As variations in radon outgassing occur as a result of different uranium concentrations in local rock and soil cover, the radon count rates in each survey area are corrected for radon emanation from each soil type. Count rates are reported in units of T (tracks) x  $10^{-2}/cm^2$  (film)/hr (exposure time).

#### Soil Mercury Surveys

Mercury is an element that has often been found to be associated with volcanic and geothermal fluids. In its elemental form, mercury is highly

volatile and tends to concentrate in surface soils above and around geothermal reservoirs. Soil surveys for mercury have been found to be a useful geothermal exploration technique in Hawaii (Cox et al, 1979), however, variations in mercury concentrations are also found to be associated with changes in soil type thus, the results of soil mercury surveys are most useful when interpreted in conjunction with soil radon surveys.

#### Isotopic Investigations

The hydrogen and oxygen isotopic composition of local groundwaters can contribute to the understanding of the hydrogeology of a study area as well as assist in the identification of areas in which geothermal fluids are entering shallow groundwater aquifers. Under favorable conditions, mixing models of local recharge with deeper geothermal fluids can provide information on reservoir temperatures and leakage rates.

Sampling of local rainfall and groundwaters in several of the study areas is presently underway. We have begun the isotopic analysis of the groundwater and rainfall samples, however, we have not yet obtained sufficient data to determine whether such surveys will be applicable as an exploration technique in the Hawaiian environment.

#### Geochemical Surveys on Hawaii

#### Kawaihae

This area is located on the dry leeward side of the Big Island and is in the contact zone between the lava flows of Mauna Kea and Kohala volcanoes. Initial interest in this area arose from the higher than expected groundwater temperatures measured in some of the water supply wells (e.g. 6147-01; 32° to 36°C, Fig. 5). Subsequent resampling of the local wells confirmed the relatively warm temperatures and water chemistry analyses yielded anomalous C1/Mg ratios in the area (Fig. 6). The highest C1/Mg ratio observed is 18.1 in well number 6048-01.

Radon surveys indicate an east-west high ground gas emanation zone peaking at a value of more than 10 units above background (Fig. 7). The highest radon emanation rate in the survey area (73 units) occurs near the warm water well (6147-01) and appears to extend to the north. The central part of the anomaly is bordered by negative values which may be attributable to downward circulation of ground gas at the borders of what is possibly a ground gas convective cell. A second, lower order, radon anomaly (40 units) occurs in the center of the area surveyed. Our interpretation of these results is preliminary as the details of the radon emanation from the soil in this area requires further substantiation as it is highly variable.

Soil mercury surveys have also delineated an elongate high (Fig. 8) (80 ppb Hg) generally parallel to and somewhat north of the radon anomaly, and open to the east. It is possible that an E-W permeable structure (perhaps a zone of fracturing) is responsible for the topographic low in which the main road is constructed and with which the anomalous zone may be associated.

Our preliminary assessment of this area is that a low level thermal anomaly may be present and that further study of this area is warranted.



### Base map Kawaihae



\_\_\_\_\_ km







Kawaihae Area, Hawaii

0<u>0.5 1.0 2.0</u> km

Closed squares indicate wells with chemical analyses.



## Ground Radon emanation



Kawaihae Area, Hawaii

0.5 1.0 2.0 km

Closed circles show measurement locations. Contours are logarithmic at 0, 5, 10, 20, 40 units.



Figure 8

Kawaihae Area, Hawaii

0 0.5 1.0 2.0 km

Mercury concentration is in ppb. and contoured logarithmically.

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#### Hualalai Northwest Rift

Studies were conducted along the northwest rift system of Hualalai volcano from sea level to an altitude of approximately 2000 meters (Fig. 9). The rift is well defined by ash and cinder cones near the summit of the volcano, however, along the lower elevations the rift zone becomes more diffuse possibly bifurcating near an altitude of 400 m. This rift zone was last active in approximately 1801 and has produced at least six major eruptions in the last 500 years (R.B. Moore, abstract, Pac. Northwest AGU, Bend, Oregon, 1979). Soil cover is variable, being virtually nonexistent on recent flows in the drier lowlands. Soil thickness increases rapidly to 10's of centimeters in the higher rainfall upper elevations.

Groundwater chemical analyses exist for only two groups of wells both of which are located on the coastal plain (Fig. 10). The observed Cl/Mg ratios for the northern group is 5.4 whereas to the south of the rift zone, the ratio is 16.1. There are, unfortunately, few other groundwater wells in this area and as a result, no firm conclusions can yet be made concerning the hydrology of this area.

Radon measurements are unusually low in the study region, most values being in the range of 0 to 5 units and several apparently broad areas of negative values occur. There are three localized areas of low positive values, two along the rift zone (Fig. 11), however, no significant trends are obvious from the presently available data.

Mercury concentrations (Fig. 12) are very low over the little weathered flows of the coastal plain although some localized highs were observed which appear to be associated with the observed radon trends. On the higher elevations of the Hualalai flanks, mercury tends to be locally elevated along











C1/Mg ratio of groundwater

Northwest Hualalar Area, Hawaii

0 0,5 1,0 20

The trend of the rift zone is shown by eruptive features.



Figure 11



the belt of eruptive features; a broader anomaly (>100 ppb) also occurs further up-rift. The elongate zone of low values on the southwest flank is thought to be related to the limited soil cover over an area of younger flows.

Overall, these data are difficult to interpret due to the great variation in elevation, climate, and soil conditions. The data suggest that there is an area of localized low order anomalies along the trend of the rift zone. Another low order anomaly occurs to the southwest of the rift which might be related to thermal groundwater flow patterns. This anomalous area appears to be continuous into the Kailua-Kona survey area to the south.

The above surveys tend to confirm the existence of at least a low level thermal anomaly along the Hualalai NW rift and we believe that further, more detailed surveys should be conducted at a later date, but are of low priority.

#### Kailua-Kona

The Kailua-Kona study area, located on the south west flank of Hualalai volcano is formed largely of older tholeiitic basalts with a narrow coastal zone of calcareous soils. Precipitation in the coastal area is quite low but increases substantially with the rapid increase in elevation inland.

Four well locations have water chemistry analyses available from U.S.G.S. files (Fig. 13), however, we have not yet completed a recent analysis of these wells. Of the four locations, three appear to have anomalous Cl/Mg ratios (Fig. 14).

Ground radon measurements outline two distinctly anomalous zones in the center and south of the study area (Fig. 15). Both are bounded by zones of



Kailua-Kona base map











Kailua, Kona Area, Hawaii

0 0.5 10 km 20

negative values. The maximum values observed were above 40 units and both anomalies are open to the east and northeast.

Soil mercury data indicate several localized variations in the coastal area and broad anomalous zone (>80-100 ppb) in the upper elevations east of Kailua (Fig. 16). A feature which is considered to be of note in the area is the particularly strong anomaly (>400 ppb) which is open to the east and northeast of Kailua. The observed mercury variations generally correlate well with the ground radon anomalies in this area.

The survey of the Kailua area shows strong geochemical anomalies with quite good coincidence between the survey techniques applied. The data indicate that the anomalous area is open to the northeast which suggests that it is associated with Hualalai volcano. This may indicate that thermal groundwaters are flowing down-dip from the summit area.

The magnitude, correlation, and location of the results of these surveys strongly suggest that a thermal anomaly is present in the Kailua-Kona district. More detailed work in Kailua-Kona is warranted, especially in the relatively unpopulated area to the northeast of Kailua Town.

#### Keaau

The Keaau study area is located on the lower east flank of Mauna Loa at an altitude of approximately 100 m (Fig. 17). The ground contour has a gentle slope to the south and east and is made up of well weathered tholeiitic basalt flows. The area has a typically high windward rainfall and is extensively cultivated in sugarcane. The surveys conducted in this area were, of necessity, largely limited to public access roadways due to the heavy agricultural activity in this region.













Only a few groundwater wells are recorded for this region and most are located outside the survey area. Of those wells considered, most have Cl/Mg ratios of approximately 1, however, just to the south of Keaau, two wells sampled were found to have ratios of 8.5 and 7.1, which are, at best, very low level anomalies.

Radon surveys yielded generally low values (Fig. 18), but suggest a localized high trending NE-SW through the survey area. This feature is somewhat substantiated by the results of the soil mercury surveys (Fig. 19).

The limited nature of the survey in this area does not allow an adequate delineation of any anomalous zones, however, the data do suggest that a low order anomaly may be present. Further work in the Keaau area is necessary if only to determine whether the observed anomalies are in fact real and due to the presence of above normal thermal conditions or if they are solely related to non-thermal variations.

#### Puna

The Puna district is located on the eastern flank of Kilauea volcano and is now known to have a high temperature geothermal reservoir as evidenced by HGP-A geothermal well. The maximum temperature of the reservoir is known to be at least 350°C and production from HGP-A has been approximately 120,000 lbs/hr with a 60% steam quality (Kroopnick et al, 1978).

Mercury and radon surveys have been underway in the Puna area during most of 1979 (Cox, in press) with the objectives of both further defining the resource area as well as elucidating the mechanisms of mercury and radon transport in a geothermal area. These studies are still underway and will continue on a limited basis during the coming year.



Figure 18



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Figure 19

#### Geochemical Surveys on Maui

#### Lahaina-Kaanapali

The Lahaina survey area is located on the central SW flank of West Maui volcano. The leeward coastal zone is made up largely of alluvial material from the heavily eroded volcano. Soil cover is well developed and the land contour is very gentle along the coast increasing gradually inland toward the remnant of the eroded shield. On the lower slopes, soil is well developed and in only a few areas are the older alkalic basalt lava flows exposed. Post erosional volcanic activity (Middle to Late Pleistocene) has produced two small cinder cones within the survey area (Fig. 20).

The field survey convered two parts of the Lahaina district: .Kaanapali to the north and Lahaina to the south. The post erosional volcanics are located just inland of Lahaina town and on a small peninsula at Kaanapali.

Groundwater geochemistry is available for several wells in the survey area. Although some of the groundwaters are within the normal range for the Cl/Mg ratio, several wells near Lahaina have low order anomalies (Fig. 21). Several wells near Kaanapali are also significantly above the normal range as well; the highest observed Cl/Mg value in these wells was 17.9 (5640-0.).

Radon surveys near Lahaina also indicate that a low order anomaly is present and that it becomes stronger to the north toward Kaanapali (Fig. 22). A narrow low positive zone separates this feature from a zone of very high radon outgassing to the northeast of Kaanapali (4 locations over 80 units, and a high value of 408 units).

Mercury surveys in the Lahaina area were limited because of the relatively small amount of undisturbed (uncultivated) soil available.








C1/Mg ratio of groundwaters



Lahaina Area , Maui

0<u>0,51,02,0</u> km









The results show a low order anomaly in the area of the cinder cone at Lahaina town (Fig. 23) and a similar magnitude anomaly at Kaanapali.

The coincidence of several anomalies both at Lahaina town and northeast of Kaanapali strongly suggest that a low order thermal anomaly is present near Lahaina and perhaps a somewhat stronger anomaly is present to the northeast of Kaanapali. Further work is warranted in this area and will be carried out during 1980.

#### Olowalu-Ukumehame

Olowalu and Ukumehame canyons are located to the southeast of Lahaina within the heavily eroded south flank of west Maui volcano. Although there has been no surface post erosional volcanic activity in this area, extensive intrusion has taken place which has surface expression in the form of dikes and bosses which have been exposed by erosional processes.

The geochemical surveys at this site have been restricted to groundwater sampling and analysis. Two of the wells sampled show strong anomalies, one having an elevated temperature of 33°C and a Cl/Mg ratio of 17.7.

Electrical resistivity surveys (see below) have indicated anomalously low resistivities in this area as well. Even though relatively little data is available for Olowalu-Ukumehame, it is felt that further geochemical surveys of these valleys are justified, and are scheduled for 1980.

#### Haiku-Paia

This survey area is on the lower northern slope of Haleakala volcano in northeast Maui (Fig. 24). Rainfall is moderate 102 to 200 cm/yr and land use varies from sugarcane in the western section, to small produce farms in the central,



Soil mercury survey









0 0.5 1.0 km

and forest in the east. A rather diffuse rift zone passes through the area and is marked by a NNW trend of cinder cones and other eruptive features extending from the summit of Haleakala to near the coast. Several large faults parallel to and apparently associated with the rift are also indicated to pass through the center of the survey area.

Groundwater geochemical data delineate several areas in which Cl/Mg ratios are significantly elevated (Fig. 25); the high values are found along the coastal strip. The highest Cl/Mg values observed (21 and 58) are in the central north of the area. All Cl/Mg ratios decrease inland with higher elevation, apparently because the lower elevation wells penetrate basal groundwater rising to discharge at the coast, whereas the higher elevation wells are tapping perched groundwaters derived from higher elevation.

Groundwater temperatures show a pattern similar to that of the C1/Mg ratio: higher temperatures (23 to 24°C) along the coast decreasing inland toward higher elevation (20 to 21°C) (Fig. 26). This is again considered to be the result of groundwater derived from higher elevation. Although we believe that the rift zone may have a channeling effect on the higher level water, more geochemical data are necessary before any firm conclusions can be drawn concerning the hydrogeology of this area.

Radon surveys in this area yielded some of the highest outgassing rates measured in Hawaii (Fig. 27). In that the measured radon emanation from the soil in this area is relatively high, only those radon values in excess of 20 units are considered to be significant, however, it is believed that the general pattern of radon values observed is valid. Very high radon counts (416 units) follow the strike of the rift (and associated faulting) and appear to decrease peripherally, notably to the west where a negative value zone has been defined. Soil mercury concentrations apparently correlate well (Fig. 28) with the pattern observed for radon with elevated concentrations over the rift zone ( 499 ppb).

The results of these geochemical surveys strongly suggest that the rift structure is a significant feature and indicate that it is highly probable that there is above normal subsurface heat associated with it. A detailed exploratory survey will be conducted over this area during 1980.

#### Geochemical Surveys on Oahu

#### Lualualei Valley

Subsequent to the DHRA Phase I Final Report, extensive geochemical work was conducted in Lualualei valley. This work was detailed in a separate report (Cox et al, 1979) and will not be discussed here. The conclusions of the above report stated that the geological and geochemical evidence strongly suggested that a low temperature thermal anomaly exists within the valley and that shallow drilling for temperature measurements should be done to confirm the surface studies. The final report was submitted to the U.S. Navy and DOE and a decision on further studies is pending.

#### Waimanalo-Maunawili

Maunawili valley, on the eastern (windward) side of Oahu, is located within the caldera area of the extinct Koolau volcano. Limited radon and mercury surveys are presently underway in this area, as is groundwater geochemical sampling. We have not yet obtained sufficient data with which to make even a preliminary assessment of the possibility of geothermal potential in this area.















Haiku - Paio, Maui

0 05 10 20 km



Figure 28

Haiku - Paia, Maui

0 05 10 20 km

#### Summary of Geochemical Results

The geochemical surveys conducted during the last year have, to a greater or lesser degree, confirmed the preliminary conclusions drawn during Phase I of the Direct Heat Resource Assessment. On the basis of these preliminary results of the Phase II surveys, we have classified each of the areas studied according to their potential indicated by the work to date as follows:

> A B C D

A A B D

A: high order anomaly;

B: moderate to high order anomaly;

C: low order anomaly;

D: no significant anomaly observed.

#### Hawaii

Kailua-Kona												
Kawaihae												
Hualalai	Northwest	Rift										
Keaau												

#### Maui

Haiku-Paia
Olowalu-Ukumehame
Lahaina-Kaanapali
Lahaina Town

#### 0ahu

Lualualei Valley	В	
Waimanalo-Maunawili	insufficient	data

#### **III. GEOPHYSICAL EXPLORATION PROGRAM**

#### Introduction

The basic strategy of the electromagnetics (EM) subtask of Phase I of the Direct Heat Resource Assessment involved two levels of exploration: first, the prospective area was covered with DC soundings to obtain shallow (1000 m) geoelectric structure; second, the same area was covered with controlled-source time-domain EM soundings using a fixed, grounded-wire source to obtain deeper (to 5 km) geoelectric structure. The shallow structure determined by DC soundings is used to obtain better resolution of the deeper structures from the TDEM data.

#### Geophysical Surveys on Hawaii

DC and electromagnetic data had been collected in five areas on Hawaii island previous to 1979. Those areas are Kawaihae, southeast rift of Hualalai, east rift of Kilauea, southwest rift of Kilauea, and the south rift of Mauna Loa. Only the data from Kilauea's east rift has been analyzed in detail; the results have been reported elsewhere (Keller et al., 1977). During the past year, a total of 30 DC and 30 TDEM soundings were completed in two new areas -- northwest rift and summit of Hualalai volcano, Keaau, and as well as the three previously mentioned areas -- Kawaihae, south rift of Mauna Loa, and Kilauea's east rift (Fig. 2). The Hawaiian island work was jointly financed by the DOE and the U.S. Geological Survey, Branch of Electromagnetism and Geomagnetism. As detailed analysis is intended for all the data from each of the seven areas, the work in each area will be described individually.

#### Kawaihae

Six Schlumberger soundings were completed between Kamuela and Kawaihae. The area was difficult to work in because of the extensive pipe network and poor vehicular access. Nevertheless, most of the soundings were interpretable and show that the area between Kamuela and Puu Kawaiwai is underlain be a resistor at several hundred meters depth. These findings are anomalous for Hawaii because rocks below sea level usually have a very low resistivity due to saturation with saltwater. This area is also anomalously resistive on a bipole resistivity map done in 1973 (Keller et al, 1977) and has an anomalous magnetic field pattern. Our preliminary interpretation is that the area is underlain by a shallow intrusive, possibly connected with Puu Kawaiwai and the 80,000 year old Puu Loa vents of Kohala volcano.

### Northwest Rift of Hualalai

Eight Schlumberger soundings were completed between the summit of Hualalai and the historic vent on the northwest rift zone named Puhi o Pele. Eight TDEM soundings were also located in the vicinity of Puhi o Pele. After interpretation of half of the Schlumberger soundings, the only anomalous discovery is that of a conductive zone 500 m deep beneath Hualalai's summit. This zone could be dike-impounded groundwater; however, its low resistivity might indicate an elevated temperature or a large amount of dissolved solids in the water.

#### Southwest Rift of Hualalai

Eight TDEM soundings were completed in this area in 1974 but were never analyzed. A partial workup of the data this year did not show any resistivities lower than 100 ohm-m.

#### Keaau

Four Schlumberger soundings and nine TDEM were completed between the Hilo end of Stainback highway and Ainaloa drive (off highway #130). Preliminary analysis shows no large anomalous conductors shallower than 5 km over the whole area. Schlumberger soundings defined a thick lens of freshwater in agreement with the known hydrology of Keaau. Geothermal prospects do not look good here.

#### Lower East Rift of Kilauea-Puna

Four new Schlumberger soundings and ten new TDEM soundings were completed. Preliminary analysis of the new data shows again that Puna has lower resistivity in general than any of the areas investigated so far. The EM and DC work done before 1979 show an area of dike-impounded water above Pahoa and the 1955 eruptive vents, an area lacking a significant freshwater lens between the 1955 vents and the coast, and an area of anomalously high conductivity westward of Puu Honuaula and the HGP-A well location. The new data were located in order to detail the structure near the 1955 vents and also the anomalous area to the west. Preliminary analysis so far indicates that the main geothermal reservoir in Puna is between Puu Honuaula and Kapoho.

#### Southwest Rift of Kilauea

Two lines of TDEM soundings were run perpendicular to this rift zone n 1974; one through the town of Pahala and one about 6 km to the north. nalysis of electric field data has indicated the existence of a buried contact parallel to the rift trace and 1-2 km northwest of it. A similar contact was detected near Kilauea summit, and appears to be related to the launa Loa-Kilauea contact rather than the SW rift zone. More data analysis will be required before a geothermal assessment will be possible.

#### South Point-South Rift of Mauna Loa

Three Schlumberger soundings were completed to complement several previous TDEM soundings in the area. As in Kawaihae, extensive pipe networks provided considerable interference and limited the surveyable area. The northernmost Schlumberger soundings was the only anomalous one in that It exhibited lateral distortion while crossing a prehistoric fissure. -140 mV SP anomaly was also observed over this fissure. Again, more data nalysis will be required for a geothermal assessment.

#### eophysical Surveys on Maui

Seventeen resistivity soundings, using Schlumberger electrode onfigurations, were made on the island of Maui to determine the applicability : direct current resistivity methods for locating geothermal resources. relve were located between the towns of Honolua and Maalaea on west Maui d five were located on the isthmus and around Haleakala.

Final interpretation which will utilize computer inversion and geologic mparisons will not be complete until mid 1980. Preliminary analysis show

a deep conductive layer in the Olowalu and Ukumehame region. This layer is between 300 and 1300 ft deep and is less than 4 ohm-m in resistivity. This anomalously conductive layer appears to lie beneath a 15-25 ohm-m layer interpreted to be saltwater saturated rock. A warm water well (33°C) and an extensive dike swarm and boss complex located inside Ukumehame Canyon all suggest geothermal processes. A high level, aeromagnetic survey has delineated a minor volcanic pipe zone 500 m (±500 m) beneath Olowalu and Ukumehame canyon (Malahoff and Woollard, 1965).

The major rift system of Haleakala has been delineated by both aeromagnetic and gravity surveys. The site of a historic lava flow (1790) on the southwest rift and a site in Hana on the east rift were chosen for additional Schlumberger soundings. These are areas of high resistivity contrasts and we suggest that the time domain electromagnetic method be employed in these areas. In similar terrain on the island of Hawaii, it has been shown that the TDEM method is quite successful in delineating a conductive body at depth.

Additional work should be done on Maui, beginning with site specific geophysics in the Olowalu-Ukumehame area; however, extreme topographic relief make much of the area inaccessible. Four or five additional Schlumberger and several TDEM soundings could define the lateral and depth extent of the conductive body. Any microearthquake activity could be recorded by one seismograph while other types of surveys were being employed. The strong aeromagnetic anomalies suggest a ground magnetic survey in Olowalu, southwest rift and east rift zone of Hakeakala be undertaken to better define those magnetic bodies. Self potential studies successfully define geothermal areas on the Big Island and may also prove successful on Maui.

#### Geophysical Surveys on Oahu

Work on Oahu has been concentrated in two areas -- Lualualei Valley in the Waianae caldera area and Kailua-Waimanalo Valleys in the Koolau caldera area. The Koolau coverage was completed in 1976 as part of the first Hawaii Geothermal Project. Work in Lualualei Valley was completed in spring 1979 and has been reported (Cox et al, 1979).

#### Lualualei Valley

Three Schlumberger soundings were located in the valley in order to complement a rotating quadripole and self potential survey done previously (Tasci, 1975). The soundings were able to delineate valley sediments, warmwater saturated basalts, and a basement resistor. The resistive basement was shallowest in the northern part of the valley, in agreement with the 1975 survey, and is thought to be part of a caldera dike complex. In conjunction with geological and geochemical data, these soundings were used to suggest four drill sites.

