PUBLIC RECORD DATA

Owner: PLANTATION PARTNERS KAUI LLC
Tax Payer: PLANTATION PARTNERS KAUI LLC
Tax Bill: PO BOX 1318, KILAUEA, HI 96754 USA

Assessed Value | Exemption | Size | Buildings: 0 | Dwellings: 0
---|---|---|---|---
Land: $7,267,900 | $0 | 928.77 ac | 0 | 0
Total Buildings: $59,200 | $0 | 0 sq ft | Project: Kealananani Makee Ph 1 & 2
Total: $7,327,100 | $0

Tenure: Fee Simple
Annual Tax: $50,400.11
Zoning: A
PITT Code: 500 - Agricultural
Land Use: 
Census Tract: 402.01
Lot#: D

SALES

6/29/1998 QD-M KEALIA PLANTATION COMPANY LLC, A Company or Corporation $1,000 DOC 98-093517
2/18/2000 QD-M KEALIA MAUKA HOLDINGS LLC, A Company or Corporation $100 DOC 00-022343
2/18/2000 DEED-M KEALIA MAUKA HOLDINGS LLC, A Company or Corporation(Tenants In Severalty) $3,897,692 DOC 00-022344
6/26/2001 QD-M POR CONVEYED ONLY- NO AREA GIVEN KEALIA PLANTATION COMPANY LLC, A Company or Corporation $1,000 DOC 01-097095
6/26/2001 DEED-M KEALIA PLANTATION COMPANY LLC, A Company or Corporation $1,000 DOC 01-097096
3/24/2006 DEED-M KEALIA PLANTATION COMPANY LLC, A Company or Corporation($Tenants In Common) $47,372,000 DOC 06-056603

KEALIAKEALANANI LLC, A Company or Corporation(Tenants in Common) *2.193% UNDIVIDED INTEREST
KEALIAKEALANANI LLC, A Company or Corporation(Tenants in Common) *93.421% UNDIVIDED INTEREST
DCA HAWAII LLC, A Company or Corporation(Tenants in Common) *4.386% UNDIVIDED INTEREST

DEVELOPER'S PUBLIC REPORT/ASSOCIATION BIENNIAL REGISTRATION

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OTHER BUILDING IMPROVEMENTS

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### Kealia_Wells

**Wells at and in vicinity of Kealia Plantation**  
(exported from database 08/07/2008)

<table>
<thead>
<tr>
<th>Well No.</th>
<th>Well Name</th>
<th>Operator/Owner</th>
<th>Year Drilled</th>
<th>Use</th>
<th>Latitude</th>
<th>Longitude</th>
<th>Ground Elev. (ft, bgs)</th>
<th>Depth (ft, bgs)</th>
<th>Casing Dia. (in.)</th>
<th>Solid Casing (ft, bgs)</th>
<th>Bottom of Hole (ft, bgs)</th>
<th>Bottom, Solid Casing (ft, bgs)</th>
<th>Initial or Static Head (ft, bgs)</th>
<th>Initial Chloride (mg/l)</th>
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<td>Kumukumu Str</td>
<td>Lihue Plantation / Kealia Plantation Company, LLC (2002)</td>
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Compiled by DE Mills, 8/8/2008
### Kealia_Wells

**Wells at and in vicinity of Kealia Plantation**

(exported from database 08/07/2008)

<table>
<thead>
<tr>
<th>Well No.</th>
<th>Well Name</th>
<th>Owner/Operator</th>
<th>Installed Pump Capacity (gpm)</th>
<th>Pumping Capacity (mgd)</th>
<th>Test Pumping Rate (gpm)</th>
<th>Specific Capacity (gpm/ft-dd)</th>
<th>T (ft$^2$/day)</th>
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<td>Ltr. dated 3-3-03, sent to owner requesting response to abandonment/sealing for wells 0618-03-07. Well modification, 6-in. dia. casing replaces 12-in. to 135.7 ft bgs, DTW=5 ft. bgs (3/13/2008)</td>
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</tbody>
</table>

Compiled by DE Mills, 8/8/2008
Mr. A. James Wriston, III  
Manager of Land Administration  
Amfac Land Company, Ltd.  
700 Bishop Street - Suite 601  
Honolulu, Hawaii 96813

Dear Jim:

Evaluation of Amfac's Kealia Well Nos. 1 and 2

Kealia, Kauai

This letter report summarizes results of field investigations and analyses of Kealia Well Nos. 1 and 2 (State Nos. 0619-01 and 0619-02) in Kealia, Kauai. and are currently the source of drinking water supply for approximately 70 mostly residential service connections in the Kealia area.

The three wells are subsequently utilized in their proximity in the first two. Two of the wells have 12-inch flanges at the top and 12-inch gate valves on the side. Locations of the three wells that could not be found are generally known, but they may be buried under fill or simply lost in the thick vegetative growth. Published information on all seven wells is presented in Exhibits 1 and 2 at the back of this letter report.

Present Pumping Configuration and Pattern of Use

Both wells are outfitted with 10-inch line shaft turbine pumps with 8-inch discharge pipes. Each pump is rated at 600 GPM against a total dynamic head of 230 feet. The pump in Well No. 1 is a 5-stage Byron Jackson and the pump in Well No. 2 is a 7-stage of unknown manufacture. The pump intake for Well No. 1 is 31 feet below the base. For No. 2, the pump is "close coupled" and its intake is only 12 feet below the base. The above ground piping at each well is identical: an 8-inch swing check valve; an 8" x 10" reducer connecting to 10-inch pipe; and an air release valve on the 10-inch pipe. Chlorine is injected into the common discharge line using chlorine gas tanks and a Grundfos booster pump. The 10-inch pipe runs from the wells all the way to the 50,000-gallon, rectangular-shaped Kumukumu tank at an elevation of about 200 feet. All customer services are connected to this main directly or to its various laterals. The tank does not have separate inflow and outflow pipelines.

The simplified set-up of the well pumps does not include a number of features that are typically found at drinking water well installations. These include: a flowmeter for the discharge rate; a pump control valve and discharge line to send the first several minutes of pumped water to waste; and a sounding tube or airline to monitor well water level.
Based on data collected during pump testing, the pumps deliver 650 to 675 GPM. This is somewhat greater than their rated capacity because the total dynamic head the pumps work against is less than 230 feet. At the present small customer base of the system, one or the other of the pumps is started and stopped three times a day by a timer. Each run is about an hour long. This translates to an average daily production of about 120,000 gallons.

Methods Used to Evaluate the Wells

The casing and total depths are somewhat different than indicated in available records (Well 0618-01 on Exhibit 1 and Well 2E on Exhibit 2). Based on its 12-inch diameter, the casing is apparently the original 1898 pipe. Not unexpectedly, there is a significant amount of tuberculation on the casing's interior. Despite this, the video log indicates that the casing is essentially intact over its entire length.

