### GROUND WATER FIELD NOTES

<table>
<thead>
<tr>
<th>Date</th>
<th>Hour</th>
<th>Depth to Water</th>
<th>Elev. of Water Surface</th>
<th>Temp. °C</th>
<th>Sp. Cond.</th>
<th>Remarks</th>
<th>Meas. by</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/22</td>
<td>0915</td>
<td>150 ft.</td>
<td>149.37</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/22</td>
<td>1020</td>
<td>150 ft.</td>
<td>149.37</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>3/23</td>
<td>0915</td>
<td>150 ft.</td>
<td>149.37</td>
<td></td>
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<tr>
<td>3/23</td>
<td>1020</td>
<td>150 ft.</td>
<td>149.37</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>3/24</td>
<td>0915</td>
<td>150 ft.</td>
<td>149.37</td>
<td></td>
<td></td>
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</tbody>
</table>

**Remarks:**
- 3/22: Depth to Water 150 ft., Elev. of Water Surface 149.37 ft.
- 3/23: Depth to Water 150 ft., Elev. of Water Surface 149.37 ft.

**New No.:**

New No. ____________
**LEVEL NOTES**

Stream: Kiiakou well (State of Hawaii) Concourse

Locality: Libou, Kauai, Hawaii

Party: N. Kitani (R. K. Kitani) Date: March 4, 1944

<table>
<thead>
<tr>
<th>STATION</th>
<th>B.S.</th>
<th>B.S.</th>
<th>F. S.</th>
<th>ELEVATION</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orange</td>
<td>4.50</td>
<td>315.60</td>
<td>371.30</td>
<td>January 2, 2000; 371.30 by drill.</td>
<td></td>
</tr>
<tr>
<td>M.P. 40' black</td>
<td>2.97</td>
<td>372.63</td>
<td></td>
<td>Top of black, white, painted orange (R. I.)</td>
<td></td>
</tr>
<tr>
<td>N.P.</td>
<td>3.94</td>
<td>371.86</td>
<td></td>
<td>Water, well, top of 240 ft. pipe clean.</td>
<td></td>
</tr>
</tbody>
</table>

No. of sheets: Comp. by: Chk. by:
**LEVEL NOTES**

Stream: [illegible]

Locality: To be determined

Party: [illegible]

Date: Mar. 23, 1977

<table>
<thead>
<tr>
<th>STATION</th>
<th>B.S.</th>
<th>HT. INST.</th>
<th>F. S.</th>
<th>ELEVATION</th>
<th>REMARKS</th>
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<tbody>
<tr>
<td>0</td>
<td>3573</td>
<td></td>
<td></td>
<td>371.58</td>
<td></td>
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<td></td>
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<td></td>
<td>375.15</td>
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<tr>
<td>M.F.</td>
<td>3231</td>
<td>371.92</td>
<td></td>
<td>2.5923 - 01</td>
<td></td>
</tr>
<tr>
<td>N.F.</td>
<td>2731</td>
<td>372.42</td>
<td></td>
<td>2.5923 - 01</td>
<td></td>
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</tbody>
</table>

Elevation of M.F. for 2.5923 - 01, Kishine.

Well 11° 31' 92.94
ROUTE SLIP
DESIGN & CONSTRUCTION BRANCH.
Division of Water and Land Development

FROM __________________________ DATE __________________ FILE IN 5923-JJ-

TO: INITIAL: PLEASE:

T. FUJII See Me
H. F. CHANG Take Action
G. MORIMOTO Review & Comment
H. MORIMATSU Investigate & Report
D. HIROKAWA Draft Reply
G. MIYASHIRO Acknowledge Receipt
C. INATSUKA Type Draft
L. YOSHIOKA Type Final
Y. SHIROMA Xerox
J. KASAMOTO Mail
J. MENOR
G. MIYAMOTO
L. NANBU

FOR YOUR:

R. T. CHUCK Approval
W. O. WATSON Signature
J. YOSHIMOTO Information

REMARKS:

7/13/77
Dansde called Kishana
well pumped 6 hrs.
300 gpm 1/2 inch
August 4, 1976

Perforated casing,

Design Q, say 400 gpm.

10 casing 12", 85 in/hr but use 80 in/ sec.

\[ \frac{80 \text{ in/hr}}{2} \times \frac{3600 \text{ sec}}{1 \text{ hr}} \times \frac{1 \text{ ft}}{12 \text{ in}} = 24.93 \text{ gpm/ft} \]

\[ 141 \text{ in/hr} \]

Say 40' x 24.93 gpm/ft = 1000 gpm > 400 ok.

