**CHECKLIST**

- Well Construction Permit
- Pump Installation Permit
- Water Use Permit Required Also

**Well Name & Number**: Kalaeloa PW-7, 8, 9
**Island**: Oahu

**Applicant**: Kalaeloa Partners, L.P.
**Landowner**: Hawaiian Electric

Date application received: 6/17/93
Date acknowledged receipt/request more info: 6/23/93
Date filing fee deposited: 6/23/93

Application sent to following:
- Dept. of Health - Safe Drinking Water Branch
- Office of Hawaiian Affairs
- Dept. of Hawaiian Home Lands
- State Historic Preservation Div.
- Sierra Club Legal Defense Fund
- Honolulu Board of Water Supply
- Maui Dept. of Water Supply
- Kauai Dept. of Water Supply
- Hawaii Dept. of Water Supply
- Hawaii Dept. of Public Works
- Koolau Lock #29 (Oahu)
- Additional List (Melekai)
- Eric Hirano/ Lyann Mizuno

Date sent: 7/3
Comments received:

Date agenda due: 4 Aug 93
Date submittal due: 4 Aug 93
Date submittal sent to applicant: 4 Aug 93
Date application approved OR disapproved: 18 Aug 93
Date applicant notified of decision: 18 Aug 93

Remarks:

9/3/93
Go for 9/15 unless Turn N calls.
Retire/reconfigure
Kalaeloa PW—7, 8, 9
Well Nos. 1805—10, 11, 12
May 9, 2000

Mr. Edwin T. Sakoda  
Department of Land & Natural Resources

Dear Mr. Sakoda:

Kalaeloa Partners LP (KPLP) is pleased to announce a recent restructuring of its ownership interests and local personnel. On April 3, 2000, PSEG Kalaeloa Inc. (PKI), an affiliate of one of the existing limited partners, purchased the general partner interests of KPLP from ABB Hawaiian Cogeneration Inc. PKI is now the managing partner of the KPLP partnership, with responsibility to conduct its day to day business.

In conjunction with this restructuring there have been some changes in the local KPLP site representatives. Ms. Gayle Baker, with whom many of you have done business for many years, has decided to take this as an opportunity to pursue other personal interests. Though I am disappointed to lose Gayle, I am pleased to announce that Ms. Wilhelmina Young has joined our staff as Business Administrator and has worked closely with Gayle over the past month to maintain the continuity of service you have come to expect from KPLP. Wilhelmina will be glad to address your needs regarding billing, inventory, accounts payable and other commercial issues.

Lastly, having had the pleasure of working with many of you over the past two years in my role as the limited partner site representative, I am glad to inform you that I will now represent KPLP as the managing partner in my new role as General Manager. I look forward to the opportunities, challenges and growing business relationships that lie ahead.

Please be aware that the fiduciary responsibilities of the KPLP partnership have not changed in any way. All existing KPLP contracts, leases, purchase orders etc. remain intact and unaffected. Only the party responsible for managing such has changed. If you have any questions or concerns please do not hesitate to call us at

Sincerely;

[Signature]
Daniel R. Nugent  
General Manager

by/dn
Dear Jeff:

Summary of the As-Built Dimensions and Hydraulic Performance of Saltwater Wells PW-7, PW-8, and PW-9

This letter and its enclosures document the dimensions and hydraulic performance of the three saltwater production wells recently completed by Roscoe Moss Company. In a separate letter which will be sent to you shortly, I will present a proposal to design the pumps, pipelines, and electrical equipment which are necessary to put the wells into service.

As-Built Dimensions

Figure 1 shows the locations of the three new wells and Figure 2 illustrates their as-built dimensions. I've designated these PW-7, PW-8, and PW-9 in the chronological sequence of their construction. Their state well numbers are 1805-10, -11, and -12. Dimensions of all three wells are identical: 12-inch diameter solid casing of Schedule 80 PVC extends 20 feet below the existing ground (about 8 to 10 feet into water, depending on the phase of the tide); below this is 25 feet of perforated well screen of the same diameter and material; river-rounded gravel fills the annulus of the borehole from the bottom of the well to one foot above the top of the perforated casing; and the balance of the annulus is grouted from the gravel pack to the ground surface.