#### Kailua-Waimanalo

Eight Schlumberger soundings were completed in 1976 in southern Kaneohe, Maunawili in Kailua, Waimanalo, and upper Nuuanu valley. The soundings were of limited utility for determining deep resistivities because of the complex sedimentary geology of these valleys and the very low resistivities of the sediments (less than 1 ohm-m); however, a resistive basement was located at 400 m depth near Kawainui Swamp. Self potentials were mapped in Waimanalo Valley to localize the source of hot water observed in one well there. SP's varied less than 70 mV over most of the valley with some moderate values observed near the west end of the valley. A -20 mV anomaly appeared to be correlated with reef limestone outcrops. Deeper soundings are required in order to determine the resistivity structure associated with the volcanic plug at 1600 m outlined be seismic refraction and gravity data.

#### Summary of the Non-seismic Geophysical Results

On the basis of our results thus far, we can rank each of the areas according to their potential for each island:

Hawaii

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Puna (Kilauea east rift)
Kawaihae
Kilauea SW rift
Hualalai NW rift
South Point (Mauna Loa south rift)
Hualalai SE rift
Keaau
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Maui

Olowalu-Ukumehame Haiki-Paia - insufficient data Lahaina-Kaanapali Lahaina town

Oahu

Lualualei Kailua-Waimanalo - insufficient data

#### IV. SUMMARY OF PHASE II WORK, 1979

The geophysical and geochemical data acquired thus far strongly suggest that thermal anomalies exist in the following areas:

Hawaii: North Kona;

Maui: Haiku-Paia, Olowalu-Ukumeheme canyons;

Oahu: Lualualei Valley.

Although the surface exploration program has been completed in Lualualei Valley, continued field surveys are required in the other locations under investigation. This work will attempt to determine the source and depth of the identified anomalies as well as to define their areal limits. It is hoped that, upon successful completion of the surface studies, exploratory drilling will proceed in these areas as the next major phase of work.

Even though the identified anomalies in some of the other survey sites are not as strong as those listed above, continued geochemical and geophysical surveys will be conducted on a limited scale in a few of the latter locations. These surveys should both provide us with further insight into the mechnisms of the anomalous geochemical and geophysical behavior observed as well as allow us to identify potential interferences of the survey techniques by non-geothermal phenomena.

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# Oahu Groundwater Chemistry

### APPENDIX I

$ \begin{array}{c} 1 & 1D = 3-210 \\ ELE = & 203.00 \\ LI = & \\ NA = & 180.00 \\ K = & 3.40 \\ CA = & 6.40 \\ MC = & 7.00 \end{array} $	7-01 WAD= F = CL = BR = I = P04=	FYP=WELL 3.20 126.00	COU= WED= BA = BA = SR = FE = MN =	-0AHU 210.00	FLO= ALK= CAR= CO2= HCO= CO2=	DC=	KAHE P SPC= HAR= N = NO2= NO3=	<b>T.</b>	LAT, LON PH = HG = CD = PB = TH =	= 212 0.00	126. EH SE ZN SB CU	1580727.9( = = =	DAT=1 TEM= SIO= SO4= H2S=	978. 164.69
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2 ID#=3-2409 ELE= 56.00 LI = NA = 680.00 K = 18.20 CA = 96.00	-07. T WAD= F = CL = BR = I =	YP=WELL 2.80 1410.00	COU=: WED= B = BA = SR = FE =	оани 73.00	L0 FLO= ALK= CAR= C02= HCO=	IC=	MAILI SPC= HAR= N = NO2=		LAT, LON= PH = HG = CD = PB =	2124	143. EH SE ZN SB	1580947.00 = =	DAT=19 TEM= SIO= SO4= H2S=	978. 25.50 171.10
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3 ID#=3-2409 ELE= 67.00 LI = NA = 690.00 K = 20.10 CA = 101.00 MG = 60.00 H/D= 0.00 SOURCE= COMENT:	-23 TY WAD= F = CL = 1 BR = I = P04= 018=	7P=WELL 2.30 480.00 0.00	COU=C WED= B = BA = SR = FE = MN = C13=	0AHU 85.00 0.00	LOC FLO= ALK= CAR= CO2= HCO= CO3= HE3=	]= 0.00	MAILI SPC= HAR= N = NO2= NH4= S34=	0.00	LAT,LON= PH = HG = CD = PB = TH = AS = C14=	2124 0.00 0.00	41. 1 EH = SE = ZN = CU = CR = T3 =	580925.00 0.00	DAT=19 TEM= SIO= H2S= O2 = P = DIS=	78. 25.00 156.13
4 ID#=3-2508- ELE= 142.00 LI = NA = 102.00 K = 10.00 CA = 40.00 MG = 80.00 MC = 80.00 H/D= 0.00 SOURCE= COMENT:	01 TY WAD= F = CL = 2 BR = I = P04= 018=	P=WELL 260.00 0.00	COU=0/ WED= B = BA = SR = FE = MN = C13=	AHU 145.00 0.00	LOC FLO= ALK= CAR= CO2= HCO= CO3= HE3=	= 0.00	LUALUALE SPC= HAR= N = N02= N03= NH4= S34=	0.00	LAT, LON= PH = HG = CD = PB = TH = AS = C14=	21250 0.00 0.00	EH = SE = ZN = SB = CU = CR = T3 =	580807.00. 0.00	DAT=197 TEM= SIO= S04= H2S= 02 = P = DIS=	8. 27.00 68.44 48.00
5 ID#=3-2508-0 ELE= 77.00 LI = NA = 380.00 K = 12.80 CA = 127.00 MG = 81.00 H/D= 0.00 SOURCE= COMENT:	97 TYP WAD= F = CL = 13 BR = I = P04= 018=	*=WELL 2.70 30.00 0.00	COU=OA WED= BA = SR = FE = MN = C13=	HU 85.00	LOC= FLO= ALK= CAR= CO2= HCO= CO3= HE3=	0.00	LUALUALE SPC= HAR= N = NO2= NO3= NH4= S34=	I 0:00	LAT, LON= PH = HG = CD = PB = TH = AS = C14=	212512 0.00 0.00	2. 15 EH = SE = ZN = SB = CU = CR = T3 =	80840.00	DAT=1978 TEM= 2 SIO= 18 SO4= H2S= 02 = P = DIS=	8. 25.50 36.07

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K =	2.60	BR =		SB =		COO-		IN =		CD =		ZN =		S04=	
CA =	11.00	I =		FE =		U02-		NUZ=		PB =		SB =		H2S=	
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K =	3.60	BR =		SB =		CO2=				CD =		ZN =		S04=	58.00
CA =	24.00	I =		FF =		- HCO-		NO2=		PB =		SB =		H2S =	
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MG =	27.00	P04=		MN =		C03=		NHA-	0.00	111 =	0.00	CU =		02 =	
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15 ID#=3-2911 ELE= 750.00 LI = NA = 21.00 K = 2.80 CA = 13.00 MG = 12.00 H/D= 0.00 SOURCE= COMENT:	-02 TY WAD= F = CL = BR = I = P04= 018=	P=TUNNEL 24.00 0.00	COU=( WED= B = BA = SR = FE = MN = C13=	0.00	L FLO= ALK= CAR= CO2= HCO= CO3= HE3=	0.00	MAKAHA SPC= HAR= N = NO2= NO3= NH4= S34=	TUN I 0.00	LAT, LON= PH = HC = CD = PB = TH = AS = C14=	21294 0.00 0.00	EH = SE = ZN = SB = CU = CR = T3 =	0.00	DAT=19 TEM= SIO= SO4= H2S= O2 = P = DIS=	978. 20.00 72.72 3.00

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$\begin{array}{rcl} K &=& 4.20 & \text{BR} = \\ CA &=& 26.00 & I = \\ MG &=& 31.00 & PO4 = & 0.25 \\ \end{array}$	FE = HCO= MN = 10.00 CO3= C12= 0.00 HE3=	154.00	NO3= NH4= S34=	0.00	TH = AS = C14=	0.00 0.00	CU CR T3	= = = 0.00	02 = P = DIS=	0.08 344.00
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COMENT:

MASTER FILE CONTAINS 16 RECORDS

# Maui Groundwater Chemistry

## APPENDIX II

100-3625-01 TYF-DUC	COU-MAUI	LOC=LA PER	OUSE BAY SPC=	LAT,LON= PH =	203617. EH	1562523.00	DAT=1979. TEM= 22.50
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	B =	ALK=	HAR=	HG = CD =	SE		SIO= 85.00
HA = 348.00 CL = 1482.00	BA = 0	CAR=	N = NO2 =	CD -	SB	=	H2S=
K = 41.00 BR - CA = 56.00 I =	SIC = FF =	HCO=	NO3=	TH =	CU	=	02 =
MG = 178.00 P04=	MN =	C03=	NH4=	AS =	CR	=	P =
H/D= 018= SOURCE=H.I.G.(8/79) COMENT:	C13=	HE <b>3</b> =	S34=	C14=	Τ3	=	DIS=
2 ID#=6-3726-02. TYP=DUG	COU=MAUI	LOC=KANAHE	NA (G.FULTZ)	LAT, LON=	203720.	1562626.00	DAT=1979.
ELE= 13.00 WAD= 0.00	WED= 15.00	FLO=	SPC=	PH =	EH	Ξ	TEM= 23.50
LI = 0.01 F = 0.55	B =	ALK=	HAR=	HG = Ch =	SE	a _	SIU= 204- 455 00
NA = 833.60 CL = 1470.00	BA =	CAR=		CD = PB =	SB	-	H2S=
K = 51.00 BR =	BR =	LU2- HCO=	NO3=	110 - 1114 =	CU	=	02 =
MG = 162.60 PO4=	MN =	C03=	NH4=	$\overrightarrow{AS} =$	CR	=	P =
H/D= 018=	C13=	HE3=	S34=	C14=	ТЗ	=	DIS=
SGURCE=H.I.G. (8/79) COMENT:NOT PUMPED, POLLUTED							
3 ID#=6-3726-03 TYP=DUG	COU=MAUI	LOC=KANAHE	NA (HUNTER)	LAT, LON=	203715.	1562622.00	DAT=1979.
ELE= 15.00 WAD= 0.00	WED= 18.00	FLO=	SPC=	PH =	EH	=	TEM= 24.50
LI = 7.20 F = 0.60	<u>B</u> =	ALK=	HAR=	HG =	SE	=	S10=87.00
NA = 847.00 CL = 1435.00	BA = 0	CAR=	N =	CD =	ZN	-	804= 400.00 H2S=
K = 46.00 BR =	SR = FF =	CO2= HCO=	NO2- NO3=	TH =		2	02 =
$MC = 172 \ G0 \ P04=$	MN =	C03=	NH4=	AS =	CR	=	P =
H/D= 018=	C13=	HE3=	S34=	C14=	тз	=	DIS=
SOURCE=H.I.G.(8/79) COMENT:							
4 ID#=6-3925-01 TYP=WELL	COU=MAUI	LOC=MAKENA	-68	LAT, LON=	203912.	1562559.00	DAT=1978.
ELE= 352.00 WAD= 0.40	WED= 382.00	FLO=	Bru= HAD- 000 AA	rn = HC =	(.30 EH	- = 0.01	SIA= 20.40
LI = F = 0.00	р = 18А -	ALK= 200.00	nar- 300.90	60 =	SL ZN	= 0.10	S04= 52.00
MA = 330.00  UL = 012.00 $V = 24.00  BR =$	SR =	CO2=	NO2= 6.00	PB =	0.01 SB	=	H2S=
CA = 38.00 I =	FE = 0.13	HCO = 244.00	NO3= 7.10	$\hat{TH} =$	0.00 CU	= 0.10	02 =
MG = 67.50 P04=	MN = 0.05	C03=	NH4=	AS =	0.01 CR	#	P =
H/D= 0.09 018= 0.00	C13= 0.00	HE3= 0.00	S34= 0.00	) C14=	0.00 T3	= 0.00	DIS= 1110.00
SOURCE=DOH(9/64), DOWALD(3/77 COMENT:	), H.I.G.(10/78	3)					

5 I	D#=6-4019	-01 T	YP=TUNNEL	COU=MAU	I LOC=P	OLI POLI PARK	LAT, LON=	204049.	1561958.00	DAT=19	79.
ELE=	6200.00	WAD=		WED=	FLO=	SPC=	PH =	EH	=	TEM=	10.30
LI =	0_000000	F =	0.14	B =	ALK=	HAR=	HG =	SE	2	SI0=	
NA =	9.80	$\tilde{\mathbf{C}}\mathbf{L} =$	2.10	BA =	CAR=	N =	CD =	ZN	2	S04=	4.60
:к =	2.10	BR =		SR =	C02=	NO2=	PB =	$\mathbf{SB}$	=	H2S=	
CA =	4.70	ī =		FE =	HCO=	N03 =	'TH =	CU	=	02 =	
MC =	1.80	P04=		MN =	C03=	NH4=	AS =	CR	=	P =	
H/D=		018=		C13=	HE3=	<b>S</b> 34=	C14=	ТЗ	2	DIS=	
SOUR	CE=DOWALD	(3/77)	H.I.G.(8	/79)		х. Х					

COMENT: SPRING IN TUNNEL, PERCHED AQUAFER

					T A CONTRACTOR	LAT LON-	204044	1562055 00	DATE 19	79.
6 ID#=6-4	020-02 I	TYP=TUNNEL	WED-	FI O=	SPC=	PH =	ZUTUTT. El	1302030.00 [ =	TEM=	11.80
ELE= 4000.	70 HAD- F =	0.00	R =	ALK=	HAR=	HG =	SI	- -	SI0=	
NA = 7.1	70 CL =	5.60	BA =	CAR=	N =	$\overline{\mathbf{C}\mathbf{D}}$ =	ZI	( =	<b>S04</b> =	10.10
K = 1.9	90 BB =	0100	SR =	C02=	NO2=	PB =	SI	3 =	H2S=	
$\Gamma \Lambda = 7$	50 I =		FE =	HCO=	N03=	TH =	CI	J =	02 =	
MC = 3	60 PO4=		MN =	C03=	NH4=	$\overline{AS} =$	CF	1 =	P =	
H/D= 0.1	018=		013=	HE3=	\$34=	C14=	TS	. =	DIS=	
SOURCE-DOW	ATD(3/77)	HIG (8	(79)	nho		411			210	
COMFNT · SPR	INC FROM S	HORT THINN	EL OB EXCAVATIO	N PERCHED AOUI	FEB .					
00112111-0110			bi on monthire	, i <u>maine</u> inaci	1 11100					
				,						
7 ID#=6-40	020-04 T	YP=TUNNEL	COU=MAUI	LOC=WAIKAA	LO SPRING	LAT.LON=	204012.	1562044.00	DAT=19	79.
FIF= 5460	aa WAD=		WED=	FLO=	SPC=	PH =	EF	[ =	TEM=	11.80
II =	F =	0.55	B =	ALK=	HAB=	HG =	SI	] =	SIO=	
NA = 13	30 CL =	2.10	BA =	CAB=	N =	$\overline{CD}$ =	ZN	=	S04=	6.60
V = 31	85 BB =		SB =	C02=	N02=	$\tilde{PB} =$	SF	} =	H2S=	
CA - 0.7	70 $I =$		FF =	HCO=	NOS=	<b>ТН =</b>	cī	, [ =	$\overline{02}$ =	
$u_{\rm H} = 0.0$	06 P04=		MN =	C03=	NH4=	ÂS =	CE	=	Р =	•
ПС - Он П/П~	019-		C19-	HE3=	\$34=	C14=	TS	. =	DIS=	
n/D-	C (9/70)		010-	11110-	D01-		10		010	
COMENT.CDD	.G.(O/(7) INC EDOM S	מעוואי ייינואא	TI OD TVCAVATIO	N PERCHED AOUI	FFR					
COMENT SPR.	ING FROM 8	monti ionn	EL ON ENGAVAIIO	A, I ERGIED AGOI	r rat •					
0 ID#-6-40	201-01 T	VP=THINET	COULEMANT	ι.ο.α=νατκάα	HI TUNNEY.	LAT LON=	204054	1562104.00	DAT=19	79.
- 0 10	30 VAD-	II -IOMADE	WED-	FIO=	SPC=	PH =	EF		TEM=	14.00
LLE- 0060.V	F -	0 07	ngg-		HAR=	HC =	SI	! =	ST0=	
	- 1	9 70		ALA -	N -	CD =	71	/	\$04=	9.70
$\mathbf{N}\mathbf{A} = \mathbf{C}\mathbf{N}$		0.10	DA -	CAR-		DE =	CI CI		H2S=	,,,,,
K = 1	$10  \text{Dr}^2$		BR -	102-	NO2-	TH =		,	$120^{-1}$	
UA = 3.2	20 1 =		FE -	nuu-	NUO-	111 - AQ -			P =	
$n_{G} = 3.4$	60 PU4=				ND4-	A0 -		. <u>.</u>		
H/D=	=810	<b>77</b> 1 0 (0	013=	HE3=	804-	11.1.4-	10	, -	DIS-	
SOURCE=DOW	$\frac{10(3/77)}{100}$		V(Y) DI OD DVCANADIO	N DEDOUED AOUT	מקויק	•				
COMENT:SPR.	ING FROM S	SHORT TOWN	EL OR EXCAVATIO	N, PERCHED AQUI	ren.					
0 104-6 44	ал <u>а</u> о т	יעט-יייוואאדי	COU-MAUT	LOC=NA LHOU	SPRINC	LAT LON=	204004	1562123.00	DAT = 19	79.
9 ID#=0-49	921-92 1 NA WAD-	IF-IONNEL	LEED-	FLOC- WAINOU	SPC=	PH =	RE-		TEM=	13.00
LLE= 4(00.0	שא שטים די די	0 90	n		HAR=	HC =	SI		SI0=	201
	- 1	0.20	D DA	ALA-	MAIL-	CD =	7		S04=	9.40
$\mathbf{MA} = 10.0$		9.60	DA -	CO2-	M09-	PB =	SI		H2S=	
K = 0.6	30 $Bn =$		BR -	UCO-	NO2-	тн =	CI	, _ [ =	02 =	
UA = 0.0	30 I -		FE	пс0- сод-	NUA -	AS =	CE		P =	
PIG = 0.0	JJ FU4-		rin - 019-	UU0- HE9-	QQ4-	C14=	TO TO		DIS=	
H/D=	016-		610-	nr.3-	30 <b>1</b> -	U1-1	14	, -	DID	
SUURCE=H.1	.G.(8/(9)	TOOPT TUNN	TI OD EVCANATIO	W DEPCHED AOUT	FFD					
COMENT:SPR	ing from s	BOAT TOWN	EL ON ENGAVAIIO	W, FLICHED AGOI	r LAC.	•				
10 110-6-4	600-01 T	VP=WFII	CON-MAILY	LOC=HANA B	ANCH	LAT LON=	204601	1560015.00	DAT=19	79.
TA TA-044	000-01 1 30 174D-	Q 00	000-HAU1 MED- 900 00	FIO=	SPC=	PH =		1000010100	TEM=	19.50
ELE~ 200.0	JU WAD-	0.00	100.00 - 200.00		HAB=	HC =	SI		SI0=	
LI - 9.0		67 00	BA -	CAR=	N =	$\frac{10}{CD} =$	20	. =	S04=	15.70
IA = 49.0	JU UL =	01.70	DA - 00 -	CA9-	NU0 =	pR =	er er		H2S=	10000
K = 4.(	av Bit =		on -	UU4- HOO-	NO2-	ти ~	01		A2 =	
UA = 12.9	≠07 I ≂		PL =	000-	NUA-	111 - AS -		·	D =	
MG = 16.1	10 PU4=		гші = 010-	UUS-	1111 <sup>12</sup> -	HO - C14-	GL MC	. — 		
H/D=	018=	<b>W 1 0 /0</b>	U13=	HE3=	234-	01-3°	16		D19-	
SOURCE=DOW	ALD(3/77),	н.1.6.(8	/(9)							
COMENT:										

Calculate Calculate

11 ID==6-4600-02 TYP=WELL COU=MAU1 LOC=HANA (COUNTY-A) LAT,LON= 20 ELE= 266.00 WAD= 1.50 WED= 288.00 FLO= SPC= PH = LL = 0.00 F = 0.17 B = ALK- HAP- HO	04636. 1560026.00 DAT=1979. EH = TEM= 20.20
NA = 77.50 CL = 115.00 BA = CAR N = CD = CAR CAR N = CD =	SE = S10= ZN = S04= 12.30
CA = 2.80 I = FE = HCO= NO3= TH =	SB = H2S = CU = 02 = CU = 02 = CU = 02 = CU = C
MG = 3.90 PO4 = MN = CO3 = NH4 = AS = H/D = 018 = C13 = H/3 = 014 = 01	CR = P =
SOURCE=H.I.G.(8/79)	T3 = DIS =
COMENT: THE COUNTY PEOPLE LOST A CAMERA BELOW THE WATER TABLE, CONSEQUENTLY THE WI	ELL IS NOT BEING PUMPED
ELE= 306.00 WAD= 2.00 WED= 323.00 FLO= SPC- BU-	04633. 1560032.00 DAT=1979.
LI = F = 0.05 B = ALK = HAR = HG =	EH = TEM = 18.00 SE = SIO=
MA = 32.00 CL = 30.10 BA = CAR= N = CD = K = 1.70 BB = SB = COP = NOP = NOP = DP	ZN = S04 = 51.50
CA = 1.29 I = FE = HCO = NO3 = TH =	SB = H2S =
MG = 1.50 PO4 = MN = CO3 = NH4 = AS = H/D = 018 = 01	CR = P =
SOURCE=DOWALD(3/77), H.I.G.(8/79)	T3 = DIS=
COMENT:	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	94827. 1562422.00 DAT=1978.
LI = F = 0.70 B = ALK = 190.00 HAB = 102.00 HC = 7.7	'0 = H = TEM = 23.22
NA = 104.00 CL = 81.00 BA = CAR = N = CD =	SL = S10 = 55.00 ZN = S04 = 6.00
CA = 12.60 I = FE = CO2 = NO2 = PB =	SB = H2S=
MC = 21.60 PO4 = MN = CO3 = NH4 = AS =	$\begin{array}{cccc} 00 & CU = & 02 = \\ CB = & P = \end{array}$
H/D= 0.00 018= 0.00 C13= 0.00 HE3= 0.00 S34= 0.00 C14= 0.0	0 T3 = 0.00 DIS = 408.00
COMENT:	
14 ID#=6-4835-01 TYP=TUNNEL COU=MAUI LOC=UKUMEHAME PUMP-P LAT.LON= 20	4847. 1563558.00 DAT=1079
ELE = 79.00 WAD = 6.00 WED = 143.00 FLO = SPC = PH = 7.5	0 = EH = TEM = 33.11
NA = 220.00 CL = 459.00 BA = CAR = 108.00 HAR = 330.00 HG = CAR = CAR = N = CAR = N = CAR = N = CAR = CAR = N = CAR = CAR = N = CAR = C	SE = SI0 = 76.00
K = 17.00  BR = 6.00  SR = C02 = N02 = PB =	SB = H2S=
MG = 26.09 P04 = 0.05 NN = 0.02 NO3 = 11.00 TH = 0.00	0  CU = 02 =
H/D= 0.00 018= 0.00 C13= 0.00 HE3= 0.00 S34= 0.00 C14= 0.00	CR = P = 0.01 co
SOURCE=0.H., DOWALD(3/77), H.I.G.(10/78) COMENT:	0.00 113- 921.00
15 ID#=6-4837-01 TYP=TUNNEL COU=MAUI LOC=OLOWALII PHMP-0 LAT LON- 00.	
ELE= $20.00$ WAD= $2.00$ WED= $20.00$ FLO= SPC= PH = 7.60	DUD 1000(09.00 DAT=1978. DEH = TEM= 95.97
NA = 260.00 CL = 676.00 BA = 0.90 ALK= 98.00 HAR= 500.00 HG =	SE = SI0 = 58.30
K = 8.50  BR = 4.00  SR = 0.02  R	ZN = S04 = 86.00 SB = U28-
CA = 152.00 I = 0.02 FE = HCO= 120.00 NO3= 5.90 TH = 0.00	0 CU = 02 = 02 = 02 = 02 = 02 = 02 = 02 = 0
H/D= 0.00 018= 0.00 C13= 0.00 HE3= 0.00 S34= 0.00 C14= 0.00	CR = P =
SOURCE=U.H., DOWALD(8/79), H.I.G.(10/78) COMENT:	9 10 = 9.00 BIS= 956.00