However, about 3 to 4 feet below the concrete pedestal, a now-abandoned pipe is connected directly to the casing. Just outside the pump house, this pipe is connected to an 12-inch gate valve and a pipeline toward the adjacent irrigation ditch. ITC Water Management excavated the valve and pipe and found the valve to be frozen open, the pipe downstream of the valve to be cracked in several places and full of roots. The valve and pipe have been removed and the rate of leakage and the pipe connected to the well casing has been sealed. In the process of doing this work, another buried pipeline, probably connected to Well No. 2, was also discovered. ITC will uncover it and seal the pipe as necessary.

Below the bottom of the casing, between depths of 60 to 100 feet, the open hole is managed with small gravel, possessing very little water. Over or in front of the gravel, Oelrichs sandstone dikes from 100 to 120 feet, composed of an associated, cemented sandstone, were observed at 120 feet. At 165 feet, a cemented sandstone layer was also part of the wall. There is a flat steel bar across the hole at 165 feet and a steel rod at the bottom of the hole at 207 feet. None of the pieces of steel in the open borehole are a concern. Constant upward leakage in the well results in a crystal clear water column (and video). No silt deposits were visible, even at the bottom of the casing, where the sedimentation usually common.

Water bearing zone: 130-145 ft bgs
Description of the Physical Condition of Well No. 2

As with Well No. 1, the above ground piping and other equipment are in good condition. However, the nominal 10-inch pump (meaning its outside diameter is 9 and a fraction inches) is a tight squeeze in the 10-inch tuberculated casing. Compounding this problem is a network of roots that has penetrated the casing and had wrapped around the pump. The crane truck had to pull more than double the weight of the pump to free it from the roots and extract the pump from the well. About half of the root system came out with the pump; the rest remained in the well. Although not visible in the video due to the presence of the plant roots, it is quite possible that there is a pipe connected to the casing similar to the one found in Well No. 1. As noted above, ITC is working on uncovering it and sealing it if necessary.

In addition to the root penetration near ground surface, there are a number of other locations where the casing is no longer intact: there is a 4-foot long root growing through the casing at 52 feet; there is an unidentified plant growth at 70 feet; and there are discernable holes in the casing at 52, 72, and 75 feet. In addition, there are several other locations of suspected holes which couldn't be clearly identified as such. The numerous holes in the casing allow a constant stream of water to move up the casing and leak outward. This leakage is clearly visible at the bottom of the concrete base facing the stream and in a pit was excavated by ITC at the pump house door. This well should be resealed as soon as practical.

Hydrologic Aspects of the Formation Tapped by the Wells

Based on available drillers logs (in Exhibit 2) and the video record, as such, they are a confining layer over the water-bearing Koloa lavas which the wells tap into with their open holes at depth. Under static conditions, the piezometric head in the confined aquifer (i.e. the level which the water rises in the well) was found to be about 10 feet above sea level. (This is based on the unconfirmed elevation benchmark at the pump house of Well No. 2, i.e. Well 2F in Exhibit 2.) Other aspects of the aquifer's behavior, which were determined during the field investigation, are as follows:

Tidal Response: Water levels in both wells respond to ocean tide in varying degrees.
Mr. A. James Wriston, ill
January 16, 1998 — 98/017
Page four

Interference Effects Between Wells. The wells are 60 feet apart and, as presently outfitted, both pump at 650 to 675 GPM. At these rates, the drawdown in one well due to pumping of the other well is approximately 0.25 feet (Exhibits 3 and 4).

Salinity and Temperature Through the Water Column. Salinity and temperature through the water columns of both wells are reasonably consistent (Exhibits 5 and 6). This is a somewhat expectable result because there is a continuous upward movement of water due to leakage at both wells. Temperatures in both wells are between 71.7° to 71.8° F. The salinity in Well No. 1 is slightly lower than in Well No. 2, about 0.14 parts per thousand (PPT) versus 0.16 PPT. This difference in salinity is also reflected in the chloride concentrations of the water pumped by each well: about 40 milligrams per liter (MGL) from Well No. 1 in 50 MGL from Well No. 2.

Relationship to the Adjacent "Stream". There is a man-made irrigation ditch which runs behind the wells. The ditch is actually an extension of an unnamed gulch and it is connected to a network of ditches which cross the low-lying area of the Kapaa Stream floodplain. Throughout the period of the field investigation, the stream flowed constantly and its level was several feet below the water level in the wells. A water level recorder was installed in this "stream" adjacent to Well No. 2 to see if there was an effect on stream flow when either of the wells is operating. The results, which are shown on Exhibit 7, show no influence on streamflow during the wells' operation.

Hydraulic Performance of Well No. 1

With the electric motor removed, a diesel engine and right angle drive was installed and operated by Roscoe Moss Hawaii so that the drawdown could be measured at various pumping rates. Drawdown of the water level was recorded using an airline bubbler system and a data logger. Flowrate was measured with a contractor installed, strap-on McCrometer flowmeter on the 10-inch discharge line.

Water level responses at four rates of pumping are illustrated on Exhibit 8. These have been converted to the drawdown versus flowrate performance curve on Exhibit 9 using a curve fitting technique. The well’s hydraulic performance is excellent. This demonstrates that the wells tap into a highly permeable formation. This performance is significantly better than most wells developed elsewhere on Kauai in the Koloa lavas.

Sustainable Yield as Determined During the Constant Rate Pump Test 30 l/min. each

Using the diesel engine and right angle drive, Engine speed was held constant at 1800 RPM. For 72 hours, the total pumpage of 3,045 million gallons was recorded at 795 GPM. Exhibit 10 is the recorded water level in the well before, during, and following this test. Drawdown...
As with the step-drawdown test, the essentially constant drawdown and rapid recovery of the constant rate test demonstrate that the wells tap into a very permeable formation with relatively high transmissivity. Since the aquifer is confined by 120 to 150 feet of poorly permeable “caprock”, its lack of a time-dependent drawdown or recovery is somewhat surprising.

Exhibit 11 is a summary of chlorides, conductivity, and salinity of water samples collected through the 72-hour pump test. Chlorides and conductivity are also displayed graphically on Exhibit 12.

Summary Conclusions and Recommendations

1. Both wells produce water of excellent potable quality. If they are eventually to be pumped on a continuous basis to maximize yield, pump capacities of 600 GPM (0.864 MGD) would be appropriate. If the wells are used only intermittently, capacities up to 700 GPM will have no adverse impact on water quality.

2. The wells are just 60 feet apart. From the perspective of sustainable yield, their near proximity means they are, in effect, a single pumping center. At the pump capacities discussed above, one well should operate at a time with the other as standby.

3. The casing of Well No. 2 is not intact and its leakage and potential contamination while pumping should be fixed as soon as practical by recasing the well. For the condition and diameter of the existing casing, the recasing should be done in the following steps:
   a. Remove the pump.
   b. Backfill the well with sand to a depth of 95 feet (about 10 feet below the bottom of the present casing).
   c. Install an 8-inch (ID), 5/16-inch wall thickness steel casing inside the existing 10-inch casing to a depth of 95 feet. The bottom of the casing needs to have a fitting such that grout can be pumped into the annular space between the existing and new casings from the bottom up to the ground surface.
   d. Using a tremie pipe, pump grout to fill the annular space between the casings to the ground surface.
   e. Remove the tremie pipe and bail the sand from the bottom of the well.