Hydraulic Performance of the Wells

Pump Testing Protocol. After each well's construction had been completed, an engine-driven line shaft vertical turbine test pump was installed with its suction intake approximately 30 feet below ground. Each well was cleaned and developed by surging with the test pump. For PW-7 and PW-9, development of the wells took an hour or less. PW-8 had to be surged for four to five hours at 1100 to 1200 GPM before acceptable water clarity was achieved. After development of each well, a 24-hour pump test was run. In the first hour, drawdown at various pumping rates up to 1200 GPM was determined. At the end of this, the pumping rate was adjusted back to 850 GPM and held constant for the remainder of the test. Water samples were collected every four hours. Water level in the pumped well was determined periodically with an airline. Pressure transducers and data loggers monitored water levels in the other wells during the pump tests.

Step-Drawdown Performance. Drawdowns at various pumping rates in each well are illustrated on Figure 3. Drawdown for PW-7, amounting to 3.0 feet at 850 GPM, is typical of the Ewa limestone. PW-8 is obviously not as hydraulically efficient and PW-9's performance is exceptionally good. Subtle changes in the structure of the limestone produce considerably different well performance despite their proximity to one another.

Tidal Efficiency. Figure 4 depicts the water level in PW-7 through the 24-hour pump test of PW-8. The tidal variation in the well is 35 to 40 percent of the ocean tide's amplitude. This reflects the high permeability of the reef limestone between the wells and the shoreline.
Well-to-Well interference. Figure 5 shows the water level response in PW-7 at the end of the 24-hour pump test of PW-9. Recovery of 0.026 feet of drawdown was rapid. At the intended 850 GPM permanent pumping rates, drawdowns in the other wells were on the order of 0.02 to 0.04 feet. These interference effects are essentially negligible.

Water Quality

Figure 6 illustrates the increase of salinity with depth into water in PW-7. This profile was made in the open borehole before its full depth had been drilled and the casing installed. The well's solid casing now extends 8 to 10 feet into water, closing off the upper, less saline groundwater. Table 1 and Figure 7 summarize the salinity of water pumped during the 24-hour tests. Salinities increased gradually through each test without stabilizing. When all three wells are operated simultaneously, a greater rate of salinity increase is likely.

Table 2 presents water quality analyses of a sample from PW-7 during a short-term pump which was conducted in the open borehole prior to the casing installation. Constituent concentrations of dilute seawater are also shown on the table for comparison. As might be expected, this sample is fresher than water produced by the well after its casing was installed. Also, groundwater is clearly enriched in calcium and alkalinity (from the reef limestone). Silica, nitrate, and phosphate are also higher than dilute seawater; these are contributions of the freshwater component of the pumped water.

Sincerely,

[Signature]

Tom Nance

Enclosures
Table 1
Summary of Salinities During 24-Hour Pump Tests

Well PW-7, December 5 to 6, 1993

<table>
<thead>
<tr>
<th>Day</th>
<th>Time</th>
<th>Temperature (°C)</th>
<th>Conductivity (μmhos)</th>
<th>Salinity (PPT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>9:00 A</td>
<td>18.10</td>
<td>23,450</td>
<td>16.61</td>
</tr>
<tr>
<td></td>
<td>1:00 P</td>
<td>17.39</td>
<td>23,850</td>
<td>17.23</td>
</tr>
<tr>
<td></td>
<td>5:00 P</td>
<td>17.14</td>
<td>24,600</td>
<td>17.49</td>
</tr>
<tr>
<td></td>
<td>9:00 P</td>
<td>17.13</td>
<td>24,440</td>
<td>17.80</td>
</tr>
<tr>
<td>6</td>
<td>1:00 A</td>
<td>17.43</td>
<td>24,885</td>
<td>18.02</td>
</tr>
<tr>
<td></td>
<td>5:00 A</td>
<td>17.20</td>
<td>25,045</td>
<td>18.25</td>
</tr>
<tr>
<td></td>
<td>9:00 A</td>
<td>17.62</td>
<td>25,425</td>
<td>18.38</td>
</tr>
</tbody>
</table>