				GOU=	HAUI	FLO-	LOC=OLOWAI	U SHAI	T-N 4670.00	LAT,LON= PH =	2049	31. 15 EH =	63712.00	TEM=	25.61
ELE= 10	65.00	WAD = F =	0.05	$\mathbf{B} =$	1.00	ALK=	116.00	HAR=	890.00	HG =		SE =		SIO=	73.50
NA = 2	55.00	CL =	669.00	BA =		CAR=		N =	1.90	CD =		ZN =		S04=	76.00
K =	11.90	BR =	2.50	SR =	10.00	C02=	18.00	N02=	C 40	PB =	A AA	SB =		H2S=	
CA = 1	12.00	I =	0.03	FE =	10.00	HCO=	141.00	NO3=	6.40	1H =	0.00	CD =		02 = 02 = 02 = 02 = 02 = 02 = 02 = 02 =	0.07
MG = 3	78.00	P04=	0.21	PIN = 0.12 =	0 00	UU3= UF9-	0 00	N14-	0 00	A5 -	0 00	T3 =	0 00		1900 00
H/D=	0.00 USCS(12	(74)	DOWALD(3/	77). H	U.00	/78)	0.00	20-1-	0.00	Q1 T	0.00	10 -	0.00	DID	1,00.00
COMENT:	0363(12	· • <del>·</del> · · ,	DOWNED	••/, 11		.0/									
Gommer															
17 ID#=	6-5130-	02 I	YP=WELL	COU=	MAUI	I	LOC=WAIKAH	20 2		LAT, LON=	2051	54.15	63038.00	DAT=1	978.
ELE = 5	18.00	WAD=	10.30	WED =	1020.00	FLO=	101 00	SPC=	461.00	PH =	8.10	EH =		TEM=	21.55
LI =		F =	0.08	B =		ALK=	194.00	HAR=	09.00	HC = CD =		DL =		S10-	15 00
NA = 3	36.00	- 90	36.00	BA =		GAn = CO2 =	3 00	N02=	4.00	PB =		SR =		H2S=	10.00
K =	3.00	DR ~ I =		FE =	10 00	HCO=	236.00	NO3=		ТН =	0.00	CU =		$\frac{1120}{02} =$	
MC =	13 00	P04=	1.00	- MM	10.00	C03=		NH4 =		$\overrightarrow{AS} =$		CR =		P =	0.34
HZD=	0.00	018=	0.00	C13=	0.00	HE3=	0.00	S34=	0.00	C14=	0.00	T3 =	0.00	DIS=	288.00
SOURCE=	USGS (3/	74), I	OWALD(3/7	7), H.	I.G. (10/7	78)									
COMENT:		-													
				000	<b>35 A TT T</b>	т	OC-WATEAT	ממיס דות	INC	LAT LON-	9651	97 15	63304 00	DAT=1	979
18 1D#=	6-5133-1		YP=SPRING	- COU=	MAUI	FLO=	JUG=WAIKAI	SPC=	ing	PH =	2001	EH =	00004.00	TEM=	19.25
ELE= 140	80.00	F =		NLD- R =		ALK=		HAB=		HG =		SE =		SI0=	17.000
$L_1 =$	12 60	r = CL =	13.70	BA =		CAR=		N =		$\overline{CD}$ =		ZN =		S04=	13.20
K =	1.40	BR =	10	SR =		C02=		N02=		PB =		SB =		H2S =	
CA =	3.20	1 =		FE =		HCO=		NO3=		TH =		CU =		02 =	
MG =	4.56	P04=		MN =		C03=		NH4=		AS =		CR =		P =	
H/D=		018=		C13=		HE3=		S34=		C14=		T3 =		DIS=	
SOURCE=1	H.I.G.(	B/79)						n.on					T MADA		
COMENT	LOCATED	~800	METERS UP	VALLE	Y FROM "	5132-02	2" AT THE	BASE	OF THE LI	EFT WALLU	SG5 QU.	ADRANGL	E FIAT)		
10 10#=	6-5240-1	ד ו מ	YP=THNNEL	COII=	ΜΔΗΙ	т	OC=PIONEP	R MILL	PUMP-C	LAT.LON=	2052	55. 15	64044.00	DAT=1	978.
FLF= 2	34.00	WAD=	3.00	WED=	39.00	FLO=		SPC=		PH =	7.20	EH =		TEM=	26.82
LI =	01.00	7 =	0.08	B =	0.50	ALK=	159.00	HAR=	830.00	HG =		SE =		SI0=	64.40
NA = 4	65.00	CL =	1030.00	BA =		CAR=		N =		CD =		ZN =		S04=	144.00
K =	17.00	BR =	12.00	SR =		C02=		NO2=		PB =		SB =		H2S=	
CA = 1	23.00	I =	0.30	FE =		HCO=	194.00	NO3=	22.00	TH =	0.00	CU =		02 =	
MG = -1	19.00	P04=	0.20	MN = 0.0	0 00	003=	A 00	NH4=	0 00	A8 -	0 00	$T_{2} =$	0 00		2040 00
H/D=	0.00 U U D	018=	0.00 17 17 17	1013 = 100	0.00	HL3-	9.00	004-	0.00	617-	0.00	10 -	0.00	018-	2010.00
CONFUT.	0.n., <i>D</i>	UNALU	олил, ц.	1.0.(1	97 (0)										
COMENT .															
										•					
20 ID#=	6-5240-	02 I	TYP=TUNNEL	COU=	MAUI	I	LOC=LAHAIN	A-A		LAT, LON=	2052	28. 15	64017.00	DAT=1	978.
ELE=	30.00	WAD=	2.00	WED=	31.00	FLO=		SPC=		PH =		EH =		TEM=	67 10
LI =	<b>TO 00</b>	F =	0.07	<u>B</u> =		ALK=		HAR=		no = cn -		SL = ZN -		S10-	200 00
NA = 6'	72.00	UL =	1300.00	ВА = Ср -		CON-		NU02-		PB =		SB =		H2S=	
	22.00	= 70		Sn - FE =		HCO=		NO3=		TH =	0.00	$\widetilde{C}\widetilde{U}$ =		02 =	
UA = 1	40.60	P04=		MN =		C03=		NH4=		$\overline{AS} =$		CR =		P =	
HZD= 1	0.00	018=	0.00	C13=	0.00	HE3=	0.00	S34=	0.00	C14=	0.00	T3 =	0.00	DIS=	
SOURCE=	DOWALD	3/77).	H.I.G.(1	0/78)											
COMENT:															

$ \begin{array}{c} \begin{array}{c} \begin{array}{c} & & & \\ & & & & \\ & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & $	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{ccccccc} \text{LAT, LON} & 205227.\\ \text{PH} & = & 7.20 & \text{EH}\\ \text{HG} & & & \text{SE}\\ \text{CD} & & & & \text{ZN}\\ \text{PB} & & & & \text{SB}\\ \text{TH} & & 0.00 & \text{CU}\\ \text{AS} & = & & & \text{CR}\\ \text{C14} & & 0.00 & \text{T3} \end{array}$	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$
COMENT: 22 ID#=6-5319-01 TYP=SPRING COU=MAUI	LOC=SILVENO SPRING	LAT,LON= 205301.	1561935.00 DAT=1979.

22	11#=6-5319	-91	FYF=SFRING	GOU=MAUI	TOC-01	LVENU SFRING	LAI,LON-	200001.	1001300100	DHIMI	
ELE	800.00	WAD=		WED=	FLO=	SPC=	PH =	EH	=	TEM=	19.80
LI	:	F =	0.08	B =	ALK=	HAR=	HG =	SE	=	SI0=	
NA =	= 19.00	$\overline{CL} =$	17.30	BA =	CAR=	N =	CD =	ZN	2	S04=	11.70
к =	1.90	$\overline{BR} =$		SR =	C02=	NO2=	PB =	SB	=	H2S =	
ČA =	2.50	I =		FE =	HCO=	NO3=	TH =	CU	=	02 =	
MC =	4,10	P04=		MN =	C03=	NH4=	AS =	CR	=	P =	
HZD	:	018=		C13=	HE3=	S34=	C14=	T3	=	DIS=	
SOUL	CE=H.I.G.	(8/79)									

COMENT: SPRING AT BOTTOM OF GULLEY WALL JUST PRIOR TO MALIKO GULCH.

23	TD#	=6-5321-	-01	TYP=TUNNEL	COU	=MAUI		LOC=KAHEK/	PUMP-18	8'B'	LAT, LON=	205327.	1562132.00	DAT=1	979.
ELF	]=	522.00	WAD=	6.20	WED=		FLO	)=	SPC=		PH =	7.70 EI	I =	TEM=	20.50
LI	=		F =	0.40	в =	0.1	Ø ALK	= 57.00	HAR=	66.00	HG =	S	() =	SI0=	53.00
NΔ	=	232.00	CL =	431.00	BA =		CAR	=	N =		CD =	Z	{ =	S04=	95.00
K	=	16.00	BR =	0.72	SR =		C02	=	NO2=		PB =	S	} =	H2S=	
CΔ	=	20.60	I =	0.05	FE =		HCO	= 140.00	NO3=	8.60	ТН =	CI	J =	02 =	
MC	Ξ	32.50	P04=	1.42	MN =		CO3	=	NH4=		AS = .	C	{ =	P =	
H/L	)=	02000	018=		C13=		HE3	=	S34=		C14=	T	} =	DIS=	279.00
SOU COM	IRCE	=U.H., I :	DOWALD	9(3/77), H.	I.G.(	8/79)									

24	IDa	#=6-5323-	-01	TYP=TUNNEL	COU=MAUI		LOC=PAIA	PUMP-2	'A'	LAT, LON=	20534	4.	1562346.00	DAT=1	979.
FL	E=	125.00	WAD=	3.90	WED=	FLO=		SPC≃		PH =	7.20	EH	=	TEM=	22.80
LI	=	6.00	F =	0.46	в =	ALK=	115.00	HAR=	250.00	HG =		SE	= .	SI0=	56.00
ŇΔ	=	300.00	$\overline{CL} =$	543.00	BA =	CAR=		N =		CD =		ZN	2	S04=	178.00
ĸ	. =	17.00	BR =	3.30	SR =	C02=	:	NO2=		PB =		SB	=	H2S=	
CΔ	=	27.30	=	0.06	FE =	HCO=	140.00	N03=	14.00	TH =		CU	=	02 =	
MC	. =	47.90	P04=	0.68	MN =	C03=		NH4=		AS =		CR	=	Р =	
H/	D=		018=	:	C13=	HE3=		S34=		C14=		тз	<b>a</b> 1	DIS=	964.00
SO	URCI	E=U.H., I	DOWALL	(3/77), H.	I.G.(8/79)										
CO	MENT	Г:													

25 ID#=6-5330-09 TYP=WELL		COU=MAUI		LOC=MOKUHAU PUMP-1				LAT, LON= 205329.			1563055.00		DAT=1978.			
ELE=	353.00	WAD=	23.00	WED=	600.00	FLO=		SPC=	470.00	PH =	7.50	EH	=		TEM=	23.54
LI =		F =	0.06	B =		ALK=	61.00	HAR=	98.00	HG =		SE	Ξ		SI0=	58.00
NA =	38.00	CL =	81.50	BA =		CAR=		N =		CD =		ZN	=	0.01	S04=	116.00
K =	3.30	BR =		SR =		C02=		NO2 =		PB =		$\mathbf{SB}$	=		H2S =	
$\vec{C}A =$	26.00	1 =		FE =		HCO=	75.00	NO3 =	4.60	ТН =	0.00	CU	=		02 =	
MG =	16.00	P04=		MN =		C03=		NH4 =		AS =		CR	=		P =	
H/D=	0.00	018=	0.00	C13=	0.00	HE3=	0.00	S34=	0.00	C14=	0.00	ТЗ	11	0.00	DIS=	198.00
SOURC	E=USGS.	DOWALD(	3/77), H.	I.G.(1	0/78)			5								
COHEN	T:															