Collapsing pressure

\( \frac{1}{4} \) "Hick casing = 900' water, from Rescue Mocs Co. manual.

Use 450' as recommended for cement slurry.

\[ \frac{450'}{141 \text{ in/hr}} = 3.19 \text{ psi} \]

\[ p = \frac{wh}{145 \text{ in}^2 \times 18.3 \text{ ft}} = 184 \text{ psi} < 195 \text{ psi} \] ok.

Bond

\[ U = \frac{V}{\Sigma o} \]

\[ U = \text{bond stress, } \Sigma o = \text{sum of perimeter of } \frac{1}{4} \text{"casing = 3.27 in} \]

\[ V = 33 \text{ gpm } \times 18.5' = 610.5 \text{ ft-lbs} \]

\[ U = \frac{610.5 \text{ ft-lbs}}{3.27 \text{ in } \times 50 \text{ ft } \times 12 \text{ in}} = 3.11 \text{ psi} \]

\[ f_c > 2000 \text{ psi for grout} \]

\[ f_w = \frac{4.8 \frac{\text{ ft}}{V}}{D} = \frac{4.8 \times 1000}{7 \times 12.5} = 8.59 \text{ psi} \]

\[ > 3.11 \text{ ok} \]
July 27, 1976

Kilohana Well "B" 59-73-02
Preliminary Estimate

Mobilization
Demobilization

Rock and backfill 10' x 10' x 6' 5" $11.00

12' solid casing 140' $1.40

12' perforated casing 20' $1.20

Rock pack annular space 120' $1.50

Cement grant 1:1 50' $2.00

Installing, removal of pumping test equipment 1 Each $5.00

Pumping test 72 hr. $2.16

Cement Bags $1.25

Due to access road cost, all items

* Prices from 10-4-76 to 4-4-76 (reflected in unit price)

** Price from 5-5-75 to 7-14-76 (only one contractor could have bid)

Job No. 14-KW-13x 12-inch casing for Kilohana Well "B" 59-73-02
Lihi Water System, Lihi, Kauai, Hawaii

Asst 195/95, A-10, B-75-22L-C

Contributor for Expl. Willy G72-337
1. Install 12" casing to depth 170'
2. Perforate casing from 140' to 170' depth
3. Rock pack annular space w/ #3 agg. from 170' to 50'
4. Grout annular space from 0'-50' depth
5. Run 72 hour pumping test, at 300-400 g.p.m.
& airline bottom set at 20' submerged SWL.
Kilohana Estate Wells

August 9, 1974 - 17W = 146° 37' from T.O.C.
May 20, 1976

MEMORANDUM FOR THE RECORD

FROM: Dan Lum

SUBJECT: Kilohana Well "B", Kauai, May 1976 Status Report and Proposed Development

The abandoned well at Kilohana, Kauai, herein referred to as Well "B" presently is capped and untested. It is proposed herein to develop the well by backfilling 60 feet, installing 10-inch diameter casing, and pump testing the well in hopes of developing new water from Koloa Lava separate from the basal water tapped by the adjacent Kilohana deep well.

Perched ground water is presently coming into the middle part of the hole and leaking out of the lower part of the hole. The depth to static water level on May 5, 1976 was measured at 144 feet, the same level that has been measured in the hole since it was abandoned in May 1973. By backfilling the hole as shown on the attached diagram, it is expected that the static water level will rise from the 144-foot depth to about the 35-foot depth, stopping the present ground water leakage and restoring the original perched groundwater storage level.

The following development and testing work is proposed:

1. Backfill the hole to a depth of 190 feet with basalt rock sand, and tremie one to three bags of cement on top of the backfill,

2. Monitor for any rise in static water level, while,

3. Install 190 feet of 10-inch diameter casing with bottom 110 feet consisting of perforated casing,

4. Rock pack the annular space around the outside of casing from 190-foot depth to 50-foot depth,

5. Seal the annular space from the 50-foot depth to ground surface with cement and concrete grout, and

6. Run 72-hour pumping test on Well "B" and monitor Well "A".

DAN LUM
KILohana Well "B"
STATUS REPORT MAY 20, 1976
AND PROPOSED DEVELOPMENT

GR. ELEV. 371.3'

DEPTHOF HOLE

100'
200'

WELL "A"
SWLS

WELL "B"
SWLS

STATE WATER LEVELS DURING DRILLING

144' ON MAY 5, '76

D.T.W.