A budget cost for recasing in this manner is $25,000. The new 8-inch casing will not accommodate the present (nominal) 10-inch diameter pump. For a pump capacity of 600 to 700 GPM, the well’s water level and excellent hydraulics will allow use of an above-ground, end suction pump.
With the completion of ITC Water Management's plugging of the pipeline attached to the casing of Well No. 1, the otherwise intact well casing should have no leaks. However, this is just an interim fix. For a longer term solution, this well should be recased this well in the same manner as described for Well No. 2. If done at the same time, the cost for both wells might be on the order of $40,000. If the new casing is 10-inch, the present pump could be re-installed. An 8-inch casing would require converting to an end-suction pump.

Because the aquifer's piezometric head is at and above the ground level, leakage through a corroded casing is more an issue of loss of aquifer yield rather than possible groundwater contamination. Section 3.1 of the Water Commission's "Well Construction and Pump Installation Standards" cites the four conditions listed below as reasons to seal an unused well. All four of the conditions appear to be applicable in this case.

1. Their purpose has been served, or
2. Their use has been permanently discontinued; and
3. Their physical condition is causing or threatening contamination, deterioration in quality, or waste of ground-water resources, or
4. Their state of disrepair makes their continued use impractical or creates a hazard to public health or safety.

The sealing will require a permit from the State Water Commission and backfilling with grout by a properly licensed contractor. If all of the wells are done in sequence, the cost should be about $7,500 per well.

Sincerely,

Tom Nance

Enclosures
## Ground Water Summary - Kauai Code 2

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<tr>
<th>WELL NO</th>
<th>OWNER NO USER</th>
<th>YEAR</th>
<th>DRLN</th>
<th>DIA</th>
<th>ELEVATIONS IN FEET</th>
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<th>PUMPING TEST RESULTS</th>
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### Notes:
Amfac's Well Nos. 1 and 2 are Nos. 0618-01 and -02 above.

### Exhibit 1
From the "Hawaii Ground Water Index and Summary" prepared by the Commission on Water Resource Management
Exhibit 2


Well Nos. 1 and 2, State Nos. 0618-01 & -02, are Wells 2E and 2F, respectively.


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<td>16-120</td>
<td>118</td>
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<tr>
<td>120-150</td>
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**8E** (Lihue Plantation Co. well 2) Kealia. 22°08'5"N, 159°18'35"W. Owner, Lihue Plantation Co. Drilled, 1898 by McCandless Bros. for Mokee Sugar Co. Altitude, 8 ft. Depth, 213 ft. Diameter, 12 in. Casing, 95 ft. At time of completion well flowed 1 mgd.
27 (Lihue Plantation Co. well 1) Kekila. 22°6'S N, 159°18'33" W. Owner, Lihue Plantation Co. Drilled, 1898 by McCandless Bros. for Makee Sugar Co. Altitude, 6 ft. Depth, 213 ft. Diameter, 10 in. Casing, 95 ft. Use, domestic supply. Well reported to flow 1 mgd at time it was drilled.

Observations
(Bench mark, top of door sill in pump house. 2 ft. above ground surface; altitude 10.65 ft.)

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<th>Date</th>
<th>Head (ft.)</th>
<th>Chloride (ppm)</th>
<th>Date</th>
<th>Head (ft.)</th>
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Driller’s log

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<th>R.O.I.</th>
<th>Depth (ft.)</th>
<th>Description</th>
<th>R.O.I.</th>
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<td>Brown and red tints</td>
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<tr>
<td>20-30</td>
<td>Gravel, clay</td>
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<td>130-140</td>
<td>Brown and red tints</td>
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<td>Gravel, clay</td>
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<td>180-190</td>
<td>Brown and red tints</td>
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<tr>
<td>80-90</td>
<td>Gravel, clay</td>
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<td>Brown and red tints</td>
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<tr>
<td>90-100</td>
<td>Gravel, clay</td>
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Oiler backfilled with brick and cement from 402 to 250 ft. and crushed rock from 230 to 224 ft.

Observations
Chloride content of water during drilling

<table>
<thead>
<tr>
<th>Depth (ft.)</th>
<th>Chloride (ppm)</th>
<th>Depth (ft.)</th>
<th>Chloride (ppm)</th>
<th>Depth (ft.)</th>
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<td>220-230</td>
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<td>330-340</td>
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</table>
STATIC WATER LEVEL IN KEALIA WELL NO. 1
DEC. 30, 1997 TO JAN. 5, 1998

WATER LEVEL (FEET MSL - ASSUMED)

DRAWDOWN DUE TO THE OPERATION OF WELL NO. 2

Exhibit 3
AMFAC'S KEALIA WELL NO. 2
STATIC LEVEL FROM DEC. 23 TO 29, 1997

WATER LEVEL (FEET MSL)

DAY IN DECEMBER 1997

DRAWDOWN DUE TO THE OPERATION OF WELL NO. 1
AMFAC'S KEALIA WELL NO. 1
DEC. 30, 1997

Exhibit 5
RECORDED WATER LEVELS
DEC. 30, 1997 TO JANUARY 5, 1998

WELL NO. 1

DRAW DOWN DUE TO THE
OPERATION OF WELL NO. 2

SLUMP OUTSIDE THE WELL NO. 1 PUMP HOUSE

DITCH/STREAM BEHIND WELL NO. 2

WATER LEVEL (FEET MSL)

DECEMBER

JANUARY

Exhibit 7
Exhibit 9

Hydraulic Performance of
Well No. 1
January 6, 1998

Step-drain-down test
AMFAC'S KEALIA WELL NO. 1

DURATION OF THE 72-HOUR PUMP TEST

WATER LEVEL (FEET MSL)

JANUARY 1998

Exhibit 10
Exhibit 11

Water Quality During the 72-Hour Constant Rate Pump Test at 705 GPM

<table>
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<tr>
<th>Sample</th>
<th>Conductivity (μmhos @ 25°C)</th>
<th>Salinity (PPT)</th>
<th>Chlorides (MG/L)</th>
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<td><strong>Day</strong></td>
<td><strong>Time</strong></td>
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<td></td>
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<td>0.146</td>
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<td>293</td>
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<td>298</td>
<td>0.158</td>
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<td>January 9</td>
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<td>January 10</td>
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**Notes:**

1. All water quality analyses done in the office of TNWRE.
2. Conductivity measured with an Orion Model 130 Conductivity meter.
3. Salinity measured with an Ocean Sensors Model OS-200 CTD.
4. Chlorides determined by digital titration with mercuric nitrate.
WATER QUALITY DURING THE CONSTANT RATE PUMP TEST - JANUARY 7 TO 10, 1998

CHLORIDES (MG/L)

CONDUCTIVITY (MICROMOS)

HOURS OF THE CONSTANT RATE PUMP TEST

CHLORIDES

CONDUCTIVITY

Exhibit 12
January 31, 2003

Ref:0618-03 to 07.let

Mr. Clark Lipscomb
Kealia Water Company Holdings, LLC
132 W. Main Street
Aspen, CO 81612

Dear Mr. Lipscomb:

Thank you for your letter dated December 10, 2002, responding to our inquiries regarding five unused wells (Well Nos. 0618-03 to 07) in the vicinity of Well Nos. 0618-01 & 02. We appreciate your clarifying land ownership issues and providing contact information for the property owners. We will pursue this matter with Kealia Plantation Company, LLC. Thank you also for including the January 16, 1998 report by Tom Nance Water Resource Engineering, which includes further information on the five wells.