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									and the second second						
	and the second statements	and the subscript	and the second			т	OC=MOKUH	U PUMP	-2	LAT, LON=	2053	29. 1	563055.00	DAT=1	978.
26 ID			21.00	WED=	600.00	FLO=		SPC=	400.00	PH =	7.60	EH =	n an	SIO-	20.01 50 9A
LLE=	333.00	F =	0.95	в =		ALK=	78.00	HAR=	100.00	HG = OD =		SE =		S10-	104 00
NA =	67.00	CL =	158.00	BA =		CAR=		N =	1.10	UD = DD = DD				304- 100-	190.00
к =	4.30	BR =		SR =		C02=	3.80	NO2=		PB =	0 00	SB =		H28=	
CA =	39.00	I =		FE =	20.00	HCO=	95.00	NO3 =		TH =	0.00	<u> </u>	· · ·	02 =	
14G =	23.00	P04=	9.25	MN =		CO3=		NH4=		AS =		CR =		P =	0.08
H∕D=	0.00	018=	0.00	C13=	0.00	HE3 =	0.00	S34=	0.00	C14=	0.00	T3 =	0.00	DIS=	242.00
SOURCI	E=USGS(9)	/74), D	OWALD (3/	77), H.	I.G.(10/	78)									
COMEN	T:														
0011200	-														
27 ID	#=6-5330	-11 T	YP=WELL	COU=1	MAUT	L	OC=MOKUH/	U PUMP	-3	LAT, LON=	2053:	30. 1	563054.00	DAT=1	978.
FIF=	354 66	wAD=		WED=		FLO=		SPC=	370.00	PH =	7.60	EH =	:	TEM=	23.52
	001.00	F =	0 06	B =		ALK=	81.00	HAB=	99.00	HG =		SE =	0.01	SI0=	64.00
	94 60	C1 =	47 50	$B\Lambda =$		CAB=	81.00	N =	2.60	$\overline{CD} =$		ZN =	0.01	S04=	7.00
$\mathbf{N}\mathbf{A} =$	34.00		-rt . 00	GP -		CO2-	4 00	NO2=	<u>a a2</u>	PB =	0.01	SB =		H2S=	
K =	2.00	BR ~		BR -	A A9	102-	00 00	NO2-	4 49	TH =	a aa	CU =	1	$\frac{12}{02} =$	
CA =	21.00	1 =		rr -	0.04	nu0-	99.00	NUO~	T.TO	111 ~ A@ =	0.00	CP =		P =	
MG =	14.00	P04=			0.05	003=	0 00	ND4-	A AA	AC -	A AA	TO -	0.00		955 00
H∕D=	0.00	018=	0.00	C13=	0.00	HE3=	0.00	534=	0.00	015-	0.00	19 -	0.00	D15-	200.00
SOURCI	E=USGS(9)	/74), D	OWALD (3/7	77), Н.	1.G. (10/	78)									
COMENT	T:														
28 ID#	#=6-5339	-04 T	YP=WELL	COU=	MAUI	L	OC=KANAH/	1-2		LAT, LON=	20534	<u>41.</u> 1	563923.00	DAT=1	978.
ELE=	654.00	WAD=	3.20	WED=	749.00	FLO=		SPC=	150.00	PH =	8.00	EH =	1	TEM=	20.30
I.I =		F =	0.10	B =		ALK=	56.00	HAR=	51.00	HG =		SE =	1	SIO=	50.00
$\tilde{N}\Delta =$	188.00	ČL =	403.00	EA =		CAR=		N =	0.33	CD =		ZN =	1	S04=	56.00
V =	5 80	BB =		SB =		C02=	1.10	NO2=		PB =		SB =	:	H2S =	
C1 -	57 00	T =		FE =	80.00	HCO=	68.00	NO3=		'TH =	0.00	CU =		02 =	
UA -	07 00	P04-	0 34	WN =	00.00		00100	MAIA -		AS =.		CP -		<b>D</b>	0.08
MG =	31.00	F + 144 -										<b>1</b> <i>1 1 1 1</i>		P =	
8705	0 00	010-	0.01	C12-	0 00	003= ur9-	0 00	S24=	0 00	C14=	0.00	T3 =	0.00	P = DIS =	123.00
aorma	0.00	018=	0.00 0.00	C13=	0.00	HE3=	0.00	S34=	0.00	C14=	0.00	T3 =	0.00	P = DIS=	123.00
SOURCI	0.00 E=USCS(2	018= /74), D	0.00 OWALD(3/	C13=	0.00 I.G.(10/	HE3= 78)	0.00	834=	0.00	C14=	0.00	T3 =	0.00	P = DIS=	123.00
SOURCI COMEN	0.00 E=USGS(2 T:	018= /74), D	0.00 OWALD(3/1	С13= 77), Н.	0.00 I.G.(10/	HE3= 78)	0.00	834=	0.00	C14=	0.00	T3 =	0.00	P = DIS=	123.00
SOURCI	0.00 E=USCS(2 T:	018= /74), D	0.00 OWALD(3/3	C13= 77), H.	0.00 I.G.(10/	603≞ HE3= 78)	0.00	834=	0.00	C14=	0.00	T3 =	0.00	P = DIS=	123.00
SOURCI	0.00 E=USCS(2. T:	018= /74), D	0.00 OWALD(3/3	C13=	0.00 I.G.(10/	CO3= HE3= 78)	0.00	834=	0.00	C14=	0.00	T3 =	0.00	P = DIS=	123.00
SOURCI COMENT	0.00 E=USGS(2 T: #=6-5340	018= /74), D	0.00 OWALD(3/3 YP=TUNNE	C13= 77), H.	0.00 I.G.(10/	CC3= HE3= 78)	0.00 OC=PIONR-	S34=	0.00 KULI-1	C14=	0.00 _2053:	T3 = 24.1	0.00	P = DIS= DAT=1	123.00 978.
SOURCI COMENT 29 ID ELE=	0.00 E=USGS(2 T: #=6-5340 26.00	018= /74), D -01 T WAD=	0.00 OWALD(3/3 YP=TUNNE1 1.50	C13= C13= 77), H. L COU=: WED=	0.00 I.G.(10/ MAUI 27.00	LU3= HE3= 78) L FL0=	0.00 OC=PIONR	-L WAHI	0.00 KULI-1	C14= LAT,LON= PH =	0.00 2053: 7.40	T3 = 24. 1 EH =	0.00	P = DIS= DAT=1 TEM=	123.00 978. 25.22
SGURCI COMENT 29 ID ELE= LI =	0.00 E=USGS(2 T: #=6-5340 26.00	$\begin{array}{c} 018 = \\ 74), D \\ -01 T \\ WAD = \\ F = \end{array}$	0.00 OWALD(3/5 YP=TUNNE 1.50	C13= C13= C13= C13= C13= C13= C13= C13=	0.00 I.G.(10/ MAUI 27.00 0.10	LC3= HE3= 78) L FL0= ALK=	0.00 0C=PIONR- 123.00	S34= -L WAHI SPC= HAR=	0.00 KULI-1 430.00	C14= LAT,LON= PH = HC =	0.00 2053: 7.40	T3 = 24. 1 EH = SE =	0.00	DAT=1 DIS= DAT=1 TEM= SIO=	123.00 978. 25.22 51.40
SOURCI COMENT 29 ID ELE= LI = NA =	0.00 E=USCS(2 T: #=6-5340 26.00 413.00	018= /74), D -01 T WAD= F = CL =	0.00 OWALD(3/5 YP=TUNNE 1.50 1180.00	C13= C13= 77), H. L COU= WED= B = BA =	0.00 I.G.(10/ MAUI 27.00 0.10	CC3= HE3= 78) L FL0= ALK= CAR=	0.00 0C=PIONR- 123.00	S34= -L WAHI SPC= HAR= N =	0.00 KULI-1 430.00	C14= LAT,LON= PH = HC = CD =	0.00 2053 7.40	24. 1 EH = SE = ZN =	0.00 564057.00	DAT=1 DAT=1 TEM= SIO= SO4=	123.00 978. 25.22 51.40 240.00
SOURCI COMEN 29 ID ELE= LI = NA = K =	0.00 E=USCS(2 T: #=6-5340 26.00 413.00 13.40	018= /74), D -01 T WAD= F = CL = BR =	0.00 OWALD(3/3 YP=TUNNE 1.50 1180.00 5.00	C13= C13= C7), H. L COU= WED= B = BA = SR =	0.00 I.G.(10/ MAUI 27.00 0.10	CC3= HE3= 78) L FLO= ALK= CAR= CO2=	0.00 0C=PIONR- 123.00	S34= -L WAHI SPC= HAR= N = NO2=	0.00 KULI-1 430.00	C14= LAT,LON= PH = HG = CD = PB =	0.00 2053 7.40	24. 1 EH = SE = ZN = SB =	0.00	DAT=1 DIS= DAT=1 TEM= SIO= SO4= H2S=	123.00 978. 25.22 51.40 240.00
SGURCI COMENT 29 ID ELE= LI = NA = K = CA =	0.00 E=USCS(2 T: #=6-5340 26.00 413.00 13.40 166.00	018= /74), D WAD= F = CL = BR = I =	0.00 0WALD(3/ YP=TUNNE 1.50 1180.00 5.00 0.02	C13= C13= 77), H. WED= B = BA = SR = FE =	0.00 I.G.(10/ MAUI 27.00 0.10	L HE3= 78) L FLO= ALK= CAR= CO2= HCO=	0.00 OC=PIONR- 123.00 150.00	S34= -L WAHI SPC= HAR= N = NO2= NO3=	0.00 KULI-1 430.00 14.00	C14= LAT, LON= PH = HC = CD = PB = TH =	0.00 2053 7.40 0.00	24. 1 EH = SE = ZN = SB = CU =	0.00 564057.00	DAT=1 DIS= DAT=1 TEM= SIO= SO4= H2S= O2 =	123.00 978. 25.22 51.40 240.00
SGURCI COMENT 29 ID ELE= LI = NA = CA = MG =	0.00 E=USCS(2 T: #=6-5340 26.00 413.00 13.40 166.09 174.00	$\begin{array}{c} 018 = \\ 74), D \\ \hline WAD = \\ F = \\ CL = \\ BR = \\ I = \\ PO4 = \end{array}$	0.00 0WALD(3/3 YP=TUNNEI 1.50 1180.00 5.00 0.02 0.20	C13= C13= 77), H. WED= B = BA = SR = FE = MN =	0.00 I.G.(10/ MAUI 27.00 0.10	LU3= HE3= 78) FL0= ALK= CAR= CO2= HC0= C03=	0.00 OC=PIONR- 123.00 150.00	S34= -L WAHI SPC= HAR= NO2= NO3= NH4=	0.00 KULI-1 430.00 14.00	C14= LAT, LON= PH = HG = CD = PB = TH = AS =	0.00 2053 7.40 0.00	24. 1 EH = SE = ZN = CU = CR =	0.00 564057.00	DAT=1 DIS= DAT=1 TEM= SIO= SO4= H2S= O2 = P =	123.00 978. 25.22 51.40 240.00
SGURCI COMENT 29 ID ELE= LI = NA = K = CA = IG = H / D=	0.00 E=USCS(2. T: #=6-5340 26.00 413.00 13.40 166.00 174.00 0.00	018= 74), D -01 T WAD= F = CL = BR = I = P04= 018=	0.00 0WALD(3/3 YP=TUNNEJ 1.50 1180.00 5.00 0.02 0.20 0.20 0.00	C13= C13= C13= C0U= WED= B = BA = SR = FE = MN = C13=	0.00 I.G.(10/ MAUI 27.00 0.10 0.00	LU3= HE3= 78) L FL0= ALK= CAR= CO2= HC0= C03= HE3=	0.00 OC=PIONR- 123.00 150.00 0.00	-L WAHI SPC= HAR= N = N02= N03= NH4= S34=	0.00 KULI-1 430.00 14.00 0.00	C14= C14= PH = HG = PB = TH = AS = C14=	0.00 2053: 7.40 0.00 0.00	T3 = T3 = T3 EH = SE = SE = SB = CR = CR = T3 = T	0.00	P = DIS= DAT=1 TEM= SIO= SO4= H2S= O2 = P = DIS=	123.00 978. 25.22 51.40 240.00 900.00
SGURCI COMENT 29 ID ELE= LI = NA = K = CA = H/D= SOUBCI	0.00 $E=USCS(2)$ $#=6-5340$ $26.00$ $413.00$ $13.40$ $166.00$ $174.00$ $0.00$ $F=UH$	018= 74), D -01 T WAD= F = CL = BR = I = P04= 018= D04ALD(	0.00 0WALD(3/3 YP=TUNNEI 1.50 1180.00 5.00 0.02 0.20 0.60 3/77). H	C13= C13= C13= WED= B = BA = SR = FE = MN = C13= . I.G. (1)	0.00 I.G.(10/ MAUI 27.00 0.10 0.00 0.78)	LU3= HE3= 78) L FL0= ALK= CAR= CO2= HC0= HE3=	0.00 OC=PIONR- 123.00 150.00 0.00	-L WAHI SPC= HAR= N = NO2= NH4= S34=	0.00 KULI-1 430.00 14.00 0.00	C14= LAT,LON= PH = HC = CD = PB = TH = AS = C14=	0.00 2053: 7.40 0.00 0.00	24. 1 EH = SE = ZN = SB = CU = CU = T3 =	0.00 564057.00 0.00	DAT=1 DIS= DAT=1 TEM= SIO= SIO= SIO= H2S= DIS=	123.00 978. 25.22 51.40 240.00 900.00
SGURCI COMENT 29 ID ELE= LI = NA = K = CA = HC = HC = SOURCI	0.00 E=USCS(2 T: #=6-5340 26.00 413.00 13.40 166.09 174.00 0.00 E=U.H., T	018= 74), D WAD= F = CL = BR = I = P04= 018= DOWALD(	0.00 0WALD(3/3 YP=TUNNE 1.50 1180.00 5.00 0.02 0.20 0.20 0.00 3/77), H	C13= C13= C13= C13= E B B B B B B B B B B B C C C C C C C C	0.00 I.G.(10/ MAUI 27.00 0.10 0.00 0/78)	LU3= HE3= 78) L FL0= ALK= CAR= CO2= HC0= CO3= HE3=	0.00 OC=PIONR- 123.00 150.00 0.00	S34= -L WAHI SPC= HAR= N = N02= N03= NH4= S34=	0.00 KULI-1 430.00 14.00 0.00	C14= LAT,LON= PH = HC = CD = PB = TH = AS = C14=	0.00 2053 7.40 0.00 0.00	24. 1 EH = SE = ZN = CU = CR = T3 =	0.00 564057.00 0.00	DAT=1 DIS= DAT=1 TEM= SIO= SO4= H2S= O2 = P = DIS=	123.00 978. 25.22 51.40 240.00 900.00
SGURCI COMENT 29 ID ELE= LI = NA = K = CA = MG = H/D= SOURCI COMENT	0.00 E=USGS(2 T: #=6-5340 26.00 413.00 13.40 166.00 174.00 0.00 E=U.H., T T:	018= 74), D WAD= F = CL = BR = I = P04= 018= DOWALD(	0.00 0WALD(3/3 YP=TUNNE1 1.50 1180.00 5.00 0.02 0.20 0.00 3/77), H	C13= C13= C13= C13= E B B B B B B B B B B C C C C C C C C C	0.00 I.G.(10/ MAUI 27.00 0.10 0.00 0/78)	CC3= HE3= 78) L FLO= ALK= CAR= CO2= HCO= CO3= HE3=	0.00 OC=PIONR- 123.00 150.00 0.00	S34= -L WAHI SPC= HAR= N = N02= N03= NH4= S34=	0.00 KULI-1 430.00 14.00 0.00	C14= LAT,LON= PH = HC = CD = PB = TH = AS = C14=	0.00 2053 7.40 0.00 0.00	24. 1 EH = SE = ZN = CU = CR = T3 =	0.00 564057.00 00	P = DIS= DAT=1 TEM= SIO= SO4= H2S= O2 = P = DIS=	123.00 978. 25.22 51.40 240.00 900.00
SGURCI COMENT 29 ID ELE= LI = NA = K = CA = MG = H×D= SOURCI COMENT	0.00 E=USCS(2 T: #=6-5340 26.00 413.00 13.40 166.00 174.00 0.00 E=U.H., 1 T:	018= /74), D WAD= F = CL = BR = I = PO4= 018= DOWALD(	0.00 0WALD(3/ YP=TUNNE) 1.50 1180.00 5.00 0.02 0.20 0.00 3/77), H	C13= C13= C13= C13= WED= B = B = B = SR = FE = MN = C13= . I.G. (1)	0.00 I.G.(10/ MAUI 27.00 0.10 0.00 0/78)	CC3= HE3= 78) L FLO= ALK= CAR= CO2= HCO= CO3= HES=	0.00 OC=PIONR- 123.00 150.00 0.00	NH4- S34= -L WAHI SPC= HAR= N = N02= N03= NH4= S34=	0.00 KULI-1 430.00 14.00 0.00	C14= LAT, LON= PH = HC = CD = PB = TH = AS = C14=	0.00 2053 7.40 0.00 0.00	T3 = T3 = EH = SE = ZN = SB = CU = CR = T3 =	0.00 564057.00 0.00	DAT=1 DIS= DAT=1 TEM= SIO= SO4= H2S= O2 = P = DIS=	123.00 978. 25.22 51.40 240.00 900.00
SGURCI COMENT 29 ID ELE= LI = NA = K = CA = MC = H/D= SOURCH COMENT	0.00 E=USCS(2 T: #=6-5340 26.00 413.00 13.40 166.00 174.00 0.00 E=U.H., T T:	018= 74), D WAD= F = CL = BR = I = P04= 018= D0WALD(	0.00 0WALD(3/ YP=TUNNEJ 1.50 1180.00 5.00 0.02 0.20 0.00 3/77), H	C13= C13= C13= C13= B = B = B = B = SR = FE = MN = C13= .I.G.(1)	0.00 I.G.(10/ MAUI 27.00 0.10 0.00 0/78)	CC3= HE3= 78) L FLO= ALK= CAR= CO2= HCO= CO3= HE3=	0.00 0C=PIONR- 123.00 150.00 0.00	-L WAHI SPC= HAR= NO2= NO3= NH4= S34=	0.00 KULI-1 430.00 14.00 0.00	C14= LAT, LON= PH = HG = CD = PB = TH = AS = C14= LAT, LON=	0.00 2053 7.40 0.00 0.00	CR = T3 = T3 = 24. 1 EH = SE = 2N = 2	0.00	DAT=1 DIS= DAT=1 TEM= SIO= SO4= H2S= O2 = P = DIS= DAT=1	123.00 978. 25.22 51.40 240.00 900.00
SGURCI COMENT 29 ID ELE= LI = NA = CA = MC = H×D= SOURCH COMENT 30 ID	0.00 E=USCS(2 T: #=6-5340 26.00 413.00 13.40 166.00 174.00 0.00 E=U.H., T T: #=6-5340	018 = 017 $\sqrt{74}$ , D $\sqrt{74}$ , D 7	0.00 0.00 0WALD(3/3 1.50 1180.00 5.00 0.02 0.20 0.00 3/77), H YP=TUNNEI	C13= C13= C13= 77), H. WED= B = BA = SR = FE = MN = C13= .I.G.(1) 	0.00 I.G.(10/ MAUI 27.00 0.10 0.70 0/78) MAUI	L HE3= 78) L FLO= ALK= CAR= CO2= HEO= CO3= HE3=	0.00 0C=PIONR- 123.00 150.00 0.00 0C=KAHOM	-L WAHI SPC= HAR= N = NO2= NO2= NH4= S34=	0.00 KULI-1 430.00 14.00 0.00	C14= LAT, LON= PH = HG = CD = PB = TH = AS = C14= LAT, LON= PH =	0.00 2053: 7.40 0.00 0.00 2053: 7.40	$\begin{array}{c} CR & - \\ T3 & = \\ C4 & . & 1 \\ EH & = \\ SE & = \\ CR & = \\ CR & = \\ CR & = \\ T3 & = \\ T3 & = \\ 43 & . & 1 \\ EH & = \\ \end{array}$	0.00 564057.00 0.00 564011.00	P = DIS= DAT=1 TEM= SIO= SO4= H2S= O2 = P = DIS= DAT=1 TEM=	123.00 978. 25.22 51.40 240.00 900.00 978. 23.65
SGURCI COMENT 29 ID ELE= LI = NA = K = CA = MG = H/D= SOURCI COMENT 30 ID ELE=	0.00 E=USCS(2. T: #=6-5340 26.00 413.00 13.40 166.00 174.00 0.00 E=U.H., T T: #=6-5340 322.00	018= 74), D WAD= F = CL = BR = I = PO4= 018= DOWALD( -02 T WAD=	0.00 0.00 0WALD(3/3 1.50 1180.00 5.00 0.20 0.20 0.00 3/77), H YP=TUNNEI 2.20	C13= C13= C13= C13= B = B = B = B = SR = FE = MN = C13= .I.G.(1) C0U= WED=	0.00 I.G.(10/ MAUI 27.00 0.10 0.78) MAUI 323.00	L HE3= 78) L FL0= ALK= CAR= CO2= HE3= HE3=	0.00 0C=PIONR- 123.00 150.00 0.00 0C=KAHOM	-L WAHI SPC= HAR= N = NO3= NH4= S34= A SHAFT SPC= HAP-	0.00 KULI-1 430.00 14.00 0.00 5 "M" 3400.00	C14= LAT, LON= PH = HG = CD = PB = TH = AS = C14= LAT, LON= PH = HC =	0.00 2053 7.40 0.00 0.00 2053 7.40	24. 1 EH = SE = SB = CR = CR = T3 = 43. 1 EH = SE =	0.00 564057.00 0.00 564011.00	DAT=1 DIS= DAT=1 TEM= SIO= SO4= DIS= DIS= DIS=	123.00 978. 25.22 51.40 240.00 900.00 978. 23.65 57.30
SGURCI COMENT 29 ID ELE= LI = NA = K = CA = MC = H $\angle$ D= SOURCI COMENT 30 ID ELE= LI =	0.00 E=USGS(2 T: #=6-5340 26.00 413.00 13.40 166.00 174.00 0.00 E=U.H., T T: #=6-5340 322.00	$ \begin{array}{c} 018 = \\ 74), D \\ \hline WAD = \\ F = \\ CL = \\ BR = \\ I = \\ PO4 = \\ 018 = \\ DOWALD(C) \\ \hline -02 T \\ WAD = \\ F = \\ F = \\ \end{array} $	0.00 0.00 0WALD(3/3 YP=TUNNEI 1.50 1180.00 5.00 0.20 0.20 0.00 3/77), H YP=TUNNEI 2.20 0.05	C13= C13= C13= C13= B = BA = BA = SR = MN = C13= . I.G. (1) COU= WED= B =	0.00 I.G.(10/ MAUI 27.00 0.10 0.78) 0/78) MAUI 323.00 5.40	L HE3= 78) L FL0= ALK= CAR= CO2= HC0= HE3= L FL0= ALK= CAR= CAR=	0.00 0C=PIONR- 123.00 150.00 0.00 0C=KAHOM/ 75.00	-L WAHI SPC= HAR= N = NO2= NH4= S34= A SHAFT SPC= HAR=	0.00 KULI-1 430.00 14.00 0.00 5 "M" 3400.00 147.00	C14= LAT,LON= PH = HG = CD = PB = TH = AS = C14= LAT,LON= PH = HG = CD =	0.00 2053: 7.40 0.00 0.00 2053 7.40	24. 1 EH = SE = ZN = CR = CR = T3 = 43. 1 EH = SE = 27 = 73 =	0.00 564057.00 0.00 564011.00	DAT=1 DIS= DAT=1 TEM= SIO= SO4= H2S= P = DIS= DIS= DAT=1 TEM= SIO= SO4-	123.00 978. 25.22 51.40 240.00 900.00 978. 23.65 57.30
SGURCI COMENT 29 ID ELE= LI = NA = K = CA = MC = H $\angle$ D= SOURCI COMENT 30 ID ELE= LI = NA =	0.00 E=USGS(2 T: #=6-5340 26.00 413.00 13.40 166.00 174.00 0.00 E=U.H., T T: #=6-5340 322.00 536.00	018 = 017 74), D F = 017 WAD = 017 F = 018 = 008 = 018 = 008 = 018 = 0	0.00 0.00 0WALD(3/3 1.50 1180.00 5.00 0.02 0.20 0.00 3/77), H YP=TUNNEl 2.20 0.05 1070.00	C13= C13= C13= 77), H. WED= BA = SR = FE = MN = C13= .I.G.(1)  COU=1 WED= B = BA = BA = SR =       	0.00 I.G.(10/ MAUI 27.00 0.10 0.78) 0.78) MAUI 323.00 5.40	L HE3= 78) L FL0= ALK= CAR= CO2= HCO= CO3= HE3= L FL0= ALK= CAR= CAR=	0.00 0C=PIONR- 123.00 150.00 0.00 0C=KAHOM/ 75.00	-L WAHI SPC= HAR= N = NO2= NO3= NH4= S34= A SHAFT SPC= HAR= N =	0.00 KULI-1 430.00 14.00 0.60 5 "M" 3400.00 147.00	C14= LAT, LON= PH = HG = CD = PB = TH = AS = C14= LAT, LON= PH = HG = CD = PH = HG = CD =	0.00 2053 7.40 0.00 0.00 2053 7.40	24. 1 EH = SE = ZN = CR = CR = T3 = 43. 1 EH = SE = ZN = CR = T3	0.00 564057.00 0.00 564011.00	DAT=1 DIS= DAT=1 TEM= SIO= SO4= H2S= DIS= DIS= DAT=1 TEM= SIO= SO4= H2S=	123.00 978. 25.22 51.40 240.00 900.00 978. 23.65 57.30 157.00
SGURCI COMENT 29 ID ELE= LI = NA = K = CA = MC = H $\angle$ D= SOURCI COMENT 30 ID ELE= LI = NA = K =	0.00 E=USCS(2. T: #=6-5340 26.00 413.00 13.40 166.00 174.00 0.00 E=U.H., T T: #=6-5340 322.00 536.00 19.20	018 = 017 74), D F = 017 F = 018 = 018 = 018 = 0000 = 000 = 0000 = 0000 = 000 = 000 = 000 = 000 = 000 =	0.00 0.00 0WALD(3/3 1.50 1180.00 5.00 0.02 0.20 0.00 3/77), H YP=TUNNEI 2.20 0.05 1070.00 2.00	C13= C13= C13= WED= B = BA = SR = FE = MN = C13= .1.G.(1) WED= B = BA = SR = SR = SR =	0.00 I.G.(10/ MAUI 27.00 0.10 0.78) 0.78) MAUI 323.00 5.40	L HE3= 78) FL0= ALK= CO2= HE3= HE3= L FL0= ALK= CAR= CAR= CAR= CAR=	0.00 0C=PIONR- 123.00 150.00 0.00 0C=KAHOM/ 75.00	-L WAHI SPC= HAR= NO2= NO3= NH4= S34= A SHAFT SPC= HAR= N = NO2=	0.00 KULI-1 430.00 14.00 0.00 5 "M" 3400.00 147.00	C14= LAT, LON= PH = HG = CD = PB = TH = AS = C14= LAT, LON= PH = HG = CD = PB = TH = HG = CD = PB = C14=	0.00 2053 7.40 0.00 0.00 2053 7.40	24. 1 EH = SE = SB = CU = CR = T3 = 43. 1 EH = SE = ZN = SB = SE = SE = SE = CU = CR = CU = CR = CR = CU = CR = CR = CR = CU = CR	0.00 564057.00 0.00 564011.00	DAT=1 DIS= DAT=1 TEM= SIO= SO4= H2S= DIS= DIS= DAT=1 TEM= SIO= SO4= H2S= O2 =	123.00 978. 25.22 51.40 240.00 900.00 978. 23.65 57.30 157.00
SGURCI COMENT 29 ID ELE= LI = NA = K = CA = MC = H $\angle$ D= SOURCH COMENT 30 ID ELE= LI = NA = K = CA =	0.00 E=USCS(2 T: #=6-5340 26.00 413.00 13.40 166.00 174.00 0.00 E=U.H., T T: #=6-5340 322.00 536.00 19.20 93.00	018 = 017 74), D 74), D F = 017 F = 018 = 018 = 018 = 018 = 018 = 018 = 018 = 018 = 018 = 0000 = 0000 = 0000 = 00000 = 0000 = 0000 = 0000 = 000 = 000 = 000 = 00	0.00 0.00 0WALD(3/3 1.50 1180.00 5.00 0.02 0.20 0.00 3/77), H YP=TUNNEI 2.20 0.05 1070.00 2.00 0.03	C13= C13= 77), H. WED= B = B = SR = FE = MN = C13= .I.G.(1) WED= B = BA = SR = FE = FE = FE = SR = FE = FE = FE = SR = FE	0.00 I.G.(10/ MAUI 27.00 0.10 0.78) MAUI 323.00 5.40	L HE3= 78) L FLO= ALK= CO2= HCO= CO3= HE3= L FLO= ALK= CAR= CO2= HCO=	0.00 0C=PIONR- 123.00 150.00 0.00 0C=KAHOM/ 75.00 91.00	-L WAHI SPC= HAR= NO2= NO3= NH4= S34= A SHAFT SPC= HAR= NO2= NO3=	0.00 KULI-1 430.00 14.00 0.00 5 "M" 3400.00 147.00 3.10	C14= LAT, LON= PH = HG = CD = PB = TH = AS = C14= LAT, LON= PH = HG = CD = PB = TH = HG = CD = PH = HG = CD = C14=	0.00 2053 7.40 0.00 0.00 2053 7.40 0.00	CR = T3 = T3 = 24.1 EH = SE = 2N = 2	0.00 564057.00 0.00 564011.00	DAT=1 DIS= DAT=1 TEM= SIO= SIO= P = DIS= DIS= DAT=1 TEM= SIO= SO4= H2S= O2 = P2= DIS=	123.00 978. 25.22 51.40 240.00 900.00 978. 23.65 57.30 157.00
Source Coment Coment 29 ID ELE= LI = NA = CA = MC = H $\times$ D= Source Coment Source Coment Source LI = NA = K = CA = K = CA = MC = H = CA =	0.00 E=USGS(2. T: #=6-5340 26.00 413.00 13.40 166.09 174.00 0.00 E=U.H., T T: #=6-5340 322.00 536.00 19.20 93.60 102.09	-01 T WAD= F = CL = BR = I = PO4= 018= DOWALD( -02 T WAD= F = CL = BR = I = PO4=	0.00 0.00 0WALD(3/3 YP=TUNNEI 1.50 1180.00 5.00 0.02 0.20 0.00 3/77), H YP=TUNNEI 2.20 0.05 1070.00 2.00 0.33 0.30	C13= C13= C13= R = B = B = B = FE = MN = C13= .I.G.(1) 	0.00 I.G.(10/ MAUI 27.00 0.10 0.78) 0.78) MAUI 323.00 5.40	L HE3= 78) L FL0= ALK= CO2= HC0= CO3= HE3= L FL0= CAR= CO2= HC0= CO3=	0.00 0C=PIONR- 123.00 150.00 0.00 0C=KAHOM 75.00 91.00	-L WAHI SPC= HAR= N = NO2= NO2= NH4= S34= A SHAFT SPC= HAR= N = NO2= NO3= NH4=	0.00 KULI-1 430.00 14.00 0.00 5 "M" 3400.00 147.00 3.10	C14= LAT, LON= PH = HG = CD = PB = TH = AS = C14= LAT, LON= PH = HG = CD = PB = TH = AS = CD = PH = HG = CD = CD = PB = C14=	0.00 2053: 7.40 0.00 0.00 2053: 7.40 0.00	T3 = T3 = T3 EH = SE = SE = CU = T3 = CU = SE = S	0.00	P = DIS= DAT=1 TEM= SIO= SO4= H2S= O2 = P = DIS= DAT=1 TEM= SIO= SO4= H2S= O2 = P =	123.00 978. 25.22 51.40 240.00 900.00 978. 23.65 57.30 157.00
SGURCI COMENT 29 ID ELE= LI = NA = K = CA = MC = H $\angle$ D= SOURCI COMENT 30 ID ELE= LI = NA = K = CA = MC = H $\angle$ D=	0.00 E=USCS(2. T: #=6-5340 26.00 413.00 13.40 166.00 174.00 0.00 E=U.H., T T: #=6-5340 322.00 536.00 19.20 93.60 102.00 9.00	018 = 074, D 74, D 74	0.00 0.00 0WALD(3/3 1.50 1180.00 5.00 0.02 0.20 0.00 3/77), H YP=TUNNEL 2.20 0.05 1070.00 2.00 0.03 0.30 0.00	C13= C13= C13= R = BA = SR = FE = MN = C13= .I.G.(1) COU= WED= B = BA = SR = FE = MN = C13= C13= SR = C13= SR = SR = C13= SR = SR = C13= SR = SR = SR = C13= SR = SR = SR = C13= SR = SR =	0.00 I.G.(10/ MAUI 27.00 0.10 0.78) MAUI 323.00 5.40 0.00	L HE3= 78) L FL0= ALK= CO2= HC0= CO3= HE3= L FL0= CAR= CAR= CAR= CO2= HC0= CO3= HE3=	0.00 0C=PIONR- 123.00 150.00 0.00 0C=KAHOM 75.00 91.00 0.00	-L WAHI SPC= HAR= N = NO3= NH4= S34= A SHAFT SPC= HAR= N = NO2= NO3= NH4= S34=	0.00 KULI-1 430.00 14.00 0.00 5 "M" 3400.00 147.00 3.10 0.00	C14= LAT, LON= PH = HG = CD = PB = TH = AS = C14= LAT, LON= PH = HG = CD = PB = TH = AS = C14= C14=	0.00 2053 7.40 0.00 0.00 2053 7.40 0.00 0.00	24. 1 EH = SE = CR = CR = CR = T3 = 43. 1 EH = SB = CR = SB = CR = SB = CR = T3	0.00 564057.00 0.00 564011.00 0.00	P = DIS= DAT=1 TEM= SIO= SO4= H2S= O2 = P = DIS= DIS= DIS=	123.00 978. 25.22 51.40 240.00 900.00 978. 23.65 57.30 157.00 630.00
Source Coment ELE= LI = NA = K = CA = H $\angle$ D= Source Coment 30 ID ELE= LI = NA = K = CA = MG = H $\angle$ D= Source	0.00 E=USGS(2. T: #=6-5340 26.00 413.00 13.40 166.00 174.00 0.00 E=U.H., T T: #=6-5340 322.00 536.00 19.20 93.00 102.00 0.00 E=USGS(3	$\begin{array}{c} 018 = \\ 018 = \\ 74), D \\ WAD = \\ F = \\ CL = \\ BR = \\ I = \\ P04 = \\ 018 = \\ 00WALD(C) \\ WAD = \\ F = \\ CL = \\ BR = \\ R = \\ CL = \\ BR = \\ P04 = \\ 018 = \\ 72, 8/7 \end{array}$	0.00 0.00 0WALD(3/3 YP=TUNNEI 1.50 1180.00 5.00 0.02 0.20 0.00 3/77), H YP=TUNNEI 2.20 0.05 1070.00 2.00 0.30 0.30 0.90 8), DOWAI	C13= C13= C13= WED= B = BA = SR = FE = MN = C13= .I.G.(1) .COU= WED= B = BA = SR = FE = MN = C13= C13= .I.G.(1)	0.00 I.G.(10/ MAUI 27.00 0.10 0.78) MAUI 323.00 5.40 0.00 ), H.I.G	L HE3= 78) L FLO= ALK= CO2= HCO= CO3= HE3= L FLO= ALK= CO2= HCO= CO3= HE3= . (10/78	0.00 0C=PIONR- 123.00 150.00 0.00 0C=KAHOM 75.00 91.00 0.00	-L WAHI SPC= HAR= N = N02= NH4= S34= NH4= SPC= HAR= N = N02= N02= N03= NH4= S34=	0.00 KULI-1 430.00 14.00 0.00 5 "N" 3400.00 147.00 3.10 0.00	C14= LAT, LON= PH = HG = CD = PB = TH = AS = C14= LAT, LON= PH = HG = CD = PB = TH = AS = C14=	0.00 2053 7.40 0.00 0.00 2053 7.40 0.00 0.00	T3 = T3 = T3 EH = SE = SB = CU = T3 T3 = T3 T3 = T3 T3 = T3 T3 = SE = SE = SE = SCU = T3 T3 = T3 = T3	0.00 564057.00 0.00 564011.00 0.00	P = DIS= DAT=1 TEM= SIO= SO4= H2S= DIS= DIS= DAT=1 TEM= SIO= SIO= SIO= SIO= SIO= SIO= SIO= SIO	123.00 978. 25.22 51.40 240.00 900.00 978. 23.65 57.30 157.00 630.00