EXPECTED
SWL

WHEN
BACKFILLED

PROPOSED CHAMING INSTALLATION
110 C.F.
12" DIAM. CASING
SOUTH SWISH SEDD

CONDUCTOR PIPE

CONCRETE

18" HOLE

ROCK PICK
W/ #3 A.GG

PROPOSED BACKFILL
WITH ROCK SAND
CAPPED WITH CEMENT

200'

190'

1. BACKFILL HOLE TO DEPTH OF 190'.
2. TROMIE 1 to 3 BAGS CEMENT ON TOP OF BACKFILL
3. INSTALL CASING & ROCK PACK ANNULAR
   SPACE W/ #3 A.GG. FROM 190'- 50' DEPTH D. LUM
4. GROUT ANNULAR SPACE FROM 0'- 50' DEPTH 5/20/76
5. RUN TO 100' HR. PUMPING TEST
Dowell has (x will give) R.O. to
Proceed misc. to pump test (22 hrs)
the 1st hole drilled @ Kelbana well
site. Test will be @ 50 to 1000 ft per max.
At request of Dan Lewis

Refine 5/14/76 if feasible

1. Probe & establish depth from
top of conductor pipe (casing) to well
water level.

2. Sound up something about 8' OD
to check for obstruction & established
bottom clear.

Note that in the 1st hole which was abanonded
by chwell drill, when the bit got stuck,
check up Dan Lewis 548-7647 for
detail on any questions

144' Static water level to top of casing
203' Depth to bottom of well
From Top of Casing
O-18 CLAY
8-34
34-64 CLAY + VOLCANIC ASH
64-117 BLACK SANDY & YELLOW CLAY
17-122 CLAY + GRAVEL
122-125 GRAVEL
28-155 GRAVEL + SANDY CLAY
35-140 STICKY MUD + CLAY & SAND
42-147 CLAY + GRAVEL
44-150 CLAY + CINDER
150-185 CINDER, LAUP, MUD, ROCK-CLAY
155-175 CINDER, LAUP, SLAG
175-184 CLAY-LAUP
184-187 LAVA BOULDER, MIXED MUD
192-187 VIAL BOULDER, MIXED MUD
200-265 MUD
265-295 MUD
125
150
245

-245

3/29/73 WORKED AT Well - 16.5' A.M. 6.0 OH

4/6/73 SPARKED IN WELD

5/2/73 FINISH TO 5' ABOVE NICE WELD

5/10/73 LOST TOOLS IN WELL, grades make it 8' above top, while RL:

804 = 12.13'

May 16, ABANDONED  NO Casing

May 17 STARTED NEW  W.L. 227.30 MSL
Mr. Barry Simmons  
Oasis Water Systems  
P.O. Box 507  
Hanalei, HI 96714  

Dear Mr. Simmons:  

Well Completion Report for Well No. 5923-02  

We received your Well Completion Report Part II for the Kilohana Well "B" (Well No. 5923-02) pump replacement on September 13, 2005 and acknowledge that it is complete.  

If you have any questions, please contact Lenore Y. Nakama of the Commission staff at 587-0218 or toll-free at 974-4000 (Hawaii), 274-3141 (Kauai), 984-2400 (Maui), or 1-800-468-4644 (Lanai & Molokai), extension 70218.  

Sincerely,  

W. Roy Handy  

DEAN A. NAKANO  
Acting Deputy Director  

LYN:ss  
c: County of Kauai, Department of Water
September 15, 2005

Commission on Water Resource Management
P.O. Box 621
Honolulu, HI 96809

Gentlemen:

Subject: Well Completion Report – Part II, Kilohana Well “B” (State Well #2-5923-002)

The pumping unit for the subject well has been replaced, and we are hereby submitting the enclosed Well Completion Report – Part II. Please direct any questions to our Assistant Chief of Operations, William Eddy, at (808) 245-5436.

Sincerely,

Edward Tschupp
Manager and Chief Engineer

WE:emi

Enclosure
c: Oasis Water System w/enc.
State of Hawaii  
COMMISSION ON WATER RESOURCE MANAGEMENT  
Department of Land and Natural Resources  
WELL COMPLETION REPORT - PART II  
Pump Installation

Instructions: Please print in ink or type and send completed report (with attachments, if applicable) to the Commission on Water Resource Management, P.O. Box 821, Honolulu, Hawaii 96809. The Commission may not accept incomplete reports. This form shall be submitted within 60 days of the completion of work. For assistance, please consult the Hawaii Well Construction and Pump Installation Standards or call the Regulation Branch at 587-0225. For updates to this form or additional information, please visit our website at http://www.hawaii.gov/dlnr/cwrm/.