If you have any questions, please contact Lenore Nakama at (808) 587-0218.

Sincerely,

DEAN A. NAKANO
Acting Deputy Director

LN:ss
January 27, 2003

Mr. Steve Goldberg
Oasis Water Systems
P.O. Box 535
Kilauea, HI 96754

Dear Mr. Goldberg:

Well Abandonment Report for Well Nos. 0618-01 & 02

We received your Well Abandonment Report for the Kealia Nos. 1 & 2 Wells (Well Nos. 0618-01 & 02) on January 17, 2003 and acknowledge that it is complete. Thank you for your attention to this matter.

If you have any questions, please contact Lenore Y. Nakama of the Commission staff at 587-0218 or toll-free at 274-3141 (Kauai), extension 70218.

Sincerely,

[Signature]

DEAN A. NAKANO
Acting Deputy Director

LYN:ss

c: Clark Lipscomb, Kealia Water Co. Holdings, LLC
TO: Water Commission
   Lenore Nakama

Phone 808-587-0219
Fax Phone 808-587-0219

FROM: Steve Goldberg
   Oasis Water Systems Inc.
   P.O. Box 535
   Kilauea Hi 96754

Phone 808-828-8876
Fax Phone 808-828-0778

Date 1/17/03
Number of pages including cover sheet 5

CC:

REMARKS: ☑ For your review ☐ Urgent ☑ Reply ASAP ☐ Please Comment

Hi Lenore:

Attached are the abandonment reports for wells 0618-01 / 0618-02 (completed 1-14-03)

Regards,

Steve
State of Hawaii
COMMISSION ON WATER RESOURCE MANAGEMENT
Department of Land and Natural Resources
WELL ABANDONMENT REPORT

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 96808. 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 808-587-0235. For further information and updates to this application form, visit http://www.state.hi.us/ewrcwrm.

1. State Well No. 0618-01 Well Name Kenlia 2
2. Location / Address Kenlia Island Kauai TMK 4-7-0071002
3. Contractor OASIS Name of driller who performed work Barry Simmons
4. Type of Rig / Construction N/A Date of well sealing completion 1-14-03

Finished Grade Elevation 198.19 ft.

Casing Diameter 12 in.

Check Material Used

Cement

Grout Seal

Sand/Cement Ratio

Measured Depth of Blank Casing 95 ft.

Total Measured Depth 201 ft.

Measured Depth of Perforated Casing

Measured Depth of Open Hole 201 ft.

Remarks:

Well Abandonment Contractor (print) OASIS WATER C-57 LIC. No. 21467

Signature

Date

Applicant (print) SEE ATTACHED

Signature

Date

WAR Form (2/006)
<table>
<thead>
<tr>
<th>Well No.</th>
<th>0618-01</th>
<th>Well Name</th>
<th>Kaula 2</th>
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<td>Kaula</td>
<td>Location</td>
<td>Kaula</td>
</tr>
<tr>
<td>Contractor</td>
<td>N/A</td>
<td>Name</td>
<td>N/A</td>
</tr>
<tr>
<td>Date of Abandonment</td>
<td>04/20/02</td>
<td>Date of Abandonment</td>
<td>04/20/02</td>
</tr>
</tbody>
</table>

- **Pitted Date:** 1941
- **Casing Diameter:** 12 in.
- **Cement Diameter:** 15 in.
- **Drill Bit Size:** 221 in.
- **Estimated Depth of Bottom casing:** 95 ft.
- **Required Depth of Open Hole:** 281 ft.

**Well Abandonment:**

- **Contractor:** [Signature]
- **CPW No.:** 21467
- **Date:** 04/20/02

**Assistant:** [Signature]  1/8/03
State of Hawaii
COMMISSION ON WATER RESOURCE MANAGEMENT
Department of Land and Natural Resources
WELL ABANDONMENT REPORT

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 621, 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 808-222-5002. For further information and updates to this application form, visit http://www.state.hi.us/wtrdiv.

1. State Well No. 0618-02  Well Name Kealua 1
2. Location / Address Kealua Island TMK 4-7-103002
3. Contractor OASIS WATER Name of driller who performed work BARRY SIMMONS
4. Type of Rig / Construction DTH Date of well sealing completion 1-14-03

Finished Grade Elevation +8 M.L.S. → Casing Diameter 12 in.

Check Material Used
Grout Slurry

Cement

Sand/Cement Ratio /1

Measured Depth of Blank Casing 95 ft

Total Measured Depth 198 ft

Measured Depth of Perforated Casing ft

Measured Depth of Open Hole 198 ft

Remarks:

Well Abandonment
Contractor (print) OASIS WATER C-67 Lic. No. 21457

Signature

Date

Applicant (print) SCA ATTACHED

Signature

Date

WAR Form (2860)
WELL CONSTRUCTION PERMIT TO ADMINISTER

Kekaha Area 1-1-1 Well No. 2003-07-1.0

In accordance with Department of Land and Natural Resources, Concession on Water Resource Management, Administrator Order, Section 13.01, entitled "Water Use Permit and Permit Application Procedure of Water Use, Title 5.5 KRS No. 3(15), of the administrative code of the State of Kentucky, Title 5.5 KRS No. 3(36) of the administrative code of the State of South Carolina, subject to the Hawaii Water Commission, a representative and authorized party, that the permit holder was authorized to the following conditions:

1. The Chairman of the Conservation on Water Resource Management, P.O. Box 110, Alahai, Pahoa 96780, shall be notified in writing before any work is started by the permit holder.

2. The person in charge of the well which has been approved by the department or voluntarily declared by the owner or operator to be closed shall be reporting to the Department of Water Management, Water Conservation, and Public Health, not later than 10 days after the completion of such work, in writing, in a condition that may result.

3. The well construction permit application is incorporated into this permit by reference and is subject to the Hawaii Water Commission's rules and regulations.

4. The well construction permit holder may be referred to the Conservation on Water Resource Management unless the permit is not valid after the completion of the work.

5. The permit holder must notify the department of any change.

6. The permit holder shall report the condition of the well to the Conservation on Water Resource Management within 10 days after the completion of the work.

7. Special conditions shall be observed and described in the permit by the permit holder.

Date of Application: January 23, 2003
Expiration Date: June

I have met the conditions and terms of this permit and understand them. I agree and agree to meet these conditions as a prerequisite and condition of my permit to operate. I also understand that the permit with any permit condition may be granted for not more than 10 days after the completion of the work.