31 ID ELE=	#=6-5419- 0 00	-01 T WAD=	YP=WELL	COU= WED= B -	Mau I	FLO=	LOC=ABOV	E HAIKU -SPC= HAR-		LAT, LON= PH = HC =	2054:	12. EH	1561938.00	DAT=1 TEM=	979. 22.00	
$ \begin{array}{l} \mathbb{N}\mathbf{A} = \\ \mathbb{K} = \\ \mathbb{C}\mathbf{A} = \end{array} $	$     \begin{array}{r}       0.00 \\       30.00 \\       2.40 \\       6.50     \end{array} $	$ \begin{array}{c} \mathbf{F} & = \\ \mathbf{CL} & = \\ \mathbf{BR} & = \\ \mathbf{I} & = \\ \end{array} $	26.30	BA = SR = FE =		CAR= CO2= HCO=		N = NO2= NO3=		$\begin{array}{l} HG = \\ CD = \\ PB = \\ TH = \end{array}$		ZN SB CU	- - -	S10= S04= H2S= 02 =	14.40	
MC = H/D= SOURC COMEN	6.60 E=H.I.CG T:	P04= 018= .(8/79)	, DOWALD	MN = C13= ('79)		C03= HE3=		NH4= S34=		AS = C14=		CR T3	± 	P = DIS=		
32 ID ELE= LI = NA =	#=6-5420- 349.00 73.00	-01 T WAD= F = CL =	YP=WELL 4.00 0.90 44.30	COU= WED= B = BA =	MAUI 371.00 0.00 0.10	I FLO= ALK= CAR=	LOC=MAUI 77.00	HICH (H. SPC= HAR= N =	AIKU) 32.00	LAT,LON= PH = HG = CD =	2054 6.90	58. EH SE ZN	1562054.00 = = = 0.03	DAT=1 TEM= SIO= SO4=	979. 19.00 53.30 51.40	
K = CA = MG = H/D= SOURC COMEN	3.80 4.00 3.26 E=USGS, I T:	BR = I = P04= 018= D0H(5/7	5), H.I.C	SR = FE = MN = C13= C13=	0.15 0.03 )	CO2= HCO= CO3= HE3=	79.00	N02= N03= NH4= S34=	0.01 3.50	PB = TH = AS = C14=	0.01 0.01	SB CU CR T3	= = 0.02 =	H2S= 02 = P = DIS=	323.00	
33 ID ELE=	#=6-542 <b>2</b> - 155.00	-01 T WAD=	YP=TUNNEL 5.20	A COU=1 WED=	MAUI 150.00	I FLO=	LOC=PAIA	MILL, P SPC=	13-A	LAT,LON= PH =	20543	3 <b>З.</b> ЕН	1562238.00 =	DAT=1 TEM=	979. 22.50	
LI = $NA =$ $K =$ $CA =$ $MG =$ $H/D =$ $SOUBC$	0.00 174.00 14.60 33.60 53.00	F = CL = BR = I = P04= 018=	0.40 531.00	B = BA = SR = FE = MN = C13=		ALK= CAR= CO2= HCO= CO3= HE3=		HAR= N = NO2= NO3= NH4= S34=		HG = CD = PB = TH = AS = C14=		SE ZN SB CU CR T3		SIO= SO4= H2S= O2 = P = DIS=	91.50	
COMEN	r:	· · · · · ,														
$\begin{array}{ccc} 34 & ID \\ ELE = \\ LI & = \\ NA & = \\ K & = \\ CA & = \\ MC & = \\ H \land D = \\ SOURCH \\ COMEN \end{array}$	#=6-5422- 295.00 0.00 175.00 11.00 25.50 33.20 E=DOWALD( F:	-02 T WAD= F = CL = BR = I = P04= 018= (3/77),	YP=TUNNEL 4.00 0.60 316.90 H.I.G.(8	. COU=1 WED= B = BA = SR = FE = MN = C13= (79)	MAUI	I FLO= ALK= CAR= CO2= HCO= CO3= HE3=	LOC=PAIA	PUMP 17 SPC= HAR= N = NO2= NO3= NH4= S34=		LAT,LON= PH = HG = CD = PB = TH = AS = C14=	20541	EH SE ZN SB CU CR T3	1562209.00 = = = = = = = =	DAT=1 TEM= SIO= SO4= H2S= O2 = P = DIS=	979. 21.20 70.00	
$\begin{array}{ccc} 35 & ID \\ ELE = \\ LI & = \\ NA & = \\ K & = \\ CA & = \\ MG & = \\ H \angle D = \\ SCURCH \\ COMEN \end{array}$	#=6-5423- 18.00 0.00 360.00 23.00 42.60 56.40 E=DOWALD( F:OPEN PI	-01 T WAD= F = CL = BR = I = P04= 018= 3/77), T	YP=WELL 4.00 0.30 706.00 H.I.G.(8	COU=1 WED= B = BA = SR = FE = MN = C13= (79)	MAUI	I FLO= ALK= CAR= CO2= HCO= CO3= HE3=	LOC=KAILU	JA GULCH SPC= HAR= N = NO2= NO3= NH4= S34=		LAT, LON= PH = HG = CD = PB = TH = AS = C14=	20544	H4. EH SE ZN SB CU CR T3	1562339.00 = = = = = = = =	DAT=1 TEM= SIO= SO4= H2S= O2 = P = DIS=	979. 28.20 99.00 120.00	
Contraction of the second																
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36 ID	#=6-5423	3-02	TYP=TUNNI	COU:	=MAUI	J	LOC=LOWER	PAIA,	P 16-D	LAT, LON=	2054	49.	15	62310.00	DAT=1	1979.
ELE=	25.00	WAD=		WED=		FLO=		SPC=		PH =	7.20	EH	=		TEM=	23.50
<b>LI =</b>	350.00	F =	0.05	B =	0.30	ALK=	115.00	HAR=	205.00	) HG =		SE	3		ST0-	102 00
NA =	840.00	CL =	1572.00	BA =		CAB=		N =		<u> </u>		771	_		510-	102.00
K =	49.90	BB =	1.50	SB =		000-		NOO-		0 <i>D</i> -		LN	-		504=	220.00
<u> </u>	70 00	1 -	0.00	1010 -		602-		NOZ=		PB =		SB	=		H2S=	
UA -	(3.20	1 -	0.03	FE =		HCO=	178.00	NO3=	12.00	) TH =		CU	Ξ		02 =	
ng =	123.00	P04=	0.40	MN =		C03=		NH4=		AS =		CB	=		<u>د</u> ور	
H∕D=		018=		C13=		HF3=		Q94-		(11A-		011	-		<u>r</u>	
COURC	E=II U ()	70 0	WAT D ( 9 /7	77 1 1		NILO-		007-		014-		13	=		DIS=	780.00
COMPRE	$D = 0 \cdot 11 \cdot 1$	· //, D		• <i>у</i> , ш.:	1.6.00/79	,										
COLEN	1:															
			•													
												•				
37 ID	#=6-5430	-01 '	TVD-WPII	COU	- NT A TT Y		00-114 1 111									
	~-0-0-0-00	-01 -			TIAOI	1	JOC=WAIEH	J HTS	PUMP-1	LAT, LON=	2054	30.	15€	63044.00	DAT=1	978.
LLL=	337.00	WAD=	18.00	WED=	675.00	FLO=		SPC=	405.00	) PH =		EH	=		TFM=	00 55
LI =		F =	0.15	B =		ALK=	31 00	HAB=	00 00	- HC -		6372	_			40.00
NA =	44 60	CI. =	45 00	BA =		CAD	01.00	MALC-	20.00			SL.	=		S10=	62.00
¥ -	0 40	01	10.00	00		uan-		14 =	3.20	) CD =		ZN	=		S04=	152.00
K	2.40	BR =		SR =		C02=		NO2=		PB =		SB	=		H2S=	
CA =	12.30	I =		FE =	20.00	HCO =	99.00	NO3 =		TH =	0 00	CII	-		00 -	
MG =	7.20	P04=	0.40	MN =		C03=		NULA-			0.00	00	-		04 -	
H/D-	0 00	010-	0 00	010-	0 00	000-	0 0 0	MI-2-		A3 -		CR	=		Р =	0.13
11/ D-	0.00	010-	0.00	C13=	0.00	HE3=	0.00	S34=	0.00	) C14=	0.00	T3	<b>=</b> `	0.00	DIS=	272.00
SOURCE	E=USGS(4	75), 1	)0WALD(3/	77), Н.	I.G.(10/	78)										
COMEN	T:															
									· ·							
00 V.D.																
38 ID#	#=6-5430	-02 1	YP=WELL	COU=	MAUI	L	OC=WAIEHI	J HTS 1	MMP-2	LAT. LON=	2054	32	156	3044 GG	DAT-1	070
ELE=	337.00	WAD=	18.00	WED=	543.00	FLO=		SPC=		DU -	2001	TITT		0011.00	DAI-I	7(0,
I.I =		F =	0 35	B -	0.0100	AT 17-		191 0-		111 ~		Eff	=		TEM=	23.92
	07 00		10.00	D -		ALK=		HAR=		HG =		SE	Ξ		SI0=	75.40
NA =	37.00	CL =	13.09	BA =		CAR=		N =		CD =		ZN	=		S04=	3 66
K =	1.90	BR =		SR =		CO2=		NO2=		PB =		CB	-		100-	0.00
CA =	8.60	I =		FE =		HCO-		MOOn		1 D -	0 00	00	-		H28=	
MC =	5 96	P04-		WW -				1100-		1 <u>n</u> =	0.00	CU	=		02 =	
110 -	0.00	F04-		1111 =		CO3=		NH4=		AS =		CR	=		P =	
H/D=	0.00	=810	0.00	C13=	0.00	HE3 =	0.00	S34=	0.00	C14=	0.00	TS	=	0 00	DIG-	
SOURCE	E=DOWALD	(3/77).	H.I.G.(	10/78)							0.00	10	_	0.00	018-	
COMENT	n •	,														
GOILINI	. •															
39 ID#	¥=6-5319·	-01 T	YP=WELL	COU=	MATLI	T.	OC=PAIIWEI	A HAI	VU SCH	TATE TON-	-	-	1	1001 00		
ELE=	365 00	WAD=	5 30	WFD-	400 00	ET O-	Od THORE		KO BOH		20000	24.	190	1931.00	DAT=1	979.
11 -	000.00	- R	0.00	1120-	400.00	rL0-		SPU=		PH =		$\mathbf{EH}$	=	•	TEM=	19.10
L1 -		r =	0.00	в =		ALK=		HAR=		HG =		SE	=		SIO=	
NA =	57.00	CL =	130.00	EA =		CAR=										
K =								N =		CD =		ZN	-		604-	10.00
<u> </u>	4.70	BR =		SB =		C02-		N = NOO-		CD = DD		ZN	=		S04=	12.20
	4.70	BR = 1		SR =		C02=		N = NO2 =		CD = PB =		ZN SB	=		S04= H2S=	12.20
UA =	4.70	BR = I = I		SR = FE =		CO2= HCO=		N = NO2= NO3=		CD = PB = TH =		ZN SB CU	2 2 2		S04= H2S= 02 =	12.20
MG =	$4.70 \\ 15.00 \\ 14.60$	BR = I = P04=		SR = FE = MN =		CO2= HCO= CO3=		N = NO2= NO3= NH4=		CD = PB = TH = AS =		ZN SB CU CB	u u u u u		S04= H2S= 02 =	12.20
ΩA = MG = H∕D=	$4.70 \\ 15.00 \\ 14.60$	BR = I = P04= 018=		SR = FE = MN = C13=		CO2= HCO= CO3= HF3=		N = NO2= NO3= NH4= S24=		CD = PB = TH = AS =		ZN SB CU CR			S04= H2S= 02 = P =	12.20
CA = MG = M/D= SOUBCE	4.70 15.00 14.60	BR = I = P04= 018= (3/77)	HICO	SR = FE = MN = C13=		CO2= HCO= CO3= HE3=		N = NO2= NO3= NH4= S34=		CD = PB = TH = AS = C14=		ZN SB CU CR T3			S04= H2S= 02 = P = DIS=	12.20
KG = H∠D= SCURCE	4.70 15.00 14.60 =DOWALD	BR = I = P04= 018= (3/77),	H.I.G.(8	SR = FE = MN = C13= 3/79)		CO2= HCO= CO3= HE3=		N = NO2= NO3= NH4= S34=	-	CD = PB = TH = AS = C14=		ZN SB CU CR T3			S04= H2S= 02 = P = DIS=	12.20
CA = MG = H∕D= SCURCE COMENT	4.70 15.00 14.60 :=DOWALD	$\begin{array}{r} BR = \\ I = \\ P04 = \\ 018 = \\ (3/77), \end{array}$	H.I.G.({	SR = FE = MN = C13= 3/79)		CO2= HCO= CO3= HE3=		N = NO2= NO3= NH4= S34=	-	CD = PB = TH = AS = C14=		ZN SB CU CR T3			S04= H2S= 02 = P = DIS=	12.20
MG = H/D= SCURCE COMENT	4.70 15.00 14.60 :=DOWALD	BR = I = P04= 018= (3/77),	H.I.G.(	SR = FE = MN = C13= 3/79)		CO2= HCO= CO3= HE3=		N = NO2= NO3= NH4= S34=	·	CD = PB = TH = AS = C14=		ZN SB CU CR T3			S04= H2S= O2 = P = DIS=	12.20
NG = H/D= SCURCE COMENT	4.70 15.00 14.60 C=DOWALD	BR = I = P04= 018= (3/77),	H.I.G.(8	SR = FE = MN = C13= 3/79)		CO2= HCO= CO3= HE3=		n = N02= N03= NH4= S34=	·	CD = PB = TH = AS = C14=		ZN SB CU CR T3	u a u u		S04= H2S= O2 = P = DIS=	12.20
MG = H/D= SCURCE COMENT	4.70 15.00 14.60 =DOWALD	BR = I = P04 = 018 = (3/77),	H.I.G.((	SR = FE = MN = C13= 3/79)	MATT	CO2= HCO= CO3= HE3=		N = N02= N03= NH4= S34=		CD = PB = TH = AS = C14=		ZN SB CU CR T3			S04= H2S= 02 = P = DIS=	12.20
$\begin{array}{c} CA = \\ MG = \\ H/D = \\ SCURCE \\ COMENT \\ 40  ID \\ EV = \end{array}$	4.70 15.00 14.60 C=DOWALDO	BR = I = P04 = 018 = (3/77),	H.I.G.(8	SR = FE = MN = C13= 3/79) COU=1	MAUI	CO2= HCO= CO3= HE3=	DC=HA1KU	N = N02= N03= NH4= S34= (DR BE	HNKE)	CD = PB = TH = AS = C14= LAT,LON=	20555	ZN SB CU CR T3	= = = = 156	1958.00	SO4= H2S= O2 = P = DIS=	12.20
MG = H/D= SCURCE COMENT 40 ID# ELE=	4.70 15.00 14.60 =DOWALD = = 6-5519- 360.00	BR = I = P04= 018= (3/77), -02 T WAD=	H.I.G.() YP=WELL 210.00	SR = FE = MN = C13= 3/79) COU=1 WED=	MAUI 228.00	C02= HCO= C03= HE3= L4 FL0=	DC=HA1KU	N = N02= N03= NH4= S34= (DR BE SPC=	HNKE)	CD = PB = TH = AS = C14 = LAT, LON = PH = C14	20555	ZN SB CU CR T3	= = = 156:	1958.00	S04= H2S= 02 = P = DIS= DAT=19 TEM=	12.20 979.
$\begin{array}{c} CA = \\ MG = \\ H/D = \\ SCURCE \\ COMENT \\ 40  ID# \\ ELE = \\ LI = \end{array}$	4.70 15.00 14.60 C=DOWALD C= C= C= C= C= C= C= C= C= C= C= C= C=	BR = I = PO4= 018= (3/77), -02 T WAD= F =	H.I.G.(8 YP=WELL 210.00 1.30	SR = FE = MN = C13= 3/79) COU=1 WED= B =	MAUI 228.00	C02= HC0= C03= HE3= L4 FL0=	DC=HA1KU 67.00	N = NO2= NO3= NH4= S34= (DR BE SPC= HAR=	HNKE)	CD = PB = TH = AS = C14 = LAT, LON = PH = HC	20555	ZN SB CU CR T3	= = = = 156:	1958.00	504= H2S= 02 = P = DIS= DAT=19 TEM=	12.20 79. 23.50
CA = MG = H/D= SCURCE COMENT 40 ID# ELE= LI = NA =	4.70 15.00 14.60 =DOWALD =6-5519- 360.00 4.30	BR = I = P04 = 018 = (3/77), $-02 T = WAD = F = CL = 00000000000000000000000000000000$	H.I.G.(8 YP=WELL 210.00 1.30 18.10	SR = FE = MN = C13= 3/79) COU=1 WED= B = B = B =	MAUI 228.00	C02= HC0= C03= HE3= Lt FL0= ALK= CAP-	DC=HA 1 KU 67 . 00	N = NO2= NO3= NH4= S34= (DR BE SPC= HAR= N -	HNKE) 40.00	CD = PB = TH = AS = C14= LAT,LON= PH = HG =	20555	ZN SB CU CR T3	= = = = 156: =	1958.00	S04= H2S= 02 = P = DIS= DAT=19 TEM= SIO=	12.20 79. 23.50 40.80
KG = KG = H/D= SCURCE COMENT 40 ID# ELE= LI = NA = V -	4.79 15.00 14.60 = DOWALD = 6-5519- 360.00 4.30	BR = I = PO4= 018= (3/77), -02 T WAD= F = CL = PP -	H.I.G.(8 YP=WELL 210.00 1.30 18.10	SR = FE = MN = C13= 3/79) COU=1 WED= B = BA = CD =	MAUI 228.00 0.10	CO2= HCO= CO3= HE3= Lt FLO= ALK= CAR=	DC=HA1KU 67.00	N = NO2= NO3= NH4= S34= (DR BE SPC= HAR= N =	HNKE) 40.00	CD = PB = TH = AS = C14= LAT, LON= PH = HG = CD =	20555	ZN SB CU CR T3 50. EH SE ZN	= = = = 156: = =	1958.00 0.56	504= H2S= 02 = P = DIS= DAT=19 TEM= SIO= S04=	12.20 79. 23.50 40.80 23.20
$\begin{array}{l} \text{KG} = \\ \text{KG} = \\ \text{H} / \text{D} = \\ \text{SCURCE} \\ \text{COMENT} \\ \\ 40  \text{ID} # \\ \text{ELE} = \\ \text{LI} = \\ \text{KA} = \\ \text{K} = \\ \\ \end{array}$	4.79 15.00 14.60 = DOWALD = 6-5519- 360.00 4.30 2.30	BR = I = PO4= 018= (3/77), WAD= F = CL = BR =	H.I.G.(8 YP=WELL 210.00 1.30 18.10	SR = FE = MN = C13= 3/79) COU=J WED= B = BA = SR = SR =	MAUI 228.00 0.10	CO2= HCO= CO3= HE3= Lto= FLO= ALK= CAR= CO2=	DC=HA1KU 67.00	N = NO2= NO3= NH4= S34= (DR BE SPC= HAR= N = NO2=	HNKE) 40.00	CD = PB = TH = AS = C14= LAT,LON= PH = HG = CD = PB =	20555 0.01	ZN SB CU CR T3 60. EH SE ZN SB	= = = = 156: = = =	1958.00 0.56	504= H2S= 02 = P = DIS= DIS= DAT=19 TEM= SI0= S04= H2S=	12.20 23.50 40.80 23.20
$\begin{array}{l} \text{K} \text{CA} = \\ \text{K} \text{K} \text{K} \text{K} \text{K} \text{K} \\ \text{K} \text{K} \text{K} \\ \text{K} \text{K} \text{K} \\ \text{K} \text{K} \text{K} \text{K} \\ \text{K} \\ \text{K} \text{K} \\ \text{K}$	4.70 15.00 14.60 = DOWALD : = 6-5519- 360.00 4.30 2.30 1.50	BR = I = PO4= 018= (3/77), WAD= F = CL = BR = I =	H.I.G.(8 YP=WELL 210.00 1.30 18.10	SR = FE = MN = C13= 3/79) COU=1 WED= BA = SR = FE =	MAUI 228.00 0.10 1.58	CO2= HCO= CO3= HE3= Lt FLO= ALK= CAR= CO2= HCO=	DC=HA1KU 67.00	N = NO2= NO3= NH4= S34= (DR BE SPC= HAR= NO2= NO3=	HNKE) 40.00 1.20	CD = PB = TH = AS = C14= LAT,LON= PH = HG = PB = TH =	20555 0.01	ZN SB CU CR T3 50. EH SE ZN SB CU	= = = = 156: = = =	1958.00 0.56 0.02	504= H2S= 02 = P = DIS= DIS= DAT=19 TEM= SIO= SO4= H2S= 02 =	12.20 79. 23.50 40.80 23.20
$\begin{array}{l} \text{K} \text{K} \text{K} \\ \text{K} \text{K} \text{K} \\ \text{K} \text{K} \\ \text{K} \text{K} \\ \text{K}$	4.79 15.09 14.60 = DOWALD = 6-5519- 360.00 4.30 2.30 1.59 0.84	BR = I = PO4= 018= (3/77), -02 T WAD= F = CL = BR = I = PO4=	H.I.G.(4 YP=WELL 210.00 1.30 18.10	SR = FE = MN = C13= 3/79) WED= B = BA = SR = FE = MN =	MAUI 223.00 0.10 1.58	C02= HC0= C03= HE3= Lt FL0= ALK= CAR= C02= HC0= C03=	DC=HA1KU 67.00	N = NO2= NO3= NH4= S34= (DR BE SPC= HAR= N = NO2= NO3= WH4=	HNKE) 40.00 1.20	CD = PB = TH = AS = C14= LAT, LON= PH = HC = CD = PB = TH = AS =	20555 0.01	ZN SB CU CR T3 T3 S0. EH SE ZN SE CU CR	156 = = =	1958.00 0.56 0.02	S04= H2S= 02 = P = DIS= DIS= DAT=10 TEM= S10= S04= H2S= 02 =	12.20 779. 23.50 40.80 23.20
$\begin{array}{l} \text{KA} = \\ \text{KG} = \\ \text{KJ} = \\ \text{SCURCE} \\ \text{COMENT} \\ \hline \\ 40  \text{ID} \\ \text{ELE} = \\ \text{LI} = \\ \text{NA} = \\ \text{K} = \\ \text{KA} = \\ \text{IG} = \\ \text{HC} = \\ \text{HC} = \\ \end{array}$	4.70 15.00 14.60 = DOWALD = 6-5519- 360.00 4.30 2.30 1.50 0.84	BR = I = PO4= 018= (3/77), WAD= F = CL = BR = I = PO4= 018=	H.I.G.(8 YP=WELL 210.00 1.30 18.10	SR = FE = MN = C13= 3/79) COU=J WED= B = BA = SR = FE = FE = KL = C12=	MAUI 223.00 0.10 1.58	C02= HC0= C03= HE3= Lt FL0= ALK= CAR= C02= HC0= C03= HE2=	DC=HA1KU 67.00	N = NO2= NO3= NH4= S34= (DR BE SPC= HAR= N = NO2= NO3= NH4= SPC=	HNKE) 40.00 1.20	CD = PB = TH = AS = C14= LAT,LON= PH = HG = CD = PB = TH = AS =	2055; 0.01 0.01	ZN SB CU CR T3 50. EH SE ZN SB CU CR	= = = = = = = = =	1958.00 0.56 0.02	S04= H2S= 02 = P = DIS= DIS= DAT=19 TEM= SIO= S04= H2S= 02 = P =	12.20 979. 23.50 40.80 23.20
$\begin{array}{l} \text{KA} = \\ \text{KG} = \\ \text{KD} = \\ \text{KD} = \\ \text{SCURCE} \\ \text{COMENT} \\ \text{COMENT} \\ \text{40 ID} = \\ \text{COMENT} \\ \text{40 ID} = \\ \text{KA} = \\ \text{KA}$	4.70 15.00 14.60 = DOWALD = 6-5519- 360.00 4.30 2.30 1.50 0.84	BR = I = P04 = 018 = (3/77), $-02 T = VAD = F = CL = BR = I = P04 = 018 = 0018 =$	H.I.G.(8 YP=WELL 210.00 1.30 18.10	SR = FE = MN = C13= 3/79) WED= B = BA = SR = FE = MN = C13=	MAUI 228.00 0.10 1.58	CO2= HCO= CO3= HE3= L4 FLO= ALK= CAR= CO2= HCO= CO3= HE3=	DC=HA1KU 67.00	N = NO2= NH4= S34= (DR BE SPC= HAR= N = NO2= NO3= NH4= S34=	HNKE) 40.00 1.20	CD = PB = TH = AS = C14= LAT,LON= PH = HG = PB = TH = AS = C14=	20555 0.01 0.01	ZN SB CU CR T3 50. EH SE ZN SB CU CR T3	156 = = =	1958.00 0.56 0.02	DAT=19 DIS= DIS= DIS= DIS= DIS= DIS= DIS=	12.20 979. 23.50 40.80 23.20 140.00
$\begin{array}{l} \text{K} & \text{K} \\ \text{K} & \text{K} \\ $	4.70 15.00 14.60 = DOWALD = 6-5519- 360.00 4.30 2.30 1.59 0.84 = DOH(7/7	BR = I = PO4= 018= (3/77), -02 T WAD= F = CL = BR = I = PO4= 018= '4), H.	H.I.G.( YP=WELL 210.00 1.30 18.10 I.G.(8/79	SR = FE = MN = C13= 3/79) WED= BA = BA = SR = FE = MN = C13= )	MAUI 228.00 0.10 1.58	C02= HC0= C03= HE3= Lt FL0= ALK= CAR= C02= HC0= C03= HE3=	DC=HA1KU 67.00	N = NO2= NO3= NH4= S34= (DR BE SPC= HAR= N = NO2= NO2= NH4= S34=	HNKE) 40.00 1.20	CD = PB = TH = AS = C14= LAT,LON= PH = HG = CD = PB = TH = AS = C14=	20555 0.01 0.01	ZN SB CU CR T3 EH SE ZN SE CU CR T3	= = = = = = = = = = =	1958.00 0.56 0.02	DAT=19 DIS= DIS= DAT=19 TEM= SIO= SO4= H2S= O2 = P = DIS=	12.20 23.50 40.80 23.20 140.00