1. State Well No.: 2-5923-002  
   Well Name: Kilohana Well "B"  
   Island: Kauai

2. Address: n/a  
   Tax Map Key: 3-8-05-15 (por)

3. Pump Installation Company: Oasis Water Systems

4. Date Pump Installed: 6/24/05

5. PERMANENT PUMP INFORMATION
   Pump Type, Make, Serial No.: 3 Stage, Vertical Turbine Pump, Goulds, Model 7CLC
   Rated Capacity: 400 gpm at head of: 200 ft.
   Motor Type, H.P., Voltage, rpm: Submersible, Franklin Electric, 30 HP, 480 V, 3600 RPM, Model #2366168020

6. Method of flow measurement:
   □ Flowmeter  Manufacturer Lakes  Model no. 675F  Size 1-1/2”
   □ Weir  □ Open Pipe  □ Orifice*  □ Other*, explain below
   *attach schematic

7. Fill in the as-built section on the other side of this sheet.

8. Attach the rating curve for the installed pump.

9. Attach photograph of well clearly showing the benchmark on the concrete pad, the well head, and the method of flow measurement.

10. Other remarks/comments:

   ____________________________________________________________
   ____________________________________________________________
   ____________________________________________________________
   ____________________________________________________________
   ____________________________________________________________
   ____________________________________________________________
   ____________________________________________________________

Pump Installation Contractor (print) Oasis Water Systems C-57C-57a/A Lic. No. 21457

Signature ___________________________ Date ___________________________
7. AS-BUILT PUMP SECTION

(Please attach as-built if different from diagram provided below)

Bench mark elevation surveyed to nearest 0.01 ft. = 371.5 ft. mean sea level

Elevation of top of chase tube = 372.0 ft. mean sea level

Pump intake depth = 176 ft. (referenced to bench mark)

Chase tube depth = 172 ft. (referenced to bench mark)

If airline installed, bottom of airline elevation = n/a ft. mean sea level

2-5923-02 KILOHANA B
Characteristics based upon pumping clear, non-aerated water. Rating point only is guaranteed. Column losses not included.
LIHUE WATER SYSTEM
Well "A" (5923-01) 450 gpm
Well "B" (5923-02) 700 gpm
Well "C" (5923-03) 120 gpm
Well "D" (5923-04) 400 gpm
Well "E" (5923-05) 200 gpm
Well "F" (5923-07) 700 gpm
Garlinghouse (5823-01) 2-700 gpm

PUHI WATER SYSTEM
Well "E" (5824-03) 120 gpm
KCC Filter Plant (Puhi Tunnel) 360 gpm
KCC Deepwell (5824-07) 200 gpm
Well "D" (5824-02) Abandoned--90 gpm

LOCATION MAP
TMK: 3-4-05
Repl. from Doc. 9-30-87
WELL MODIFICATION PERMIT

for

State Well No. 5923-02
Lihue, Kauai, Hawaii

TO: Department of Water
P.O. Box 1706
Lihue, Kauai, Hawaii 96766

In accordance with Chapter 166 of Title 13, "Rules for the Control of Ground Water Use in the State of Hawaii," your application to modify State Well No. 5923-02 is approved subject to the following conditions:

1. A Driller's Well Completion Report (enclosed) shall be submitted to the Division of Water and Land Development. Upon reviewing our files no completion report has been found.

2. Monthly pumpage records shall be submitted after the well is put into production.

3. The applicant comply with all applicable rules, ordinances, and law.

SUSUMU ONO
Chairperson of the Board

OCT 1 1984
Date of Issuance

Inc. Driller's Report Form
cc: USGS
Dept. of Health
STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P. O. BOX 621
HONOLULU, HAWAII 96809

WELL MODIFICATION PERMIT
for
State Well No. 5923-02
Lihue, Kauai, Hawaii

TO: Department of Water
P.O. Box 1706
Lihue, Kauai, Hawaii 96766

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Chairperson of the Board

Date of Issuance

Enc. Driller's Report Form

cc: USGS
Dept. of Health
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for

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TO: Department of Water
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Chairperson of the Board

SUSUMU ONO

Date of Issuance

10/1/84

Enc. Driller's Report Form
cc: USGS
Dept. of Health
September 20, 1984

Mr. Robert T. Chuck  
Manager and Chief Engineer  
Division of Water & Land Development  
P.O. Box 373  
Honolulu, HI 96809

Re: Well Modification Permits for Kilohana Wells "B", "G" and "I"

Enclosed are three (3) completed application forms for well modification permits of the subject wells.

Raymond H. Sato  
Manager and Chief Engineer

MM:at

Enclosures
APPLICATION FOR (check one)

☐ WELL DRILLING PERMIT  ☐ WELL MODIFICATION PERMIT

Instructions: Send completed application and attachments to Department of Land and Natural Resources, P.O. Box 373, Honolulu, Hawaii 96809.