Permit Holder's Signature: ____________________________ Date: 1/2/03
Firm or Title: ____________________________

Contractor's Signature: ____________________________ Date: 1/3/03
Firm or Title: ____________________________

Printer Name: ____________________________

Printed Name: ____________________________

Date of Application: January 23, 2003
Expiration Date: June

I have met the conditions and terms of this permit and understand them. I agree and agree to meet these conditions as a prerequisite and condition of my permit to operate. I also understand that the permit with any permit condition may be granted for not more than 10 days after the completion of the work.

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Firm or Title: ____________________________

Contractor's Signature: ____________________________ Date: 1/3/03
Firm or Title: ____________________________

Printer Name: ____________________________

Printed Name: ____________________________

Date of Application: January 23, 2003
Expiration Date: June

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Signature: ____________________________

Title: ____________________________

Date: ____________________________

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Title: ____________________________

Date: ____________________________

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Signature: ____________________________

Title: ____________________________

Date: ____________________________

I have met the conditions and terms of this permit and understand them. I agree and agree to meet these conditions as a prerequisite and condition of my permit to operate. I also understand that the permit with any permit condition may be granted for not more than 10 days after the completion of the work.

Signature: ____________________________

Title: ____________________________

Date: ____________________________
December 10, 2002

State of Hawaii, Dept. of Land and Natural Resources
Commission on Water Resource Management
Attn: Gilbert S. Coloma-Agaran, Chairperson
P.O. Box 621
Honolulu, HI 96809

Re: Well Abandonment Permit Kealia Nos. 1 & 2 (Well No. 0618-01 & 02)

Dear Mr. Coloma-Agaran:

This letter is in response to a letter received from you dated February 19, 2002, a copy of which is attached hereto, as well as inquiries from Ms. Lenore Y. Nakama with regards to five unused wells in the general vicinity of the wells referenced above. Your letter states the following with respect to the five wells:

"We understand that there are five other unused wells on this parcel (Well Nos. 0618-03 to 07) that exist in the vicinity of Well Nos. 0618-01 & 02, of which two wells can be located and the other three have been buried or lost (but whose locations are generally known). We believe these five wells also meet the criteria for abandonment in the Hawaii Well Construction and Pump Installation Standards (1997). Please submit, within the next sixty (60) days, either 1) applications to abandon/seal these wells or 2) your reasons why you do not believe these wells meet the criteria for abandonment/sealing. (Please visit our website at www.state.hi.us/dlnr/cwrm to view the Hawaii Well Construction and Pump Installation Standards for abandonment/sealing criteria in Part 3, Section 3.1.)"

Kealia Water Company Holdings, LLC (hereinafter “KWC”) does not own the land on which the five other wells are believed to be located. KWC only owns an exclusive easement for its newly constructed water facilities. The easement area encompasses, in part wells 0618-01 and 0618-02. KWC has contracted with Oasis Water Systems to properly abandon and seal wells 0618-01 and 0618-02.

You will need to contact the party owning the parcel of land on which the other five wells (well nos. 0618-03 to 07) are believed to exist in order to determine the status of the other five wells. The owner is Kealia Plantation Company, LLC. I have included their contact information below in order for you to contact them regarding the abandonment of the other five wells referenced above.

Kealia Plantation Company, LLC
Attn: Justin Hughes
6 Rolling Hills Rd.
Tiburon, CA 94920
Ph: (970) 948-3127
With a copy to:

Walton D.Y. Hong  
Attn: Lorna Nishimitsu  
3135-A Akahi Street  
Lihue, Kauai, HI 96766  
Ph: (808) 245-4757

I have also included a report prepared by Tom Nance Water Resource Engineering dated January 16, 1998, for your reference, which includes some further information regarding the five other wells located on the parcel.

Should you need any additional information or have any further questions or comments, please feel free to contact me with any questions or comments by phone at (303) 410-2828 or via letter at the address below.

Sincerely,

Clark Lipscomb,  
Vice President

CC: Steve Goldberg, Oasis Water Systems (808) 828-0778  
Greg Kingsley (808) 823-1008

Attachments: February 19, 2002 State of Hawaii Letter  
November 25, 2002 Lenore Y. Nakama e-mail  
Clark,

As discussed, we are awaiting your response to our concerns regarding five other unused wells, Kealia Wells 3 to 7 (0618-03 to 07) at Kealia, Kauai at TMK 4-7-3:2. Attached is a copy of our 2/9/02 letter which transmitted the abandonment permits for Kealia Wells 1 & 2 (0618-01 & 02). Please refer to the second to the last paragraph of the letter. Our understanding at this point is that at least 2 of the 5 other unused wells can be located, and we would like you to submit abandonment permit applications for those 2 wells. We look forward to your response.

Sincerely,
Lenore Y. Nakama

0618-01 & 02 Kealia.wap
February 19, 2002

Mr. Clark Lipscomb
Kealia Water Co. Holdings, LLC
132 W. Main Street
Aspen, CO 81611

Dear Mr. Lipscomb:

Well Abandonment Permit
Kealia Nos. 1 & 2 (Well No. 0618-01 & 02)

Enclosed are two (2) copies of your approved Well Construction Permit for the captioned well(s) which authorizes well abandonment/sealing activities. As part of the Chairperson's approval, the following special conditions were added and are part of your permit under Permit Condition 7:

**Special Conditions**

1. Both wells must be cleared of debris and roots and sealed to a depth of at least 130 feet with neat cement.
2. Separate Well Abandonment Reports (attached) shall be submitted for each well.

To validate your permit, please sign and have the contractor sign both permit originals and return one for our files.

**IMPORTANT** - The well owner is responsible for all conditions of the permit. This includes ensuring that the your licensed contractor, submits a completed Well Abandonment Report form (enclosed) within sixty (60) days after the well construction work is completed. Be advised that you may be subject to fines of up to $1000 per day for any violations of your permit conditions.

We understand that there are five other unused wells on this parcel (Well Nos. 0618-03 to 07) that exist in the vicinity of Well Nos. 0618-01 & 02, of which two wells can be located and the other three have been buried or lost (but whose locations are generally known). We believe these five wells also meet the criteria for abandonment in the Hawaii Well Construction and Pump Installation Standards (1997). Please submit, within the next sixty (60) days, either 1) applications to abandon/seal these wells or 2) your reasons why you do not believe these wells meet the criteria for abandonment/sealing. (Please visit our website at www.state.hi.us/dlnr/cwrm to view the Hawaii Well Construction and Pump Installation Standards for abandonment/sealing criteria in Part 3, Section 3.1.)

If you have any questions, please call Lenore Nakama of the Commission staff at (808) 587-0218.

Aloha,

GILBERT S. COLOMA-AGARAN
Chairperson

Enclosures

C: Steve Goldberg, Oasis Water Systems
WELL CONSTRUCTION PERMIT TO ABANDON/SEAL

Kealia Nos. 1 & 2, Well No. 0618-01 & 02

In accordance with Department of Land and Natural Resources, Commission on Water Resource Management's Administrative Rules, Section 13-168, entitled "Water Use, Wells, and Stream Diversion Works", this document permits the abandonment/sealing of Kealia Nos. 1 & 2 (Well No. 0618-01 & 02) at Kealia, TMK 4-7-3:2, subject to the Hawaii Well Construction & Pump Installation Standards (1/23/97) which include but are not limited to the following conditions:

1. The Chairperson of the Commission on Water Resource Management, P.O. Box 621, Honolulu, Hawaii 96809, shall be notified in writing before any work covered by this permit commences.