41 $1D = 6-5520 = 01$ TYP=TUNNI ELE 30.00 WAD= LI = 0.00 F = 0.10 NA = 475.00 CL = 287.00 K = 23.00 BR = CA = 39.60 I = MC = 64.50 PO4= H/D= 018= SOURCE=DOWALD(3/77), H.I.C. COMENT:WATER COMES FROM TUNE	EL COU=MAUI WED= B = BA = SR = FE = MN = C13= (8/79) WEL TO A HOLDING	LOC=MALIK FLO= ALK= CAR= CO2= HCO= CO3= HE3= PIT EXPOSED TO	O PUMP 11 SPC= HAR= N = N02= N03= NH4= S34= THE SUN AND R	LAT, LON= 2 PH = HG = CD = PB = TH = AS = C14= AIN	805554. 1582018.00 EH = SE = ZN = SB = CU = CR = T3 =	DAT=1979. TEM= 20.50 SIO= SO4= 156.00 H2S= O2 = P = DIS=
42 ID $= 6-5322-01$ TYP=TUNNI ELE= 156.00 WAD= 4.00 LI = F = 0.34 NA = 203.00 CL = 295.00 K = 8.60 BR = 2.80 CA = 14.50 I = 0.02 MG = 18.90 PO4= 0.19 H/D= 018= SOURCE=USGS(12/74), DOWALD(3 COMENT:	EL COU=MAUI WED= B = 0.10 BA = SR = FE = 230.00 MN = 10.00 C13= B/77), H.I.G.(8/2)	LOC=KUAU FLO= ALK= 103.00 CAR= CO2= 25.00 HCO= 125.00 CO3= HE3= 79)	PUNP 12 SPC= 1260.00 HAR= 110.00 N = 3.90 N02= N03= 15.00 NH4= S34=	LAT,LON= 2 PH = 6. HG = CD = PB = TH = AS = C14=	005511. 1562221.00 90 EH = SE = ZN = SB = CU = CR = T3 =	DAT=1979. TEM= 21.30 SIO= 52.00 SO4= 63.00 H2S= O2 = P = 0.11 DIS= 710.00
43 $ID = 6-5540-01$ TYP=WELL ELE= 444.00 WAD= 1.40 L1 = F = 0.22 NA = 320.00 CL = 62.00 K = 15.00 BR = 582.00 CA = 36.00 I = MG = 62.00 P04= 0.19 H/D= 0.00 018= 0.00 SOURCE=DOH(8/69), USCS(9/71) COMENT:	COU=MAUI WED= 472.00 B = BA = SR = FE = 0.02 NN = 0.01 C13= 0.00 , H.I.G.(10/78)	LOC= FLO= ALK= 120.00 CAR= CO2= HCO= 146.00 CO3= HE3= 0.00	PUUKOLII SPC= 1490.00 HAR= 180.00 N = NO2= 0.01 NO3= 11.00 NH4= S34= 0.00	LAT, LON= 2 PH = 7. HG = CD = PB = 0. TH = 0. AS = C14= 0.	05559. 1564028.00 70 EH = SE = 0.01 ZN = 0.01 01 SB = 00 CU = 0.08 CR = 00 T3 = 0.00	DAT=1978. TEM= 21.79 SIO= 66.60 SO4= 82.00 H2S= O2 = P = DIS= 833.00
44 ID#=6-5615-01 TYP=WELL ELE= 250.00 WAD= 110.00 LI = 0.00 F = 0.20 NA = 33.00 CL = 38.30 K = 1.15 BR = CA = 4.20 I = MG = 4.20 P04= H/D= 018= SOURCE=H.I.G.(8/79) COMENT:POSITION AND ELEVATION	COU=MAUI WED= 208.00 B = BA = SR = FE = MN = C13= W TAKEN FROM 7.5	LOC=KEALI FLO= ALK= CAR= CO2= HCO= CO3= HE3= 5 MIN TOPO MAP,	'I PT.(STORN) SPC= HAR= N = NO2= NO3= NH4= S34= WED AND WAD CI	LAT, LON= 2 PH = HG = CD = PE = TH = AS = C14= IVEN BY OW	05615. 1561552.00 EH = SE = ZN = SB = CU = CR = T3 = NER - PERCHED AQU	DAT=1979. TEM= 23.50 SIO= SO4= 17.40 H2S= O2 = P = DIS= IFER
45 $ID#=6-5620-01$ TYP=TUNNE ELE= 59.00 WAD= LI = F = 1.20 NA = 66.09 CL = 23.20 K = 2.09 BR = CA = 0.53 I = hC = 0.40 PO4= H/D= G18= SOURCE=H.I.C.(8/79) COMENT:TUNNEL BORES INTO THE	L COU=MAUI WED= B = BA = SR = FE = MN = C13= SIDE OF THE VAI	LOC=MALIK FLO= ALK= CAR= CO2= HCO= CO3= HE3= LLEY WALL, WATE	D BAY SPC= HAR= N = NO2= NO3= NH4= S34= R FREE-FLOWS	LAT, LON= 2 PH = HG = CD = PB = TH = AS = C14= PERCH	05609. 1562031.00 EH = SE = ZN = SB = CU = CR = T3 = ED AQUIFER	DAT=1979. TEM= 21.50 SIO= SO4= 58.50 H2S= O2 = P = DIS=