Reference: Regulation 9, Dept. of Land & Natural Resources.

Is the well located in a Designated Ground Water Control Area? ☐ Yes ☐ No

If "yes", application must be accompanied by a Water Use and/or Water Supply Permit and a non-refundable filing fee of $100 payable to the Department of Land & Natural Resources. However, if application is for minor modification of well, filing fee may be waived. If "no", no filing fee is required. Filing fee is waived for federal, state, and county government agencies.

1. WELL LOCATION: Island ☐ Kauai ☐ Other Tax Map Key 3-8-05-15. Attach a plot plan showing well location referenced to established property boundaries.

2. WATER USER ☐ Department of Water ☐ Other Telephone ☐ Address ☐ Zip Code ☐

3. PROPOSED DRILLING COMPANY: ☐ NA

4. PROPOSED WORK: ☐ Drill new well ☐ Deepen ☐ Redrill ☐ Alter ☐ Seal ☐ Abandon ☐ Install new pump ☐ Replace pump ☐ Modify pump

Fill in the diagram and briefly describe the proposed work (use back of form if necessary): Install a 700 gpm vertical turbine pump and appurtenances.

5. PROPOSED SECTION OF WELL

6. PROPOSED USE: ☐ Municipal ☐ Military ☐ Agriculture ☐ Industrial ☐ Domestic ☐ Disposal ☐ Other (specify) ☐

7. PROPOSED AMOUNT OF WITHDRAWAL: Check most appropriate box and fill in amount.

☐ Daily 1000 gallons ☐ Monthly _______ gallons ☐ Yearly _______ gallons

8. PROPOSED PUMP OR FLOW CAPACITY: _______ gallons per minute

Signature: ___________________________ Date: 9-20-84

Water User

Signature: ___________________________ Date: 9-20-84

Landowner of Well Site

For Official Use:

State Well No. 5923-0

DLNR Permit No.

DLNR Application No.
JOB NO. 14-KW-13X

H CASING FOR WELL "B" (5923-02)

UE WATER SYSTEM
IHUE, KAUA'I, HAWAII

STATE OF HAWAII
F LAND AND NATURAL RESOURCES
- WATER AND LAND DEVELOPMENT
SLH 1975, ITEM A-10, B-75-424-C

SECTION THRU WELL
NOT TO SCALE

APPROVED:
DATE: 10/4/76

CHIEF, ENVIRONMENTAL PROTECTION AND HEALTH
SERVICES DIVISION, DEPARTMENT OF HEALTH

APPROVED:
DATE: 12/12/76

MANAGER - CHIEF ENGINEER
DIVISION OF WATER AND LAND DEVELOPMENT
DEPARTMENT OF LAND AND NATURAL RESOURCES
PUMPING TEST RECORD for

Kahului "P" Well 5922-02

Island Project or Job No. Nahele 15-1977

Description of Well---
1. Elevation: ground surface 77.2 ft., top of casing 71.5 ft.,
   rotary table _______ ft., referenced to _______ benchmark.
2. Total depth of well 167 ft.; or 191.7 ft. elevation, msl
3. 1/2 in. solid casing to 162 ft. depth, perforated to 160 ft. depth
4. Static water level on March 19, 1977: 145.4 ft. below ground
   surface, top of casing; or 145.9 ft. elevation msl
   measured _______ method

Description of Pump and Pump Setting---
5. Tullalin type pump with 10 stage bowl assembly
6. Gasoline diesel, electric, power with _______ horsepower
7. Shaft speed: _______ rpm at 4.0 gpm flow
8. Depth of pump intake: 167 ft. below casing; or 190.8 ft. elev. msl
9. Depth of airline bottom: 167 ft. below _______ ; or 190.8 ft. elev. msl
10. Center of gage: _______ ft. elev., msl. Flow measured with _______.

<table>
<thead>
<tr>
<th>Date &amp; Time</th>
<th>Sample No.</th>
<th>Pumping rate (gpm)</th>
<th>Airline Drawdown (feet)</th>
<th>Chlorides (ppm)</th>
<th>Temp. (°F)</th>
<th>Cond. (mmhos 25°C)</th>
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<tbody>
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Test conducted by _______.
# Pumping Test Record

For: Kilohana "B" Well 5902-62

Kauai Island 14-K1-12 Project or Job No. March 15-17 1977

<table>
<thead>
<tr>
<th>Date &amp; Time</th>
<th>Sample No.</th>
<th>Pumping Rate (gpm)</th>
<th>Airline Drawdown (feet)</th>
<th>Chlorides (ppm)</th>
<th>Temp. (°F)</th>
<th>Cond. (mmhos 25°C)</th>
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Sheet No. __________ of __________ Sheets
**PUMPING TEST RECORD**

for

KILOHANA "B"  
(No.)