2. The owner or operator of any well which has been determined by the department or voluntarily declared by the owner or operator to be abandoned as defined in §13-168-2, after written notification, shall be required, at owner's or operator's expense, to re-case, cement, plug back, cap, or otherwise repair the well or fill and seal the well with cement in a manner approved by the commission.

3. The well construction permit application is incorporated into this permit by reference and is subject to the Hawaii Well Construction & Pump Installation Standards (January 23, 1997; HWCPIS). If the HWCPIS are not followed and as a consequence water is wasted or contaminated, a lien on the property may result.

4. The Well Abandonment Report form (attached) shall be submitted to the Commission on Water Resource Management within sixty (60) days after completion of the work.

5. The permittee shall comply with all applicable laws, rules, and ordinances.

6. The sealing shall be completed within two (2) years.

7. Special conditions in the attached cover transmittal letter are incorporated herein by reference.

Date of Approval: January 28, 2002
Expiration Date: None
GILBERT S. COLOMA-AGARAN, Chairperson
Commission on Water Resource Management

I have read the conditions and terms of this permit and understand them. I accept and agree to meet these conditions as a prerequisite and underlying condition of my ability to proceed. I also understand that non-compliance with any permit condition may be grounds for revocation and fines of up to $1000 per day.

Permittee's Signature: ___________________________ Date:______________
Printed Name: ___________________________ Firm or Title: ___________________________
Contractor's Signature: ___________________________ License #: __________ Date:______________
Printed Name: ___________________________ Firm or Title: ___________________________

Please sign both copies of this permit, return one to the Chairperson, and retain the other for your records.

Attachment
C:
USGS
Department of Health/ Safe Drinking Water, Wastewater, and Clean Water Branches
Kauai Department of Water Supply
Steve Goldberg, Oasis Water Systems
## DEPARTMENT OF LAND AND NATURAL RESOURCES

**UAC OR ATTACHED WORKSHEET**

**DATE:** 2/19/02

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LINE (3)
LINE (4)

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Steve Goldberg: What is the intended use for Well 1?  Should it be similar to Well 2 (130' deep)? Well 1 should have roots removed before filling with cement.  What about the rest of the wells in the area? Perhaps they should also be sealed.

- [Signature]
Mr. A. James Wriston, III
Manager of Land Administration
Amfac Land Company, Ltd.
700 Bishop Street - Suite 601
Honolulu, Hawaii 96813

Dear Jim:

Evaluation of Amfac's Kealia Well Nos. 1 and 2
Kealia, Kauai

This letter report summarizes results of field investigations and analyses of Kealia Well Nos. 1 and 2 (State Nos. 0618-01 and -02) in Kealia, Kauai. These two wells were drilled for the Maloe Sugar Company in 1898 and are currently the source of drinking water supply for approximately 70 mostly residential service connections in the Kealia area.

Five other wells were subsequently drilled in near proximity to the first two. Two of these were done in 1906 and the last three were completed in 1928. None of these five have been used for at least four decades and only two of them were located during our recently completed field work. The tops of these two have 12-inch tees with a blind flange at the top and 12-inch gate valve on the side. Locations of the three wells that could not be found are generally known, but they may be buried under fill or simply lost in the thick vegetative growth. Published information on all seven wells is presented in Exhibits 1 and 2 at the back of this letter report.

Present Pumping Configuration and Pattern of Use

Both wells are outfitted with 18-inch line shaft turbine pumps with 9-inch discharge pipes. Each pump is rated at 600 GPM against a total dynamic head of 230 feet. The pump in Well No. 1 is a 5-stage Byron Jackson and the pump in Well No. 2 is a 7-stage of unknown manufacture. The pump intake for Well No. 1 is 31 feet below the base. For No. 2, the pump is "close coupled" and its intake is only 12 feet below the base. The above ground piping at each well is identical: an 8-inch swing check valve; an 8-inch gate valve; an 8" x 10" reducer connecting to 10-inch pipe; and an air release valve on the 10-inch pipe. Chlorine is injected into the common discharge line using chlorine gas tanks and a Grundfos booster pump. The 10-inch pipe runs from the wells all the way to the 60,000-gallon, rectangular-shaped Kumukuulu tank at an elevation of about 200 feet. All customer services are connected to this main directly or to its various laterals. The tank does not have separate inflow and outflow pipelines.

The simplified set-up of the well pumps does not include a number of features that are typically found at drinking water well installations. These include: a flowmeter for the discharge rate; a pump control valve and discharge line to send the first several minutes of pumped water to waste; and a sounding tube or airline to monitor well water level.
Based on data collected during pump testing, the pumps deliver 650 to 675 GPM. This is somewhat greater than their rated capacity because the total dynamic head the pumps work against is less than 250 feet. At the present small customer base of the system, one or the other of the pumps is started and stopped three times a day by a timer. Each run is about an hour long. This translates to an average daily production of about 120,000 gallons.

Methods Used to Evaluate the Wells

For each of the wells in turn, the following steps were undertaken to evaluate their condition: the pump and motor were removed; the depth of the well was sounded; a video log of the entire length of the casing and open hole was made; profiles of the salinity and temperature through the water column were made; well water level variations were recorded for several days to delineate tidal and barometric variations and the drawdown due to operation of the other well; and the pump and motor were re-installed with an airline so that the water level could be measured. (Note: We had intended to install sounding tubes rather than airlines but there was insufficient annular space between the pump and well casing.) For Well No. 1, pump testing was also conducted to determine hydraulic performance and potential yield. All measurements summarized in this report were made by me. All other work was performed by Roscoe Most Hawaii personnel.

Description of the Physical Condition of Well No. 1

The above ground piping, pump, motor, column pipe, and pump house are all in reasonably good condition. The well has 12-inch casing to a depth of 94 feet below its concrete pedestal and open hole from 94 feet to the bottom of the well at 207 feet. The casing and total depths are somewhat different than indicated in available records (Well 0618-01 on Exhibit 1 and Well 2E on Exhibit 2). Based on its 12-inch diameter, the casing is apparently the original 1898 pipe. Not unexpectedly, there is a significant amount of tuberculation on the casing's interior. Despite this, the video log indicates that the casing is essentially intact over its entire length.

However, about 3 to 4 feet below the concrete pedestal, a now-abandoned pipe is connected directly to the casing. Just outside the pump house, this pipe is connected to an 12-inch gate valve and a pipeline toward the adjacent irrigation ditch. ITC Water Management excavated the valve and pipe and found the valve to be frozen open, the pipe downstream of the valve to be cracked in several places and full of roots. The valve and pipe have been removed and the rate of leakage and the pipe connected to the well casing has been sealed. In the process of doing this work, another buried pipeline, probably connected to Well No. 2, was also discovered. ITC will uncover it and seal the pipe as necessary.