46 II	)#=6-5641·	-01	TYP=TUNNE	L COU	=MAUI	I	OC=KAANA	PLAI PI	лт <b>Р-D</b>	LAT.LON=	2056	35.	1564131 00	DAT=1079	
ELE=	27.00	WAD=	1.50	WED=	28.00	FLO=		SPC=		PH =	7.10	EH	=	TEM = 22.8	85
	044 60	F =	0.22	B =	0.40	ALK=	141.00	HAR=	430.00	HG =		SE	=	SIO= 44.6	66
$\mathbf{H}\mathbf{A} = \mathbf{V}$	864.00	CL =	1530.00	BA =		CAR=		N =		CD =		ZN	=	S04= 210.0	ล้ด
K =	30.00	BR =	9.00	SR =		C02=		NO2=		PB =		SB	3	H2S=	
UA = UO =	94.00	1 =	0.04	FE =		HCO=	172.00	NO3 =	13.00	TH =	0.00	CU	=	02 =	
$H_{C} =$	149.00	P04=	0.50	$r_{\rm IN} =$		C03=		NH4=		AS =		CR	=	P =	
n/ D=	0.00 E-U U (0	018=	0.00	C13=	0.00	HE3=	0.00	S34=	0.00	C14=	0.00	T3	= 0.00	DIS= 1700.0	20
COMEN	E=0.H.(2)	/(0),	DOWALD(3/	77), н	.I.G.(10/	78)								210 10010	
Combi	• •														
47 ID	#=6-5641-	-02 1	TYP=TUNNE	L COU:	=MATLI	Y	OC-HONOVO	WAT DE	MD E	TATT TON-	DORC				
ELE=	65.00	WAD=	2.00	WED=	65.00	FI0=	oc-nonok	JMAI LO SDC-	rir-r	LAI,LUN-	2000	97. ETT	1564106.00	DAT=1978.	
LI =		F =	0.24	B =	00.00	$\Delta L K =$	97 00	BFU- HAD-	400 00	rn - uc -	6.CV	Eff	E _	TEM= 22.6	58
NA =	773.00	CL =	1470.00	BA =		ALIC-	26.00	MAR-	400.00	пь - 0р -		SE	<b>a</b>	SI0 = 36.0	)0
K =	30.20	BR =	8.00	SB =		C02=				<u>u</u> -		ZN	=	S04 = 208.0	0
CA =	88.00	I =	0.04	FE =		400-		NO2-	4 00	<u> </u>	A 44	SB	2	H2S=	
MG =	128.00	P04=	0.40	MN =		C02-		NU3=	4.30		0.00	CU	=	02 =	
H∕D=	0.00	018=	0.00	C13=	0 00	400- 469-	0 00	NA4=	A 44	AS = O(A - A)	0 00	CR	=	P =	
SOURC	E=U.H.(2/	70).DO	WALD (3/7)	7). H. 1	C (10/7)	2)	0.00	204-	0.00	U14=	0.00	13	= 0.00	DIS= 1880.0	0
COMEN	T:	,		,		,									
48 ID	#=6-5731-	-01 7	YP=WELL	COU=	MAUI	L	OC=WAIHER	CE.M	ENDESI	LAT LON=	20570	21.	1540101 00		
48 ID ELE=	#=6-5731- 475.00	-01 7 WAD=	TYP=WELL 23.00	COU= WED=	MAUI 530.00	LO FLO=	OC=WAIHEF	L (E. M SPC=	ENDES)	LAT,LON=	2057;	34. FH	1563131.00	DAT=1979.	
48 ID ELE= LI =	#=6-5731- 475.00 0.00	-01 7 WAD= F =	TYP=WELL 25.00 0.00	COU= WED= B =	MAU1 530.00	LO FLO= ALK=	OC=WAIHEF	C (E. M SPC= HAB=	ENDES)	LAT,LON= PH = HC =	2057;	34. EH	1563131.00	DAT=1979. TEM= 22.8	0
48 ID: ELE= LI = NA =	#=6-5731- 475.00 0.00 31.90	-01 7 WAD= F = CL =	TYP=WELL 25.00 0.00 25.20	COU= WED= B = BA =	MAUI 530.00	LO FLO= ALK= CAB=	OC=WAIHEF	C (E. M SPC= HAR= N =	ENDES)	LAT,LON= PH = HG = CD =	2057;	34. EH SE	1563131.00 = =	DAT=1979. TEM= 22.8 SIO=	0
48 ID ELE= LI = NA = K =		-01 7 WAD= F = CL = BR =	TYP=WELL 25.00 0.00 25.20	COU= WED= B = BA = SR =	MAUI 530.00	LO FLO= ALK= CAR= CO2=	OC=WAIHEF	C (E. M SPC= HAR= N = NO2=	ENDES)	LAT,LON= PH = HG = CD = PB =	2057;	34. EH SE ZN	1563131.00 = = -	DAT=1979. TEM= 22.8 SIO= SO4= 25.0	0
48 ID ELE= LI = NA = K = CA =	$ \begin{array}{c} \#=6-5731-\\ 475.00\\ 0.00\\ 31.90\\ 2.54\\ 5.10 \end{array} $	-01 7 WAD= F = CL = BR = I =	TYP=WELL 25.00 0.00 25.20	COU= WED= B = BA = SR = FE =	MAUI 530.00	LO FLO= ALK= CAR= CO2= HCO=	OC=WAIHEF	C (E. M SPC= HAR= N = NO2= NO3=	ENDES)	LAT,LON= PH = HG = CD = PB =	2057:	B4. EH SE ZN SB	1563131.00 = = =	DAT=1979. TEM= 22.8 SIO= SO4= 25.0 H2S=	0
48 ID ELE= LI = NA = K = CA = MG =	#=6-5731- 475.00 0.00 31.90 2.54 5.10 8.90	-01 7 WAD= F = CL = BR = I = P04=	TYP=WELL 25.00 0.00 25.20	COU= WED= B = BA = SR = FE = NN =	MAUI 530.00	LO FLO= ALK= CAR= CO2= HCO= CO3=	OC=WAIHEE	C (E. M SPC= HAR= N = NO2= NO3= NH4=	endes)	LAT, LON= PH = HG = CD = PB = TH =	2057:	B4. EH SE ZN SB CU	1563131.00 = = = = =	DAT=1979. TEM= 22.8 SIO= SO4= 25.0 H2S= O2 =	0
48 ID: ELE= LI = NA = K = CA = HG = H/D=	#=6-5731- 475.00 0.00 31.00 2.54 5.10 8.90	-01 7 WAD= F = CL = BR = I = P04= 018=	TYP=WELL 23.00 0.00 25.20	COU= WED= B = BA = SR = FE = NN = C13=	MAUI 530.00	LA FLO= ALK= CAR= CO2= HCO= CO3= HE3=	OC=WAIHEE	C (E. M SPC= HAR= N = NO2= NO3= NH4= S24-	endes)	LAT, LON= PH = HG = CD = PB = TH = AS = .	2057;	SE SE ZN SB CU CR	1563131.00 = = = = = =	DAT=1979. TEM= 22.8 SIO= SO4= 25.0 H2S= O2 = P =	0 0
48 ID ELE= LI = NA = K = CA = MG = H/D= SOURCI	#=6-5731- 475.00 0.00 31.00 2.54 5.10 8.90 E=DOWALD(	-91 7 WAD= F = CL = ER = I = P04= 3/77).	TYP=WELL 23.00 0.00 25.20 H.I.G.(8	COU= WED= B = BA = SR = FE = MN = C13=	MAUI 530.00	L4 FL0= ALK= CAR= C02= HC0= C03= HE3=	OC=WAIHEE	C (E. M SPC= HAR= N = NO2= NO3= NH4= S34=	endes)	LAT, LON= PH = HG = CD = PB = TH = AS = . C14=	2057;	SE SE ZN SB CU CR T3	1563131.00 = = = = = = = =	DAT=1979. TEM= 22.8 SIO= SO4= 25.0 H2S= O2 = P = DIS=	0
$\begin{array}{ccc} 48 & ID \\ ELE = \\ LI = \\ NA = \\ CA = \\ MG = \\ H/D = \\ SOURCH \\ COMENT \end{array}$	#=6-5731- 475.00 0.00 31.00 2.54 5.10 8.90 E=DOWALD( C:	-01 7 WAD= F = CL = BR = I = P04= 018= 3/77),	TYP=WELL 23.00 0.00 25.20 H.I.G.(8	COU= WED= B = BA = SR = FE = MN = C13= Z79)	MAUI 530.00	L0 FL0= ALK= CAR= C02= HC0= C03= HE3=	OC=WAIHEE	C (E. M SPC= HAR= N = N02= N03= NH4= S34=	endes)	LAT, LON= PH = HG = CD = PB = TH = AS = . C14=	2057:	B4. EH SE ZN SB CU CR T3	1563131.00 = = = = = = =	DAT=1979. TEM= 22.8 SIO= SO4= 25.0 H2S= O2 = P = DIS=	0
$\begin{array}{llllllllllllllllllllllllllllllllllll$	#=6-5731- 475.00 0.00 31.00 2.54 5.10 8.90 E=DOWALD( C:	-01 T WAD= F = CL = BR = PO4= 018= 3/77),	TYP=WELL 23.00 0.00 25.20 H.I.G.(8	COU= WED= B = BA = SR = FE = MN = C13= Z79)	MAUI 530.00	L0 FL0= ALK= CAR= C02= HC0= C03= HE3=	OC=WAIHEE	C (E. M SPC= HAR= N = N02= N03= NH4= S34=	endes)	LAT, LON= PH = HG = CD = PB = TH = AS = . C14=	2057:	34. EH SE ZN SB CU CR T3	1563131.00 = = = = = = =	DAT=1979. TEM= 22.8 SIO= SO4= 25.0 H2S= O2 = P = DIS=	0
$\begin{array}{llllllllllllllllllllllllllllllllllll$	#=6-5731- 475.00 0.00 31.00 2.54 5.10 8.90 E=DOWALD( C:	-01 T WAD= F = CL = BR = PO4= 018= 3/77),	TYP=WELL 23.00 0.00 25.20 H.I.G.(8	COU= WED= B = BA = SR = FE = MN = C13= Z79)	MAUI 530.00	L0 FL0= ALK= CAR= C02= HC0= C03= HE3=	OC=WAIHEE	C (E. M SPC= HAR= N = N02= N03= NH4= S34=	endes)	LAT, LON= PH = HG = CD = PB = TH = AS = . C14=	2057:	34. EH SE ZN SB CU CR T3	1563131.00 = = = = = = =	DAT=1979. TEM= 22.8 SIO= SO4= 25.0 H2S= O2 = P = DIS=	0
$\begin{array}{rrrr} 48 & ID \\ ELE = \\ LI & = \\ NA & = \\ CA & = \\ NG & = \\ H \\ COMENT \\ COMENT \\ 49 & ID \end{array}$	#=6-5731- 475.00 0.00 31.00 2.54 5.10 8.90 E=DOWALD( C:	-01 T WAD= F = CL = BR = PO4= 018= 3/77), 01 T	TYP=WELL 23.00 0.00 25.20 H.I.G.(8 YP=WELL	COU= WED= B = BA = SR = FE = MN = C13= S/79) COU=	MAUI 530.00 MAUI	L0 FL0= ALK= CAR= C02= HC0= C03= HE3=	OC=WAIHEE	C (E. M SPC= HAR= N = N02= N03= NH4= S34=	endes)	LAT, LON= PH = HG = CD = PB = TH = AS = . C14=	2057:	34. EH SE ZN SB CU CR T3	1563131.00 = = = = = =	DAT=1979. TEM= 22.8 SIO= SO4= 25.0 H2S= O2 = P = DIS=	0
$\begin{array}{ccc} 48 & ID^{*}\\ ELE=\\ LI =\\ NA =\\ K =\\ CA =\\ MG =\\ H \land D=\\ SOURCH\\ COMENT\\ \end{array}$	<pre>#=6-5731- 475.00 0.00 31.00 2.54 5.10 8.90 E=DOWALD( C: #=6-5840- 860.00</pre>	-01 T WAD= F = CL = BR = I = P04= 018= 3/77), 01 T WAD=	YP=WELL 25.00 0.00 25.20 H.I.G.(8 YP=WELL 2.70	COU= WED= B = BA = SR = FE = MN = C13= C13= COU= WED=	MAUI 530.00 MAUI 274.00	L0 FL0= ALK= CAR= C02= HC0= C03= HE3=	OC=WAIHEE OC=ALAELO	C (E. M SPC= HAR= N = N02= N03= NH4= S34=	endes)	LAT, LON= PH = HG = CD = PB = TH = AS = . C14= LAT, LON= PH =	2057; 20585 7 24	34. EH SE ZN SB CU CR T3	1563131.00 = = = = = = 1564001.00	DAT=1979. TEM= 22.8 SIO= SO4= 25.00 H2S= O2 = P = DIS= DAT=1978.	0
$\begin{array}{rrrr} 48 & ID^{2} \\ ELE = \\ LI = \\ NA = \\ K = \\ CA = \\ H \land D = \\ SOURCI \\ COMENT \\ 49 & ID^{2} \\ ELE = \\ LI = \end{array}$	<pre>#=6-5731- 475.00 0.00 31.00 2.54 5.10 8.90 E=DOWALD( C: #=6-5840- 860.00</pre>	$\begin{array}{ccc} -91 & T \\ & WAD = \\ F & = \\ CL & = \\ BR & = \\ I & = \\ PO4 = \\ 018 = \\ 3/77), \\ 01 & T \\ WAD = \\ F & = \end{array}$	YP=WELL 23.00 0.00 25.20 H.I.G.(8 YP=WELL 2.70 0.15	COU= WED= B = SR = FE = MN = C13= C13= WED= B =	MAUI 530.00 MAUI 274.00	LA FLO= ALK= CAR= CO2= HCO= CO3= HE3= LC FLO= ALK=	OC=WAIHER OC=ALAELO 72.00	C (E. M SPC= HAR= N = N02= N03= NH4= S34= A SPC= HAB=	ENDES)	LAT, LON= PH = HG = CD = PB = TH = AS = . C14= LAT, LON= PH = HC =	2057; 20585 7.24	34. EH SE ZN SB CU CR T3 56. EH	1563131.00 = = = = = = 1564001.00	DAT=1979. TEM= 22.8 SIO= SO4= 25.00 H2S= O2 = P = DIS= DAT=1978. TEM= 21.42	0
$\begin{array}{rrrr} 48 & ID^{2} \\ ELE = \\ LI = \\ NA = \\ K = \\ CA = \\ MG = \\ H \land D = \\ SOURCI \\ COMENT\\ 49 & ID^{2} \\ ELE = \\ LI = \\ NA = \end{array}$	<pre>#=6-5731- 475.00 0.00 31.00 2.54 5.10 8.90 E=DOWALD( C: #=6-5840- 860.00 177.00</pre>	$\begin{array}{ccc} -91 & T \\ & WAD = \\ F & = \\ CL & = \\ BR & = \\ I & = \\ PO4 = \\ 018 = \\ 3 / 77), \\ 01 & T \\ WAD = \\ F & = \\ CL & = \end{array}$	YP=WELL 25.00 0.00 25.20 H.I.G.(8 YP=WELL 2.70 0.15 291.00	COU= WED= BA = SR = FE = MN = C13= C13= WED= B = BA =	MAUI 530.00 MAUI 274.00	Ld FLO= ALK= CAR= CO2= HCO= CO3= HE3= LC FLO= ALK= CAR=	OC=WAIHER OC=ALAELO 72.00	C (E. M SPC= HAR= N = NO2= NO3= NH4= S34= A SPC= HAR= N =	ENDES) 148.00	LAT, LON= PH = HG = CD = PB = TH = AS = . C14= LAT, LON= PH = HG = CD =	2057; 20585 7.24	34. EH SE ZN SB CU CR T3 66. EH SE	1563131.00 = = = = = = 1564001.00 = 0.01	DAT=1979. TEM= 22.8 SIO= SO4= 25.00 H2S= O2 = P = DIS= DAT=1978. TEM= 21.42 SIO= 8.76	0
$\begin{array}{rrrr} 48 & ID^{*}\\ ELE=\\ LI =\\ NA =\\ K =\\ CA =\\ MG =\\ H/D=\\ SOURCH\\ COMENT\\ 49 & ID^{*}\\ ELE=\\ LI =\\ NA =\\ K = \end{array}$	#=6-5731- 475.00 0.00 31.00 2.54 5.10 8.90 E=DOWALD( F: *=6-5840- 860.00 177.00 8.50	-91 T WAD = F = CL = BR = I = P04 = 018 = 3 / 77), 01 T WAD = F = CL = BR =	TYP=WELL 25.00 0.00 25.20 H.I.G.(8 YP=WELL 2.70 0.15 291.00	COU= WED= BA = SR = FE = MN = C13= C13= WED= BA = SR =	MAUI 530.00 MAUI 274.00	L0 FL0= ALK= CAR= C02= HC0= C03= HE3= L0 FL0= ALK= CAR= C02=	OC=WAIHER OC=ALAELO 72.00	C (E. M SPC= HAR= N02= N03= NH4= S34= A SPC= HAR= N02=	ENDES) 148.00	LAT, LON= PH = HG = CD = PB = TH = AS = . C14= LAT, LON= PH = HG = CD = PB =	2057; 20585 7.24	34. EH SE ZN SB CU CR T3 6. EH SE ZN SP	1563131.00 = = = = = = 1564001.00 = = 0.01 = 0.10	DAT=1979. TEM= 22.8 SIO= SO4= 25.00 H2S= O2 = P = DIS= DIS= DAT=1978. TEM= 21.42 SIO= 8.76 SO4= 21.06	0 0 2 0 3
$\begin{array}{rrrr} 48 & ID^{*}\\ ELE=\\ LI =\\ NA =\\ K =\\ CA =\\ MG =\\ H/D=\\ SOURCH\\ COMENT\\ 49 & ID^{*}\\ ELE=\\ LI =\\ NA =\\ K =\\ CA =\\ \end{array}$	<pre>#=6-5731- 475.00 0.00 31.00 2.54 5.10 8.90 E=DOWALD( T: #=6-5840- 860.00 177.00 8.50 12.40</pre>	-91 T WAD = F = DR = I = P04 = 918 = 3/77), 91 T WAD = F = CL = BR = I = I =	TYP=WELL 23.00 0.00 25.20 H.I.G.(8 YP=WELL 2.70 0.15 291.00	COU= WED= BA = SR = FE = MN = C13= C13= V79) COU= WED= B = BA = SR = FE =	MAUI 530.00 MAUI 274.00 0.02	L4 FL0= ALK= CAR= C02= HC0= C03= HE3= L0 FL0= ALK= CAR= C02= HC0=	OC=WAIHEB OC=ALAELO 72.00 88.00	C (E. M SPC= HAR= N02= N03= NH4= S34= A SPC= HAR= N = N03=	ENDES) 148.00	LAT, LON= PH = HG = CD = PB = TH = AS = . C14= LAT, LON= PH = HG = CD = PB = TH =	2057; 20585 7.24 0.01	34. EH SE CU CR T3 6. EH SE ZN SE	1563131.00 = = = = = = = = = = = = = = = = = =	DAT=1979. TEM= 22.8 SIO= SO4= 25.00 H2S= O2 = P = DIS= DIS= DAT=1978. TEM= 21.42 SIO= 8.76 SO4= 21.06 H2S=	0 0 2 0 0
48 ID ELE= LI = NA = K = CA = MG = H∠D= SOURCH COMENT 49 ID ELE= LI = NA = K = CA = MG =	<pre>#=6-5731- 475.00 0.00 31.00 2.54 5.10 8.90 E=DOWALD( T: #=6-5340- 860.00 177.00 8.50 12.40 20.00</pre>	-01 T WAD= F = CL = BR = I = PO4= 018= 3/77), 01 T WAD= F = CL = BR = I = PO4=	TYP=WELL 23.00 0.00 25.20 H.I.G.(8 YP=WELL 2.70 0.15 291.00	COU= WED= BA = FE = NN = C13= C13= V79) COU= WED= BA = SR = FE = MN =	MAUI 530.00 MAUI 274.00 0.02 0.08	L4 FL0= ALK= CAR= C02= HC0= C03= HE3= L0 FL0= ALK= C02= HC0= C03=	0C=WAIHEB 0C=ALAEL0 72.00 88.00	C (E. M SPC= HAR= N02= N03= NH4= S34= A SPC= HAR= N = N02= N03= NH4=	ENDES) 148.00 3.80	LAT, LON= PH = HG = CD = PB = TH = AS = . C14= LAT, LON= PH = HG = CD = PB = TH = AS =	2057; 20585 7.24 0.01 0.00 0.01	34. EH SE CU CR T3 6. EH SE ZN SB CU CR T3	1563131.00 = = = = = = = = = = = = = = = = = =	DAT=1979. TEM= 22.8 SIO= SO4= 25.0 H2S= O2 = P = DIS= DIS= DAT=1978. TEM= 21.42 SIO= 8.76 SO4= 21.06 H2S= O2 =	0 0 2 3 3
48 ID ELE= LI = NA = K = CA = MG = H∠D= SOURCH COMENT 49 ID ELE= LI = NA = K = CA = MG = H∠D=	<pre>#=6-5731- 475.00 0.00 31.00 2.54 5.10 8.90 E=DOWALD( T: #=6-5840- 860.00 177.00 8.50 12.40 29.00 0.60</pre>	-01 T WAD= F = CL = BR = I = P04= 018= 3/77), 01 T WAD= F = CL = BR = I = P04= 018=	TYP=WELL 23.00 0.00 25.20 H.I.G.(8 YP=WELL 2.70 0.15 291.00 0.00	COU= WED= BA = SR = FE = NN = C13= V79) COU= WED= BA = FE = MN = C13=	MAUI 530.00 MAUI 274.00 0.02 0.08 0.00	L4 FL0= ALK= CAR= C02= HC0= C03= HE3= L0 FL0= ALK= CAR= CAR= C02= HC0= C03= HE3=	0C=WAIHEH 0C=ALAEL0 72.00 88.00	C (E. M SPC= HAR= N02= N03= NH4= S34= A SPC= HAR= N02= N03= NH4= S24=	ENDES) 148.00 3.80	LAT, LON= PH = HG = CD = PB = TH = AS = . C14= LAT, LON= PH = HG = CD = PB = TH = AS = . C14=	2057; 20585 7.24 0.01 0.00 0.01	34. EH SE CU CR T3 6. EH SE ZN SB CU CR T3	1563131.00 = = = = = = = = = = = = = = = = = =	DAT=1979. TEM= 22.8 SIO= SO4= 25.0 H2S= O2 = P = DIS= DIS= DAT=1978. TEM= 21.42 SIO= 8.70 SO4= 21.00 H2S= O2 = P =	0 0 2 0 0
48 ID ELE= LI = NA = K = CA = H $\angle$ D= SOURCH COMENT 49 ID ELE= LI = NA = K = CA = MG = H $\angle$ D= SOURCE	<pre>#=6-5731- 475.00 0.00 31.00 2.54 5.10 8.90 E=DOWALD( C: #=6-5840- 860.00 177.00 8.50 12.40 20.00 0.60 E=DOH(7/60</pre>	-91 T WAD= F = CL = BR = I = P04= 018= 3/77), 01 T WAD= F = CL = BR = I = P04= 018= 4), D0	TYP=WELL 23.00 0.00 25.20 H.I.G.(E YP=WELL 2.70 0.15 291.00 0.00 WALD(3/77	COU= WED= BA = SR = FE = NN = C13= V79) COU= WED= BA = FE = FE = MN = C13= ), H.I	MAUI 530.00 MAUI 274.00 0.02 0.08 0.00 .C. (10/78	L0 FL0= ALK= CAR= C02= HC0= C03= HE3= L0 FL0= ALK= CAR= C02= HC0= C03= HE3= )	0C=WAIHEH 0C=ALAEL0 72.00 88.00 0.00	C (E. M SPC= HAR= N02= N03= NH4= S34= A SPC= HAR= N = N02= N03= NH4= S34=	ENDES) 148.00 3.80 0.00	LAT, LON= PH = HG = CD = PB = TH = AS = . C14= LAT, LON= PH = HG = CD = PB = TH = AS = C14=	20573 20585 7.24 0.01 0.00 0.01 0.00	34. EH SE CU CR T3 6. EH SE ZN SB CU CR T3	1563131.00 = = = = = = = = = = = = = = = = = =	DAT=1979. TEM= 22.8 SIO= SO4= 25.0 H2S= O2 = P = DIS= DIS= DIS= DAT=1978. TEM= 21.42 SIO= 8.70 SO4= 21.00 H2S= O2 = P = DIS= 755.00	0 0 2 0 0

ASTER FILE CONTAINS 49 RECORDS

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## Hawaii Groundwater Chemistry

## APPENDIX III

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MA = K = CA = MG = H/D= SOURCE= COMENT:	7.20 2.10 6.90 3.30 0.00	CL = BR = I = P04= 018=	• <u>5.13</u> 5.08 0.00	BA = BA = SR = FE = MN = C13=	203:00 0.00	FLO= ALK= CAR= CO2= HCO= CO3= HE3=	31.00 38.00 0.00	olaa 5 SPC= N = N02= N03= NH4= S34=	HAFT-7 87.00 26.00	LAT,LON= PH = CD = PB = TH = AS = C14=	19375 7.00 0.00 0.00	7. 155 EH = SE = ZN = SB = CU = CR = T3 =	50200.00 0.00 0.00	DAT=19 TEM= SIO= SO4= H2S= O2 = P = DIS=	78. 19.70 38.49 5.50 88.00
2 ID#={ ELE= 21 LI = NA = K = CA = MG = H/D= SOURCE= COMENT:	3-3802- 5.00 6.80 1.80 4.80 2.50 0.00	02 TYP WAD= F = CL = BR = I = PO4= 018=	=WELL 0.10 3.63 0.00	COU=E WED= BA = SR = FE = MN = C13=	IAWAII 450.00 0.10 0.08 0.01 0.00	LO FLO= ALK= CAR= CO2= HCO= CO3= HE3=	C=	KEAAU- SPC= HAR= N = N02= N03= NH4= S34=	2 78.00 22.00 0.01 0.36 0.00	LAT,LON= PH = HG = CD = PB = TH = AS = C14=	19380 7.40 0.01 0.01 0.00 0.01 0.00	3. 155 EH = SE = ZN = SB = CU = CR = T3 =	50202.00 0.02 0.02 0.01 0.00	DAT=19 TEH= S10= S04= H2S= 02 = P = DIS=	78. 19.16 33.49 10.00 80.00
3 ID#={ ELE= 21 LI = NA = K = CA = MG = H/D= SOURCE= COMENT:	-3892- 4.00 6.30 1.80 4.80 2.50 0.00	03 TYP WAD= F = CL = BR = I = PO4= 018=	=WELL 13.40 0.10 2.49 0.21 0.00	COU=E WED= BA = SR = FE = MN = C13=	IAWA I I 379.00 10.00 0.00	L0 FL0= ALK= CAR= C02= HC0= C03= HE3=	C= 30.00 0.90 36.00 0.00	KEAAU SPC= HAR= N = N02= N03= NH4= S34=	MILL-1 83.00 30.00 0.49 0.00	LAT,LON= PH = HG = CD = PB = TH = AS = C14=	19380 7.80 0.00 0.00	4. 157 EH = SE = ZN = SB = CU = CR = T3 =	50202.00 0.00	DAT=19 TEM= SIO= SO4= H2S= O2 = P = DIS=	78. 19.44 27.80 10.00 0.07 85.00
4 ID#=8 ELE= 21 LI = NA = K = CA = MG = H/D= SOURCE= COMENT:	3-3802- 4.00 6.30 1.80 4.80 2.50 0.00	04 TYP WAD= F = CL = BR = I = PO4= 018=	=WELL 12.40 0.10 3.27 0.00	COU=B WED= B = BA = SR = FE = MN = C13=	IAWAII 371.00 0.00	L0 FL0= ALK= CAR= C02= HC0= C03= HE3=	C= 32.00 38.00 0.00	KEAAU SPC= HAR= N = NO2= NO3= NH4= S34=	MILL-2 88.00 27.00 1.50 0.00	LAT,LON= PH = HG = CD = PB = TH = AS = C14=	19380 7.40 0.00 0.00	6. 157 EH = ZN = SB = CU = CR = T3 =	50202.00 0.00	DAT=19 TEH= SIO= SG4= H2S= O2 = P = DIS=	78. 19.70 36.36 10.00 82.00
<b>5 ID</b> #= <b>{</b> ELE= 21 LI = NA = K = CA = H/D= SOURCE= COMENT:	3-3802-0 4.00 2.10 6.10 3.20 0.00	95 TYP WAD= F = CL = BR = I = P04= 018=	=WELL 12.40 0.10 3.86 0.00	COU=B WED= BA = BA = SR = FE = MN = C13=	IAWAII 375.00 0.00	L04 FL0= ALK= CAR= C02= HC0= C03= HE3=	C= 31.00 38.00 0.00	KEAAU SPC= HAR= N = N02= N03= NH4= S34=	MILL-3 88.00 27.00 1.50 0.00	LAT,LON= PH = HG = CD = PB = TH = AS = C14=	19380 7.40 0.00 0.00	7. 153 EH = SE = ZN = SB = CU = CR = T3 =	50202.00 · 0.00	DAT=19 TFII= S10= S00= H2S= O2 = P = DIS=	78. 19.70 03.49 10.00 81.00

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						т	00-	WFA AT	ORCH-1	LAT LON-	1939	37. 155	50043 00	יייב האיד 1	079
- ID-	8-3900		TP=WELL 8.50	WED=	137.00	FLO=	00-	SPC=	300.00	PH =	7.10	EH =	0010.00	TEM=	18.50
ELE=	92.00	F =	0.10	B =	10000	ALK=	29.00	HAR=	51.00	HG =		$\overline{SE} =$		SI0=	33.49
NA =	41.00	CL =	66.60	BA =		CAR=		N =	1.10	CD =		ZN =	10.00	S04=	10.00
K =	3.50	BR =		SR =		C02=	4.40	NO2=		PB =		SB =		H2S=	
CA =	8.10	I =		FE =	10.00	HCO=	44.00	NO3=	3.60	TH =	0.00	CU =		02 =	
MC_=	7.80	P04=	0.21	MN =		<u>C03</u> =		NH4 =		AS =	0.00	CR =		P =	0.07
H/D=	0.00	018=	0.00	C13=	0.00	HE3=	0.00	\$34=	0.00	C14=	0.00	T3 =	0.00	DIS=	197.00
SUURUE															
COMENT	•														
7 ID#	-8-3900	-02 · T	YP=WELL	COU=	HAWAII	L	0C=	KEAAU	ORCH-2	LAT, LON=	1939	34. 155	50045.00	DAT=1	978.
ELE=	95.00	WAD=	8.10	WED=	147.00	FLO=		SPC=	380.00	PH =	6.80	EH =		TEM=	19.50
LI =		F =	0.08	B =		ALK=	36.00	HAR=	45.00	HG =		SE =		SI0=	30.49
NA =	54.00	CL =	88.40	BA =		CAR=		N =		CD =		ZN =	18.00	S04=	10.00
K =	4.00	BH =		SK =	10.00	CO2=	44 00	NO2=	0 (0	$PB \approx$	0 00	SB =		H2S=	
UA = MC =	8.80	1 = P04=		re = mn -	40.00	HUU=	44.00	NU3=	3.00	111 =	0.00	CD =		02 = P -	
HG - HZDa	9.00	018=	0.00	C13=	0.00	UU3- HE3=	0.00	S34=	0,00	A5 =	0.00	T3 =	0:00		353 00
SOURCE	:=	010-	0.00	010-	0.00	11120-	0.00	001-	0.00	OT F	0.00	10 -	0.00	D10-	000.00
COMENT	:														
						_									
8 ID#	=8-4003	-01 T	YP=WELL	COU=	HAWAII	L	DC=	PANAE	IA-1	LAT, LON=	1940	35.155	50355.00	DAT=1	976.
ELE=	206.00	WAD=	13.10	WED=	306.00	FLO=	07 00	SPC=	93.00	PH =	7.50	EH =		TEM=	20.00
$L_1 =$	5 50	F =	9.11	D = BA =		ALK=	37.00	HAR=	20.00	HG = CD =		SE =		S10=	30.30
MA =	3.00	BB =	0.44	SB =		CO2=	2 36	N02=		PB =		SB =		304- H90=	10.00
CA =	6.40	I =		FE =		HCO=	45.00	NO2-		TH =	0.00	CU =		02 =	
MG =	2.60	P04=		MN =		C03=	20.00	NH4 =		ÂS =	0.00	CR =		₽ =	
H/D= .	0.00	018=	0.00	C13=	0.00	HE3=	0.00	S34=	0.00	C14=	0.00	T3 =	0.00	DIS=	76.00
SOURCE	;=														
COMENT	':												;		
		•													
0 ID#	-9-4009-		TTWEET	COT-	TAWAT T	т	<b>30-</b>	DAMATE	M-9	LAT LON-	1040	40 155	0050 00	DAT-1	070
7 10 <sup></sup>	201 00	WAD=	13.10	WED=	302 00	FLO=	Ju-	SPC=	88.00	PH =	1740		00002.00	DAI-1 TEM=	20 00
LI =		F =	0.22	B =	004.00	ALK=	44.00	HAR=	30.00	HG =		SE =	-	S10=	36.36
$\tilde{N}A =$	5.40	ĈL =	2.70	BA =	0.10	CAR=	12000	N =	00.00	$\overrightarrow{\mathbf{CD}}$ =		ZN =	0.01	S04=	10.00
K =	1.60	BR =		SR =		C02=		N02=	0.01	PB =	0.02	SB =		H2S=	
CA =	6.20	I =		FE =	0.01	HCO=		N03=	0.24	TH =	0.00	CU =	0.02	02 =	
MG =	2.50	P04=		MN =	0.03	C03=		NH4 =		AS =	0.01	CR =	0.01	P =	
H∕D=	0.00	018=	0.00	C13=	0.00	HE3=	0.00	S34=	0.00	C14=	0.00	T3 =	0.00	DIS=	80.00
SOURCE	=														
COMENT	•														
10 ID#	=8-4203-	-02 T	P=WELL	COU=	HAWAI I	L	-DC=	WAIAKE	A TH 2	LAT, LON=	1942	23. 155	i0352.00	DAT=1	978.
ELE=	41.00	WAD=	9.10	WED=	55.00	FLO=		SPC=		PH =	7.00	EH =		TEI1=	23.00
LI =		F =		B =		ALK=	41.00	HAR=	38.00	HG =		SE =		SI0=	88.49
NA =	9.20	CL =	10.40	BA =		CAR=		N =		CD =		ZN =		S04=	3.00
K =	1.60	BR =		SR =		CO2=	<b>50</b> 00	NO2=	A AA	PB =	0 00	SB =		H2S=	
UA = MC =	0.60	1 =		FE =		HCU=	00.00	NU3=	0.20	1H =	0.00	CU ≃		02 = D -	
ПС = И/П=	3.3V 6 66	rv%= ∩18=	0.00	nn ≈ C12=	0 00	1003= HF2=	0 00	N114= S94=	0.00	AS = C1A =	0 00	UN = T3 =	0:00	r = nie-	04 00
SOURCE	5.99 =	01 <b>0-</b>	0.00		0.00	шео	v.vv.		0.00	01-7-	0.00	10 -	<b>U</b> • UU	110-	970 <b>.</b> C (F
COMENT															