Island   14 - KW  Project or Job No. March 17 - 18 1971

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<th>Chlorides (ppm)</th>
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<th>Cond. (mmhos 25°C)</th>
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Sheet No. 4 of 4 Sheets
### PUMPING TEST RECORD

for

KILOLANA "B" Well 5973-07

(name) (No.)

Kauai Island 14-K12 Project or Job No. Mar 14 1971

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<th>Chlorides (ppm)</th>
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Sheet No. 1 of 2
### PUMPING TEST RECORD

**for**

**Kiawahana**

**Well 59, Job 02**

*name*  

\[ \text{Date: March 18, 1977} \]

**Project or Job No.**

**Island**

**Project or Job No. March 18, 1977**

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**Notes:**
- Sample rate:
- Chlorides: 597.00
- Temp.: 77.6°C
- Cond.: 512.44
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<td>AgNO₃ - 0.2 ml</td>
<td>Mult. Factor</td>
<td>Chlorides (ppm)</td>
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Titrations conducted by

K-101 Island Project or Job No. 19
Kilohana Well "B" # 5025-02
March 21, 1977
Q = 400 GPM for 143 Hours

Recovery

Since pumping stopped in hours
**United States Department of the Interior**
**Geological Survey**
**Central Laboratory, Denver, Colorado**

**WATER QUALITY ANALYSIS**
**CAID # 97034 RECORD # 0416**

SAMPLE LOCATION: 2-30°42.1'N, 116°40.1'W AT X2-01
STATION ID: 218401-02-1500-38302 CATALOG. REF.: 215901 154x353 02
DATE OF COLLECTION: 3/89-770321 EN.-- TIME--10:00
STATE CODE: 14 COUNTY CODE: 607 PROJECT IDENTIFICATION: 11003
DATA TYPE: 2 SOURCE: GROUND WATER

**COMMENTS:**

**ERROR W00-00-00**

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<th><strong>(MEQ/L)</strong></th>
<th><strong>(MG/L)</strong></th>
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**CATIONS**

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<td>POTASSIUM DISS</td>
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<td>SODIUM DISS</td>
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**ANIONS**

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**TOTAL**

PERCENT DIFFERENCE = -9.06
UNITED STATES DEPARTMENT OF THE INTERIOR  
GEOLoGICAL SURVEY  
CENTRAL LABORATORY, DENVER, COLORADO  

WATER QUALITY ANALYSIS  
Lab. No. 2-39, Sample No. 62156

SAMPLE LOCATION: 2-52-02 LIME AT KA-HI  
STATION ID: 2190911-51-3362  
LAT. LONG.: 21°59.91' 15°23.93' W

DATE OF COLLECTION: 1996-07-31  
TIME: 1000  
STATE CODE: 15  
COUNTY CODE: 007  
PROJECT IDENTIFICATION: MILCO  
DATA TYPE: 1  
SOURCE: SUBMISSED WATER  

COMMENTS:


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<td>mg/L</td>
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<tr>
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<td>mg/L</td>
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<td>CHLORIDE DISS</td>
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<td>mg/L</td>
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<tr>
<td>IRON DISSOLVED</td>
<td>mg/L</td>
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<td>MANGANESE DISSOLVED</td>
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<tr>
<td>NO2+NO3 AS N DISS</td>
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CATIONS

| CALCIUM DISS | (mg/L) | 7.2 |
| MAGNESIUM DISS | (mg/L) | 0.6 |
| POTASSIUM DISS | (mg/L) | 1.1 |
| SODIUM DISS | (mg/L) | 17 |

ANIONS

| BICARBONATE | (mg/L) | 0.36 |
| CARBONATE | (mg/L) | 0.741 |
| CHLORIDE DISS | (mg/L) | 0.029 |
| FLUORIDE DISS | (mg/L) | 0.743 |
| SULPHATE DISS | (mg/L) | 0.3 |
| NO2+NO3 AS N DISS | (mg/L) | 0.84 |

TOTAL 1.397

DEPCNT DIFFERENCE = -0.12

TOTAL 1.374
**Drilling Log**

**Date:** 3-24-1977  
**Job No.:** 5923-D2  
**Hole No.:** 02  
**Elevation:** 311.3 ft.

**Customer:** State Dept. of Land & Water  
**Location:** Lilue Precinct, Hi.

**Driller:** T. Cunningham  
**Hrs.:** 9  
**Rig:**  
**Helper:** J. Lopez  
**Hrs.:** 9  
**Gas:**  
**Oil:**  
**Repairs:**