Below the bottom of the casing, between depths of 94 to 130 feet, the open hole is near-gun barrel smooth, appearing to either be a poor yielding conglomerate or simply a plastering of the borehole walls with precipitate from water moving up the hole. A piece of tuberculated steel laying across a portion of the borehole at 130 feet marks a distinct change to a highly fractured zone and an irregularly shaped borehole. The fractured formation from 130 to 145 feet appears to be the well's primary water bearing strata. The borehole below 145 feet is smooth and fractures are infrequent. There is a flat steel bar across the hole at 166 feet and a steel rod at the bottom of the hole at 207 feet. None of the pieces of steel in the open borehole are a concern. Constant upward leakage in the well results in a crystal clear water column (and video). No silt deposits were visible, even at the bottom of the hole where the accumulation of silt is common.
Description of the Physical Condition of Well No. 2

As with Well No. 1, the above ground piping and other equipment are in good condition. However, the nominal 10-inch pump (meaning its outside diameter is 9 and a fraction inches) is a tight squeeze in the 10-inch tuberculated casing. Compounding this problem is a network of roots that has penetrated the casing and had wrapped around the pump. The crane truck had to pull more than double the weight of the pump to free it from the roots and extract the pump from the well. About half of the root system came out with the pump; the rest remained in the well. Although not visible in the video due to the presence of the plant roots, it is quite possible that there is a pipe connected to the casing similar to the one found in Well No. 1. As noted above, ITC is working on uncovering it and sealing it if necessary.

Although records suggest that casing and well depths are identical to No. 1 (Well 2F in Exhibit 2), the casing was found to end at 86 feet. In addition to the root penetration near ground surface, there are a number of other locations where the casing is no longer intact: there is a 4-foot long root growing through the casing at 52 feet; there is an unidentified plant growth at 70 feet; and there are discernible holes in the casing at 52, 72, and 78 feet. In addition, there are several other locations of suspected holes which couldn't be clearly identified as such. The numerous holes in the casing allow a constant stream of water to move up the casing and leak outward. This leakage is clearly visible at the bottom of the concrete base facing the stream and in a pit was excavated by ITC at the pump house door. This well should be recased as soon as practical.

Strata in the open hole of this well match up reasonably accurately with Well No. 1: a mostly smooth borehole to 132 feet; an irregular and fractured formation from 132 to 150 feet where most of the well's yield is derived; and a relatively smooth borehole below. The reported depth for this well is 213 feet. Its present depth, which consists of boulders suggesting a cave-in, is at 163 feet. Judging by the lack of soil around the boulders, it appears that water can flow upward through them from the borehole below. Based on the strata below this depth in Well No. 1 and the performance of this well when it is pumped, the cave-in appears to have no significant adverse impact on the well's hydraulic performance.

Hydrologic Aspects of the Formation Tapped by the Wells

Based on available drillers logs (in Exhibit 2) and the video record, the upper 120 to 130 feet penetrated by the wells is comprised of interbedded Kapaa Stream alluvium and calcareous marine sediments. Taken as a hydrologic unit, these clays, sandstones, and other alluvial material have little or no permeability. As such, they are a confining layer over the water-bearing Koloa lavas which the wells tap into with their open holes at depth. Under static conditions, the piezometric head in the confined aquifer (ie. the level which the water rises in the well) was found to be about 10 feet above sea level. (This is based on the unconfirmed elevation benchmark at the pump house of Well No. 2, ie. Well 2F in Exhibit 2.) Other aspects of the aquifer's behavior, which were determined during the field investigation, are as follows:

Tidal Response: Water levels in both wells respond to ocean tide in varying degrees. In Well No. 1, water level responses are about 10 percent of the tidal amplitude (Exhibit 3). In Well No. 2, the response is almost 30 percent of the tidal amplitude (Exhibit 4).
Interference Effects Between Wells. The wells are 60 feet apart and, as presently outfitted, both pump at 650 to 675 GPM. At these rates, the drawdown in one well due to pumping of the other well is approximately 0.25 feet (Exhibits 3 and 4).

Salinity and Temperature Through the Water Column. Salinity and temperature through the water column of both wells are reasonably consistent (Exhibits 5 and 6). This is a somewhat expectable result because there is a continuous upward movement of water due to leakage at both wells. Temperatures in both wells are between 71.7° to 71.8° F. The salinity in Well No. 1 is slightly lower than in Well No. 2, about 0.14 parts per thousand (PPT) versus 0.16 PPT. This difference in salinity is also reflected in the chloride concentrations of the water pumped by each well: about 40 milligrams per liter (MGL) from Well No. 1 in 80 MGL from Well No. 2.

Relationship to the Adjacent "Stream". There is a man-made irrigation ditch which runs behind the wells. The ditch is actually an extension of an unnamed gulch and it is connected to a network of ditches which cross the low-lying area of the Kapaa Stream floodplain. Throughout the period of the field investigation, the stream flowed constantly and its level was several feet below the water level in the wells. A water level recorder was installed in this "stream" adjacent to Well No. 2 to see if there was an effect on stream flow when either of the wells is operating. The results, which are shown on Exhibit 7, show no influence on streamflow during the wells’ operation.

Hydraulic Performance of Well No. 1

A step-drawdown pump test of Well No. 1 was conducted to determine its hydraulic performance characteristics. With the electric motor removed, a diesel engine and right angle drive was installed and operated by Roscoe Moses Hawaii so that the drawdown could be measured at various pumping rates. Drawdown of the water level was recorded using an airline bubbler system and a data logger. Flowrate was measured with a contractor installed, strap-on McCrometer flowmeter on the 10-inch discharge line.

Water level responses at four rates of pumping are illustrated on Exhibit 8. These have been converted to the drawdown versus flowrate performance curve on Exhibit 9 using a curve fitting technique. The well's hydraulic performance is excellent. At 980 GPM, the equivalent of 0.98 MGD on a 24-hour basis, drawdown was just 2.0 feet. This demonstrates that the wells tap into a highly permeable formation. This performance is significantly better than most wells developed elsewhere on Kauai in the Koloa area.

Sustainable Yield as Determined During the Constant Rate Pump Test

Using the diesel engine and right angle drive, a 72-hour constant rate pump test of Well No. 1 was conducted. Engine speed was held constant at 1800 RPM. For 72 hours, the total pumpage of 3,045 million gallons was equivalent to an average of 705 GPM or 1.015 million gallons per day (MGD). Exhibit 10 is the recorded water level in the well before, during, and following this test. Drawdown was very rapid and held reasonably constant at 2.0± feet through the 72 hours. Essentially full recovery was achieved within minutes of turning the pump off.
As with the step-drawdown test, the essentially constant drawdown and rapid recovery of the constant rate test demonstrate that the wells tap into a very permeable formation with no discernible aquifer boundary effects or influence of the nearby stream. Since the aquifer is confined by 120 to 130 feet of poorly permeable "caprock", its lack of a time-dependent drawdown or recovery is somewhat surprising. These drawdown characteristics are more like the response of a well which taps a highly permeable, unconfined basal lens.