ELE 47.00 LI = NA = 25.00 K = 2.40 CA = 7.80 MG = 5.90 H/D = 0.00 SOURCE = COMENT:	wad= F = CL = BR = I = P04= 018=	7.10 0.14 39.80	COO= WED= BA = SR = FE = MN = C13=	HAWAII 201.00 0.20 0.05 0.00	L FLO= ALK= CAR= CO2= HCO= CO3= HE3=	oc= 38:00 47.00 0.00	WAIAKI SPC= HAR= N = NO2= NO3= NH4= S34=	CA-4 94.00 33.00 0.00	LAT, LON= PH = HG = CD = PB = TH = AS = C14=	1942 7.20 0.00 0.00	22. 155 EH = SE = ZN = CU = CR = T3 =	0351.00 0.01 0.10 0.00	DAT=1 TEM= SIO= SO4= H2S= O2 = P = DIS=	978. 21.00 37.64 2.60 107.00
12 ID#=8-420: ELE= 50.00 LI = NA = 17.00 K = 2.20 CA = 7.60 MG = 4.80 H/D= 0.00 SOURCE= COMENT:	3-05 T WAD= F = CL = BR = I = P04= 018=	YP=WELL 27.00 0.00	COU= WED= B = BA = SR = FE = MN = C13=	HAWAII 200.00 0.00	L FLO= ALK= CAR= CO2= HCO= CO3= HE3=	0C= 0.00	KANOE) SPC= HAR= N = NO2= NO3= NH4= S34=	2EHUA-1 0:.00	LAT, LON= PH = HG = CD = PB = TH = AS = C14=	1942 0.00 0.00	22. 155 EH = SE = ZN = SB = CU = CR = T3 =	0350.00+ 0.00	DAT=1 TEM= SIO= SO4= H2S= O2 = P = DIS=	978. 23.00 38.49
13 ID#=8-420: ELE= 50.00 LI = NA = 17.00 K = 2.20 CA = 7.80 MG = 5.00 H/D= 0.00 SOURCE= COMENT:	3-06 T WAD= F = CL = BR = I = PO4= 018=	YP=WELL 6.50 28.00 0.18 0.00	COU= WED= B = BA = SR = FE = MN = C13=	HAWAII 200.00 20.00 0.00	L FLO= ALK= CAR= CO2= HCO= CO3= HE3=	0C= 32.00 39.00 39.00 0.00	KANOEI SPC= HAR= N = N02= N03= NH4= S34=	LEHUA-2 130.00 42.00 0.01 0.80 0.00	LAT, LON= PH = HG = CD = PB = TH = AS = C14=	1942 6.20 0.01 0.00 0.01 0.00	23. 155 EH = SE = ZN = CN = CU = CR = T3 =	0349.00 0.01 0.01 0.10 0.00	DAT=1 TEM= SI0= S04= H2S= O2 = P = DIS=	978. 21.00 38.49 5.00 0.06 109.00
14 ID#=8-420: ELE= 50.00 LI = NA = 15.00 K = 2.10 CA = 7.60 MG = 4.60 H/D= 0.00 SOURCE= COMENT:	3-07 T WAD= F = CL = BR = I = PO4= 018=	YP=WELL 0.10 24.50 0.00	COU= WED= BA = SR = FE = MN = C13=	HAWAII 200.00 0.00	L FLO= ALK= CAR= CO2= HCO= CO3= HE3=	0C= 39.00 47.00 0.00	KANOEI SPC= HAR= N = NO2= NO3= NH4= S34=	EHUA-3 94.00 33.00 0.00	LAT, LON= PH = HG = CD = PB = TH = AS = C14=	1942 7.20 0.00 0.00	24. 155 EH = SE = ZN = SB = CU = CR = T3 =	0350.00+ 0.00	DAT=1 TEM= SIO= H2S= O2 = P = DIS=	978. 23.00 36.36 2.60 107.00
15 ID#=8-4203 ELE= 55.00 LI = NA = 22.00 K = 2.30 CA = 8.50 MG = 5.80 H/D= 0.00	3-10 T WAD= F = CL = BR = I = PO4= O18=	YP=WELL 6.00 38.00 0.00	COU= WED= B = BA = SR = FE = MN = C13=	HAWAII 210.00 0.00	L FLO= ALK= CAR= CO2= HCO= CO3= HE3=	0C= ○00⊶0	HELCO SPC= HAR= N = NO2= NO3= NH4= S34=	KAN6-2 0.00	LAT, LON= PH = HG = CD = PB = TH = AS = C14=	1942 0.00 0.00	22. 155 EH = SE = ZN = SB = CU = CR = T3 =	0347.00 0.00	DAT=1 TFM= SIO= SO4= H2S= O2 = P = DIS=	978. 20.05 37.48 10.00

SOURCE= COMENT:

		-00 T	YP=	COU	HAWAII	1	.oc=			LAT.LON=	*****	*****	****	ከለጥ=	1079
IG ID== ELE=	=8-4203	WAD=		WED=		FLO=		SPC=		PH =		EH =		TEM=	21 00
LI =		F =	0.02	B =		ALK=	0.00	HAR=		HC =		$\overline{SE} =$		SIO=	36 36
NA =	7.90	CL =	9.18	BA =		CAR=		N =		CD =		$\overline{ZN} =$		S04=	10.00
K =	1.80	BR =		SR =		C02=		NO2=		PB =		SB =		H2S=	1.4. • 27.7
CA =	6.80	I =		FE =		HCO=		N03=		<b>TH</b> =	0.00	CU =		02 =	
MG =	3.10	P04=		MN =		C03=		NH4 =		AS =	0100	CB =		ю <u> </u>	
H/D=	0.00	018=	0.00	C13=	9.00	HE3=	0.00	S34=	0.00	C14=	0.00	T3 =	0 00	nie-	
SOURCE=	=										0.00	10 -	0.00	D10-	
COMENT	:														
17 ID#=	-8-4306	-01 T	YP=WELL	COU=	HAWAII	I	.0C=	PIIHON	UA	LAT.LON=	1943	18. 11	59618.00	DAT:=	078
ELE= 2	278.00	WAD=	42.00	WED=	425.00	FLO=		SPC=	93.00	PH =	8.00	EH =		TEM=	17 80
LI =		F =	0.20	B =		ALK=	38.00	HAR=	26.00	HG =		SE =		SIO:	40 64
NA =	8.40	CL =	1.44	BA =		CAR=		N =		$\overline{CD} =$		7N =		S10-	10.02
K =	2.20	BR =		SR =		C02=		N02=		PB =		<u>SB</u> =		BO3~	10.00
CA =	5.00	J =		FE =		HCO=	46.00	NO3=	0.30	TH =	0 00	CU -		00 -	
MG =	3.40	P04=		MN =		C03=		NH4=	0.00	45 =	0.00	CP -		04 - D -	
HZD=	0.00	018=	0.00	C13=	0.00	HE3=	0.00	\$34=	0 00	C14=	0 00	$T_{2}$ -	0 00	r =	00 00
SOURCE=		0.0			0.00	ALO	0.00	001	0.00	01-2-	0.00	10 -	0.00	D18-	83.00
COMENT:	•														
001111.1															
18 ID#=	-4706	-01 T	YP=WELL	COU=	HAWAII	L	.0C=	PAPAIK	ΩŪ	LAT.LON=	1947	15 15	50619 00	DAT-1	070
ELE= 3	369.00	WAD=	21.00	WED=	425.00	FLO=		SPC=	119.00	PH =	7.30	тн =	00010.00	TTM-	00 00
LT =		F =	0.26	B =		ALK=	62.00	HAR=	42 00	HC =	• • • • •	QF -		CIO-	20.00
NA =	6.90	CL =	2.10	$\overline{B}A =$	0.10	CAR=	04.00	N =	-14:00	CD =		7N -	A 10	510=	0.5.22
K =	1.40	RB =		SB =		C02=	•	N02=	0 01	PB =	0 01	SP -	0.12	504= T00-	10.00
CA =	9.50	I =		FE =	0 01	HCO=	66 00	NO2=	0.00		0.01	SB -	0.01	H2S=	
MC =	5 00	P04=		MN =	0.01	C03=	00.00	NUA-	V • 6464	111 -	0.00	- CD =	0.01	02 =	
HG - HZD=	0.00	019=	0 00	C12-	0.01	100-	0 00	N11-7-	0 00	A0 -	0.01	GR =	9.01	P =	
Somer-		010-	0.00	010-	0.00	neo-	0.00	304-	0.00	U144-	0.00	T3 =	0.00	DIS=	76.00
COMPET.	•														
COMENT .															
19 ID#=	8-5005	-91 T	YP=WELL	COU=	HAWATI	T.	00=	PEPEEK	TO SUC	LAT. LON=	1950	34 15	50545 00.	DAT-1	070
ELE= 3	04.00	WAD=	11.40	WED=	333.00	FIN=		SPC=	162.00	PH =	7 20	ਸਸ =	00010100	TEM-	01 60
$\overline{LI} =$		म ≠	0.10	B =		ALK=	61.00	HAB=	72.00	HG =		SF =	0 01	SIO-	21.09
NA =	9.30	ĈL =	9.90	BA =	0.10	CAB=	0	N =	12100	$\overline{CD} =$		7N =	14 00	804-	10 00
K =	1.00	BR =		SR =		C02=		N02=	0.01	PB =	0 01	SR =	1-1.00	002-	10.00
CA =	11.70	ī =		FF =	0.23	HCO=	74.000	N03=	0.50	$\widetilde{TH} =$	0.00	CII -	0 00	идо- 00 -	
MC =	9 10	P04=		MN =	0 05	003=		NH4=	0.00	AS =	0.00	CD -	0.02	U2 =	
H/D=	a aa	018=	0.00	C13=	0.00 0 00	HE9=	A 00	S34=	0 00	C14=	0 00	un -	0.00	r =	141 00
SOURCE=	0,00	010	0.00	410	0.00	nno-	0.00	DOT-	0.00	UIT-	0.00	10 -	0.00	DIS=	141.00
COMENT:															
domin't ·										•					
20 IB#=	8-5005-	-04 TY	YP=WELL	COU=	HAWAII	L	0 <b>C=</b>	MAKAI-2	2	LAT, LON=	1950	50. 15	50516.00	DAT= 1	978.
ELE=	74.00	WAD=	6.80	WED=	375.00	FLO=		SPC=		PH =		EH =		TEM=	20.00
LI =		F =		B =		ALK=		HAR=		HG =		SE =		SIG	60.17 8 X7 X7
NA =		CL = 5	5720.00	BA =		CAR=		N =		CD =		$\overline{ZN} =$		SOd=	
K =		BR =		SR =		C02=		N02=		PB =		SB =		H29:	
CA =		I =		FE =		HCO=		N03=		TH =	0.00	$\tilde{\mathbf{C}}\tilde{\mathbf{U}}$ =		02 =	
MG =		P04=		MN =		C03=		NH4=		AS =		CB =		р <u>-</u>	
H/D=	0.00	018=	9.00	C13=	0.00	HE3=	0.00	S34=	0.00	C14=	0.00	T3 =	Q / QQ	nte-	
SOURCE=										19 A #	v • v v	10 -	0.00	D10-	
COMENT															

							ana ang ang ang ang ang ang ang ang ang	Alfaria Alfaria da sera da se			
21 ID#=8-5548-01 7	TYP=WELL	COU=HAWAII	.LOC=	PARKI	ER-1	LAT, LON=	1955	546. 15	554802.00	DAT=	1978.
ELE= 814.00 WAD=	6.10 WI	D= 849.00	FLO=	SPC:	: 2000.00	) PH =	7.50	EH =		TEM=	28.00
LI = F =	0.52 B	2	ALK= 110.	0 HAR:	270.00	) HG =		SE =		ST0=	68.44
NA = 334.00 CL =	545.00 BA	. =	CAB=	N :		CB =		7N =		504-	02.00
K = 23.80 BB =	SI	- 	C02= 7	A NO2-	-	- 99		<u> </u>		204-	93.00
								<b>3D</b> =		H2S=	
UA - 30.00 1 -	F I	- 20.00	HCU= 140.0	10 NO3-	5.16	TH =	0.00	CU =		02 =	
MG = 49.00 PU4=	1F1	= 10.00	C03=	NH4=	:	AS =		CR =		P =	
H/D= 0.00 018=	0.00 CI	3= 0.00	HE3= 0.0	)0 🐁 S34=	. 0.00	) C14=	0.00	T3 =	0.00	DIS=	1180.00
SOURCE=										212	
COMENT:											
22 10#=8-5745-01 1	IP=WELL (	OU=HAWAII	LOC=	PARKE	2R-5	LAT, LON=	1957	25.15	54553.00	DAT=	1978.
ELE= 1213.00 WAD=	16.00 WH	D= 1236.00	FLO=	SPC=	280.00	) PH =	2.00	EH =		TEM=	26.00
LI = F =	0.33 B	=	ALK= 88.0	0 HAB=	76.00	HC =		SE =		ST0=	70 59
NA = 33.00 CL =	23.00 BA	= 010	CAB=	N -	3 90	cn -		ZN -	A: 10	504-	01.00
V = A 20 BB =					0.00		0.01	LIN -	V.12	504=	21.00
	51		0.4- 0.4	NUZ-	0.01	PB =	0.01	SB =		H2S=	
CA = 7.80 1 =	F E	= 0.27	HCO = 102.0	00 NO3=	0.94	TH =	0.00	CU =	0.05	02 =	
MG = 10.50 PO4 =	MN	= 0.01	C03≈	NH4=		AS =	0.01	CR =	0.01	P =	
H/D= 0.00 018=	0.00 C1	3= 0.00	HE3= 0.0	Ø S34=	0.00	C14=	0.00	T3 =	0 00	DIS=	210 00
SOURCE=							0.00	10	0.00	D10-	210.00
COMENT											
GOIDAL .											
23 IB#=8-5745-02 T	YP=WELL C	OU=HAWAII	LOC=	PARKE	R-4	LAT, LON=	1957	22.15	54551.00	DAT=1	978.
ELE= 1203.00 WAD=	16.00 WE	D= 1231.00	FLO=	SPC=	280.00	PH =	2.00	EH =		TEM=	26.50
LI = F =	0.31 B	=	ALK= 82.4	O HAR=	63 00	HC =		SF -		SIO-	70 50
NA = 35.00 CL =	28.00 BA	=	CAD-	N m	00.00	<u> </u>		1711 -	1 = 00	810-	10.00
	20.00 DA		CAR-	- 11 -				ZIN =	12.00	804=	28.00
A = 4.40 Br =	an		0.4	0 NOZ=		PB =		SB =		H2S=	
CA = 8.30 I =	FE	= 20.00	HCO = 100.0	0 NO3=		TH =	0.00	CU =		02 =	
MG = 10.40 PO4=	MIN	=	C03=	NH4=		AS =		CB =		P =	
H/D = 0.00 018 =	0.00 C1	3= 0.00	HE3= 0.0	0 534=	A: 0A	C14=	0 00	TQ =	0 00		007 00
SOURCE:			LLG 0.0	0 DOI	0.00	UL L-	0.00	10 -	0.00	018-	201.00
CONFERT											
COMENT .											
04 104-0 5040 61 55		011									
24 10#=8-5948-01 1	IT=MELL U	UU=HAWAIII	LOC=	HAPUN	A BCH P	LAT,LON≠	1959	47. 15	54858.00	DAT=1	978.
ELE= 244.00 WAD=	WE	D= 278.00	FLO=	SPC=	1600.00	PH =	7.30	EH =		TEM=	25.00
LI = F =	0.28 B	=	ALK= 78.0	0 HAR=	202.00	HG =		SE =		SIO=	68 44
NA = 250.00 CL =	436.00 BA	=	CAB=	N =		CD =		7		804-	40 AA
K = 16.40 BR =	SB	=	002=	N09-		PR =		6D -		001-	00.00
	EE	- 50.00		n02-				SB -		H2S=	
MG - 40 00 DC4	F E	- (8.00	nuu= 95.0	0 NO3=	5.30	TH =	0.00	CV =		02 =	
MG = 42.00 P04 =	MN	8	C03=	NH4=		AS =		CR =		P =	
H/D= 0.00 018=	0.00 C1	3= 0.00	HE3= 0.0	0 · S34=	0.00	C14=	0.00	T3 =	0.00	DIS=	922.00
SOURCE=								- 0		210	200.00
COMENT:											
25 ID#=8-6048-00 m	PEWELI C	OII-HAWATI	100-	NT 17-10 A	DOIT TIM	TATE LOW-	0000	(A		<b>T</b>	
		OU-HANALI		H KEA		LAI,LUN=	2000	15	04999.00	DAT=I	978.
115- 040.00 nAD=	3.00 Wb.	0- 310.00	rLV=	SPC=	1000.00	РН =	7.60	ЕН =		TEM=	26.00
$\Gamma I = K =$	0.28 B	=	ALK= 77.0	9 HAR=	193.00	HC =		SE =		SI0=	70.58
NA = 237.00 CL =	394.00 BA	2	CAR=	N =		CD =		ZN =	36.00	S04=	256 0.9
K = 15.50 BR =	SR	=	C02=	NO2=		PB =		SB =		H28-	
CA = 24.00 I =	FF.	= 0.25	HCO= 94 0	A NO3=	3 20	<b>TH</b> =	0 00			00 r	
MC = 40 00 PO4=	MIN MIN	v•20	000- 71.0		0.20	111 ~	0.00	00 =		v∡ =	
HAD- 0 00 10-	1111	-	uuo~	NUGe		A3 =		UH =		н =	
	0 00 014		11120- 0.0	S. 00.1	~ ~ ~	A + +	<b>•</b> • •		· · ·	· · ·	-
COMPART- 0.00 010-	0.00 Ci	3= 0.00	HE3= 0.0	)= _ 534=	0.00	C14=	0.00	T3 =	0.00	DIS=	838.00
SOURCE=	0.00 C1	3= 0.00	HE3= 0.0	)∝ , S34=	0.00	C14=	0.00	T3 =	0.00	DIS=	838.00

ELE= 188.00 ELE= 188.00 LI = 0.00 NA = 239.00 K = 13.00 CA = 24.00 MG = 40.00 H/D= 0.00 SOURCE= COMENT:	9-01 F = CL = BR = P04= 018=	0.00	COU: WED= BA = SR = FE = MN = C13=	-HAWAII 218.00 0.00	I FLO= ALK= CAR= CO2= HCO= CO3= HE3=	20C= 78200 95.00 0.00	M KEA SPC= HAR= N02= N03= NH4= S34=	BCH HT 1520.00 193.00 1.90 0.00	LAT, LON= PH = HG = CD = PB = TH = AS = C14=	2000) 8.10 0.00 0.00	EH SE ZN SB CU CR T3	1554920.00 = = = = = = = = = 0.00	DAT= TEM= SIO= SO4= H2S= O2 = P = DIS=	1978. 25.00 66.30 74.00 838.00
<b>27</b> ID#=8-614 FLE= 982.00	7-01 <sup>-</sup> 1 WAD=	TYP=WELL	COU=	HAWAII	L FLO-	-0C=	KAWAII	IAE-3	LAT, LON=	20013	2	1554711.00	DAT=1	978.
LI =	F =	0.18	B =	10-10.00	ALK=	81:00	HAR=	331 00	PH = HC =	7.10	EH	=	TEM=	31.00
NA = 100.00	CL =	171.00	BA =		CAR=	14.00	N =	001.00	CD =		OL 7N	= 0.01	S10=	51.33
K = 12.80	BR =		SR =		C02=		N02=		PB =	0.01	SB	= 0.11	804- H2S=	9.00
CA = 23.00	I =		FE =	7.20	HCO=	105.00	N03=	3.60	TH =	0.00	CU	= 0.10	02 =	
MG = 8.50	P04=		MN =	12.00	C03=		NH4=		AS =	0.01	CR	=	р =	
H/D= 0.00 SOURCE= COMENT:	018=	0.00	C13=	0.00	HE3=	0.00	S34=	0.00	C14=	0.00	ТЗ	= 0.00	DIS=	728.00
28 ID#=8-614	3-01 T	YP=WELL	COU=	HAWAI I	$\mathbf{L}$	0C=	KAWAIH	IAE-1	LAT, LON=	20012	2.	1554809.00	DAT=1	978.
ELE= 579.00	WAD=	3.30	WED=	620.00	FLO=		SPC=	1350.00	PH =	7.80	$\mathbf{EH}$	=	TEM=	27.00
$\frac{L1}{NA} = 210.00$		250 00	B =	0.00	ALK=	66.00	HAR=	192.00	HG =		SE	8	SI0=	74.86
K = 16.30	BB =	002.00	GR -	0.30	CAR=				CD =		ZN	= 68.00	S04=	118.00
CA = 28.00	I =		FE =	6 20	UU2- HCO=	89 00	NO2=	0.01	PB =	0.16	SB	=	H2S=	
MG = 36.00	P04=		MN =	0.05	C03=	04.00	NHA-	0.00	1H = 0	0.00	CU	= 0.03	02 =	
H/D= 0.00	018=	0.00	C13=	0.00	HE3=	0.00	S84a	0 00	A8 -	0.05	UR. TO	= 0.01	P =	<b>2</b> 41 00
SOURCE= COMENT:						0140	501	0.00	017-	0.00	10	- 0.00	D18=	741.00
29 ID#=8-6148	3-02 T	YP=WELL	COU=	HAWAI I	I.A	DC=	KAWATH	ΔE-4	LAT LON=	20012	1	1554000 00	DAM-1	070
ELE= 582.09	WAD=	7.60	WED=	626.00	FLO=		SPC=	1400.00	PH =	7.40	г. гч	100%000.00	DAT = 1	978.
LI =	F =	0.33	B =		ALK=	69.30	HAR=	172.00	HG =		SE	= 0.01	SIO=	20.40
NA = 204.00	CL =	370.00	BA =		CAR=		N =		CD =		ZN	= 90.00	S04=	63.00
K = 17.30	BR =		SR =		C02=		NO2=	0.01	PB =	0.01	SB	=	H2S=	00.00
UA = 30.00			FE =	23.00	HCO =		NO3=	0.18	TH =	0.00	CU	= 0.02	02 =	
$H_{2} = 38.00$	ru4=	0.00	MN = 0.10	0.01	<u>C03</u> =		NH4=		AS =		CR	2	P =	
SOURCE=	0104	4.44	u13=	9.00	HE3=	<b>9.00</b> 0	S34=	Ø., 00	C14=	0.00	ТЗ	= 0.00	DIS=	

MASTER FILE CONTAINS 29 RECORDS

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