**Arv. Job**  
**Lv. Job**  
**Hrs.**  
**Or. No.:**

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<tr>
<th>Bit-Size</th>
<th>Type</th>
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<tr>
<th>Casing-Size</th>
<th>in., Length in hole</th>
<th>ft.</th>
<th>in., Amt. Perforated</th>
<th>ft.</th>
<th>in.</th>
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<th>Time</th>
<th>M</th>
<th>ft.</th>
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**Measurements**

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**Remarks:**

We have All the Pump Engines & 3rd Set  
To the Pump Shop to Rebuild.  
Then we buy 1 Reamer, 3/8 Point Steel  
& Clean up. Job. Date.

**Signed:** Reg Cunningham  
**Date:** March 24, 1977
Date: 3-23-1977

Job No: 5913-02

State Dept. of Land & Water
Location Lihu'e, Kaua'i

Driller: J. Cunningham
9 Hrs. Rig

Helper: Jr. Lopez
9 Hrs. Repairs

Arv. Job: __
Lv. Job: __

Bit-Size: __

Casing-Size: __ in., Length in hole __ ft., Amt. Perforated __ ft. __ In.

Depth Start: __ ft., Depth Stop: __ ft., Feet Drilled __

Water Levels, Time: __ M __ ft., __ M __ ft.

Measurements

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<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
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Remarks:

We pull out all the Pump. Package everything up ready to ship out.

Signed: J. Cunningham
Date: March 23, 1977
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Remarks:
- We had to do some cleaning of the pump. The pipes were very slow. The bit was also clean.
- Start pull pump, take off bend & clean.
- Start cleaning.

Signed: [Signature]  Date: March 22, 1977
Date: 3-21-1977  Job No: Kilohana  Hole No: 5423-02  Elevation: 376.3 ft.

Customer: State Dept. of Land & Water  Location: Lihue, Kauai - HI

Driller: T. Cunningham 5 Hrs.  Rig:  
Helper:  Hrs.  Gas:  
Helper:  Hrs.  Oil:  
Helper:  Hrs.  Repairs:  
Arr. Job:  Lv. Job:  Or. No:  

Bit-Size  
Type:  
Depth Start  ft., Depth Stop  ft., Feet Drilled  
Water Levels, Time  M  ft., Time  M  ft.  

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<td></td>
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<td>Test Pump 10 Hrs</td>
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<td></td>
<td>Total:</td>
<td>143 Hrs</td>
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Shut down the Test Pumping at 10:00 AM
Pumping level at shut down 18.6 - static level 26.6 -
- Manometer readings about 3'-- draw down--

Remarks: We used - 630 Gallons of diesel fuel - 11½ drums
(13 drums purchased)
Oil used in Test engine 2 gals during Test.

Signed: T. Cunningham  Date: March 21, 1977
Date 3-20-1977  Job No. Kitchen well  Hole No. 5923-02  Elevation 3713 ft.
Customer Flat. Dept. of Land & Water  Location Lilie, Kauai, Hi.
Driller T. Cunningham  12 Hrs.  Rig
Helper B. Lopez  12 Hrs.  Gas
Helper Or. No.
Repairs

Bit-Size  Type
Casing-Size in., Length in hole ft. in., Amt. Perforated ft. in.
Depth Start ft., Depth Stop ft., Feet Drilled

Water Levels, Time M ft., Time M ft.
Test Pump 24 Hrs

Measurements

Top

Remarks: Pumps at 4pm

Signed: Ray Cunningham  Date: March 20, 1977
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</table>

Test Pump 24 hrs

$\frac{1}{85}$ hrs

Total $\frac{1}{10}$ hrs

State w/ level 21.6 on meniscus
Pumping level 18.65 at 5:00 PM.

Remarks: Pumping Time Until 12:00 Midnt Sat.

Signed: [Signature] Date: March 19, 1972
## Drilling Log

**Date:** 3-18-1977  
**Job No:** Kilauea Well  
**Hole No:** Z91202  
**Elevation:** 371.3 ft.

### Customer Information
- **State:** Dept. of Land & Water
- **Location:** Lihue, Kauai

### Drilling Personnel
- **Driller:** T. Cunningham  
  - **Hrs.:** 12  
  - **Rig:**  
- **Helper:** R. Lopez  
  - **Hrs.:** 12  
  - **Repair:** 

### Drilling Details
- **Arv. Job:** 6  
  - **Lv. Job:** 6  
  - **24 Hrs.:** 

### Casing Information
- **Bit-Size:** 
- **Type:** 
- **Casing-Size:** 
  - **in., Length in hole:** 
  - **ft., Amt. Perforated:** 
  - **in., In:** 