Exhibit 11 is a summary of chlorides, conductivity, and salinity of water samples collected through the 72-hour pump test. Chlorides and conductivity are also displayed graphically on Exhibit 12. There was a gradual but continuous increase in all three of the quality parameters throughout the test, the result of a moderate intrusion of saline water. The test rate was slightly greater rate than can be sustained at this location.

Summary Conclusions and Recommendations

1. Both wells produce water of excellent potable quality. If they are eventually to be pumped on a continuous basis to maximize yield, pump capacities of 600 GPM (0.864 MGD) would be appropriate. If the wells are used only intermittently, capacities up to 700 GPM will have no adverse impact on water quality.

2. The wells are just 60 feet apart. From the perspective of sustainable yield, their near proximity means they are, in effect, a single pumping center. At the pump capacities discussed above, one well should operate at a time with the other as standby. Simultaneous operation, unless the pumping rate are 350 GPM or less, would not be advisable.

3. The casing of Well No. 2 is not intact and its leakage and potential contamination while pumping should be fixed as soon as practical by recasing the well. For the condition and diameter of the existing casing, the recasing should be done in the following steps:
   a. Remove the pump.
   b. Backfill the well with sand to a depth of 95 feet (about 10 feet below the bottom of the present casing).
   c. Install an 8-inch (ID), 5/16-inch wall thickness steel casing inside the existing 10-inch casing to a depth of 95 feet. The bottom of the casing needs to have a fitting such that grout can be pumped into the annular space between the existing and new casings from the bottom up to the ground surface.
   d. Using a tremie pipe, pump grout to fill the annular space between the casings to the ground surface.
   e. Remove the tremie pipe and bail the sand from the bottom of the well.

A budget cost for recasing in this manner is $25,000. The new 8-inch casing will not accommodate the present (nominal) 10-inch diameter pump. For a pump capacity of 600 to 700 GPM, the well's water level and excellent hydraulics will allow use of an above-ground, end suction pump.
4. With the completion of TC Water Management's plugging of the pipeline attached to the casing of Well No. 1, the otherwise intact well casing should have no leaks. However, this is just an interim fix. For a longer term solution, this well should be recased this well in the same manner as described for Well No. 2. If done at the same time, the cost for both wells might be on the order of $40,000. If the new casing is 10-inch, the present pump could be re-installed. An 8-inch casing would require converting to an end-suction pump.

5. The two of the five other wells in the battery which were located are partially buried but show no signs of leaking. However, all five of these wells are between 70 and 90 years old and the integrity of their casings is problematic. Because the aquifer's piezometric head is at and above the ground level, leakage through a corroded casing is more an issue of loss of aquifer yield rather than possible groundwater contamination. Section 3.1 of the Water Commission's "Well Construction and Pump Installation Standards" cites the four conditions listed below as reasons to seal an unused well. All four of the conditions appear to be applicable in this case.

   1. Their purpose has been served, or
   2. Their use has been permanently discontinued; and
   3. Their physical condition is causing or threatening contamination, deterioration in quality, or waste of ground-water resources, or
   4. Their state of disrepair makes their continued use impractical or creates a hazard to public health or safety.

If you elect to seal the wells, three of them will have to be located first. The sealing will require a permit from the State Water Commission and backfilling with grout by a properly licensed contractor. If all of the wells are done in sequence, the cost should be about $7,500 per well.

Sincerely,

Tom Nance

Endeclosures
State of Hawaii
COMMISSION ON WATER RESOURCE MANAGEMENT
Department of Land and Natural Resources
APPLICATION FOR PERMIT

[Information]

APPLICANT INFORMATION:

1. (a) WELL OWNER: Katie Walter C. Harrington
   Address: 711 Kamehameha Hwy, Kapolei, Oahu 80818
   Phone: 945-5555
   Fax: 945-5555
   Email: katiewc@hawaii.rr.com

2. (b) LAND OWNER: Katie Walter C. Harrington
   Address: 711 Kamehameha Hwy, Kapolei, Oahu 80818
   Phone: 945-5555
   Fax: 945-5555
   Email: katiewc@hawaii.rr.com

3. (c) CONTRACTOR: Oasis Water
   Address: 112 W Main St, Kapolei, Oahu 80818
   Phone: 828-5876
   Fax: 828-5876
   Email: katiewc@hawaii.rr.com

WELL & PUMP INFORMATION:

2. WELL NAME: s_0618-01 & 02
   Island: Kauai
   Address: [Address]
   Tax Map Key: [Key]

   3. PROPOSED WORK: (check all that apply)
      [Options]
      [Legend]

   4. CONSTRUCTION: [Options]

   5. PROPOSED PUMPING RATE: [Rate]

   6. PROPOSED USE: [Options]

   7. (a) PROPOSED AMOUNT OF WITHDRAWAL:
      [Amount]
      [Method]

   OTHER IMPORTANT INFORMATION:

8. LEGAL REQUIREMENTS: If required, these permits must be obtained before the Commission can legally issue a permit.

   Conservation District Use Permit (CUP): To find out if a CUP is necessary, call DLNR Land Division at 808-6414
   Not Required
   Required
   Data Approved

   Environmental Impact Statement (EIS) or Environmental Assessment (EA): To determine if an EIS or EA is necessary, call SEPA at 808-1111
   Not Required
   Required
   Data Approved

   Special Management Area Permit (SMAP): To determine if an SMAP is necessary, call DLNR at 808-6374; on Maui, call 808-298-218; for Molokai, call 808-298-2989; for Lanai, call 808-567-1111.
   Not Required
   Required
   Data Approved

9. REMARKS, EXPLANATIONS:

   [Remarks]

   [Signature]

   [Date]

   [For official use only]
   Latitude
   Aquifer System No.
   Longitude
   State Well No.
LICENSE SCREEN

Please click a link listed below to display the other screen.

***** GENERAL LICENSEE *****

LIC ID: CT-21457
NAME: OASIS WATER SYSTEMS INC
TRADE NAME: 
STATUS: CURRENT, VALID & IN GOOD STANDING
ENTITY: CORPORATION
ORIG LIC DATE: 5/19/98
CLASS PREFIX: C
RESTRICTION: 
BUSINESS ADDR: 
MAILING ADDR: P O BOX 535 KILAUEA HI 96754

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http://www.ehawaiigov.org/serv/pvl?_a=d&_f=n&lictp=CT&licno=21457&off=&nm=OASIS 2/12/2002
# PUBLIC RECORD DATA

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This information has been supplied by third parties and has not been independently verified by Hawaii Information Service and is, therefore, not guaranteed.
Tracy Runnells Well Service Inc.
364-B Manono Street, Kailua, Hawaii 96734
Phone/Fax (808) 263-6055

FACSIMILE TRANSMISSION

Date April 6, 2000  # of Pages to follow  # 4

To CWRM  Attn. Lenore Nakama

Hi Lenore,

Do you gals have any record of Kaalia Wells 1 & 2 shown on Pages following.

One is 12" cased and one is 10" cased.

A job aide to recase them both on April 14th.  Specify call for removal of top 20' of existing.

Roscoe Moss did them I believe.  All logs about cement and conductors for top 20' would be most useful.

Thank Tracy