### Drilling Depth
- **Depth Start:** 
- **Depth Stop:** 
- **Feet Drilled:** 

### Water Levels
- **Water Levels, Time:** M  
  - **M:** 
  - **Time:** 

### Test Results
- **Test Pump:** 24 Hrs.
  - **Total** 8 1/2 hr.
  - **400 GPM**

### Remarks:

**Signed:** Roy Cunningham  
**Date:** March 18, 1977
**Date:** 3-17-1977  
**Job No.:**  
**Well No.:** 923-02  
**Elevation:** 371.3 ft.  
**Customer:** State Dept. of Land & Water  
**Location:** Laker Truss.

<table>
<thead>
<tr>
<th>Driller</th>
<th>Helper</th>
</tr>
</thead>
<tbody>
<tr>
<td>T. Cunningham</td>
<td>R. Lopez</td>
</tr>
<tr>
<td>12 Hrs.</td>
<td>12 Hrs.</td>
</tr>
</tbody>
</table>

**Rig:**  
**Gas:**  
**Oil:**  
**Repairs:**

**Depth Start:**

<table>
<thead>
<tr>
<th>Depth</th>
<th>29 Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total:</td>
</tr>
<tr>
<td>37</td>
<td>61 Hrs.</td>
</tr>
</tbody>
</table>

**Water Levels, Time:**

<table>
<thead>
<tr>
<th>M</th>
<th>ft. Time</th>
<th>M</th>
<th>ft.</th>
</tr>
</thead>
</table>

**Remarks:**

- Test Pumping 29 Hrs.
- 37
- Total 61 Hrs.
- 8 P.M. 400 - between 2’ and 3’

**Signed:** Troy Cunningham  
**Date:** March 17, 1977
Date: 3-16-1977
Job No: Toshimura
Hole No: B5723-02
Elevation: 311.3 ft.
Customer: State Dept of Land + Water
Location: Lihue, Kauai, Hi.

Driller: T. Cunningham
12 Hrs.
Rig:

Helper: R. Lopez
12 Hrs.
Gas:
Oil:
Repairs:

Arv. Job 6
Lv. Job 6
24 Hrs.
Or. No.

Bit-Size
Type

Casing-Size
in., Length in hole
ft.
Amnt. Perforated
ft.

Depth Start
ft.
Depth Stop
ft., Feet Drilled

Water Levels, Time M ft., Time M ft.

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>Top</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Test Pumping</td>
<td>24 hrs</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td></td>
<td>37</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Remarks:

Signed: Troy Cunningham
Date: March 16, 1977
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer</td>
<td>State Dept of Land &amp; Water</td>
<td>Location</td>
<td>Lihue, Kauai, Hi</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Driller</td>
<td>T. Cunningham</td>
<td>12 Hrs.</td>
<td>Rig.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Helper</td>
<td>R. Lopez</td>
<td>12 Hrs.</td>
<td>Gas</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arv. Job</td>
<td></td>
<td>24 Hrs.</td>
<td>Oil</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Repairs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bit-Size</td>
<td></td>
<td>Type</td>
<td>Or. No.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depth Start</td>
<td>ft., Depth Stop</td>
<td>ft.</td>
<td>Foot Drilled</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water Levels, Time</td>
<td>M ft., Time</td>
<td>M ft.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Measurements**

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>Top</th>
</tr>
</thead>
</table>

- I get everything ready to start pumping.
- We start the pump at 11:00 AM.
- 400 GPM Pump RPM 3600 (shut 2 & 5, draw-down).
- We pump 13 hours today.

Remarks:

Signed: T. Cunningham  Date: March 15, 1977
Date: 3-14-1977  
Job No: Kiheku  
Hole No: E5713-01  
Elevation: 271.3 ft.

Customer: State Dept. of Land & Water  
Location: Kieheku, Kauai, HI.

Driller: T. Cunningham  
6 Hrs.  
Helper: R. Lopez  
6 Hrs.

Rig  
Gas  
Oil  
Repairs

Arv. Job  
Lv. Job  
Hrs.  
Or. No.

<table>
<thead>
<tr>
<th>Bit-Size</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Casing-Size</td>
<td>in.</td>
</tr>
<tr>
<td>Depth Start</td>
<td>ft.</td>
</tr>
</tbody>
</table>

Water Levels, Time: M | ft. | M | ft. |

Remarks:

- We picked up the GM Test Engine from Don Allen.
- Set up on jobsite, ready to pump.
- Picked up some fuel oil from Bulk Plant.

Signed: T. Cunningham  
Date: March 14, 1977