Well PW-8, January 5 to 6, 1994

<table>
<thead>
<tr>
<th>Day</th>
<th>Time</th>
<th>Temperature (°C)</th>
<th>Conductivity (μmhos)</th>
<th>Salinity (PPT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>11:30 A</td>
<td>21.02</td>
<td>25,335</td>
<td>16.87</td>
</tr>
<tr>
<td></td>
<td>3:30 P</td>
<td>22.80</td>
<td>26,890</td>
<td>17.30</td>
</tr>
<tr>
<td></td>
<td>7:30 P</td>
<td>22.85</td>
<td>27,360</td>
<td>17.60</td>
</tr>
<tr>
<td></td>
<td>11:30 P</td>
<td>22.59</td>
<td>27,580</td>
<td>17.87</td>
</tr>
<tr>
<td>6</td>
<td>3:30 A</td>
<td>22.66</td>
<td>27,935</td>
<td>18.09</td>
</tr>
<tr>
<td></td>
<td>7:30 A</td>
<td>22.73</td>
<td>28,125</td>
<td>18.20</td>
</tr>
<tr>
<td></td>
<td>11:00 A</td>
<td>23.28</td>
<td>28,580</td>
<td>18.29</td>
</tr>
</tbody>
</table>

Well PW-9, January 7 to 8, 1994

<table>
<thead>
<tr>
<th>Day</th>
<th>Time</th>
<th>Temperature (°C)</th>
<th>Conductivity (μmhos)</th>
<th>Salinity (PPT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>8:15 A</td>
<td>23.43</td>
<td>29,040</td>
<td>18.24</td>
</tr>
<tr>
<td></td>
<td>12:15 P</td>
<td>23.38</td>
<td>29,020</td>
<td>18.55</td>
</tr>
<tr>
<td></td>
<td>4:15 P</td>
<td>23.32</td>
<td>29,240</td>
<td>18.72</td>
</tr>
<tr>
<td></td>
<td>8:15 P</td>
<td>23.36</td>
<td>29,430</td>
<td>18.86</td>
</tr>
<tr>
<td>8</td>
<td>12:15 A</td>
<td>23.37</td>
<td>29,780</td>
<td>19.09</td>
</tr>
<tr>
<td></td>
<td>4:15 A</td>
<td>23.39</td>
<td>29,990</td>
<td>19.24</td>
</tr>
<tr>
<td></td>
<td>7:15 A</td>
<td>23.43</td>
<td>30,040</td>
<td>19.25</td>
</tr>
</tbody>
</table>

Notes: 1. Conductivity, temperature, and salinity were determined using an Ocean Sensors Model OS-200 CTD.

2. Temperatures are office temperatures at the time of measurement, not field temperatures of the pumped water.
Table 2

Water Quality Sample During a Pump Test of the Open Borehole, November 3, 1993

<table>
<thead>
<tr>
<th>Constituent</th>
<th>Units</th>
<th>Pumped Sample</th>
<th>Diluted Seawater</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salinity</td>
<td>PPT</td>
<td>12.40</td>
<td>12.40</td>
</tr>
<tr>
<td>Conductivity</td>
<td>μmhos/cm</td>
<td>22,120</td>
<td>21,540</td>
</tr>
<tr>
<td>Total Dissolved Solids</td>
<td>MG/L</td>
<td>12,830</td>
<td>12,490</td>
</tr>
<tr>
<td>Sodium</td>
<td>MG/L</td>
<td>3,654</td>
<td>3,763</td>
</tr>
<tr>
<td>Potassium</td>
<td>MG/L</td>
<td>154</td>
<td>135</td>
</tr>
<tr>
<td>Calcium</td>
<td>MG/L</td>
<td>254</td>
<td>143</td>
</tr>
<tr>
<td>Magnesium</td>
<td>MG/L</td>
<td>439</td>
<td>453</td>
</tr>
<tr>
<td>Chloride</td>
<td>MG/L</td>
<td>6,580</td>
<td>6,762</td>
</tr>
<tr>
<td>Sulfate</td>
<td>MG/L</td>
<td>1,412</td>
<td>944</td>
</tr>
<tr>
<td>Nitrate</td>
<td>MG/L</td>
<td>5.671</td>
<td>Negligible</td>
</tr>
<tr>
<td>Phosphate</td>
<td>MG/L</td>
<td>0.005</td>
<td>Negligible</td>
</tr>
<tr>
<td>Ammonium</td>
<td>MG/L</td>
<td>0.248</td>
<td>Negligible</td>
</tr>
<tr>
<td>Silica</td>
<td>MG/L</td>
<td>19.085</td>
<td>Negligible</td>
</tr>
<tr>
<td>Bicarbonate Alkalinity</td>
<td>MG/L (as CaCO₃)</td>
<td>240</td>
<td>39</td>
</tr>
<tr>
<td>Total Alkalinity</td>
<td>MG/L (as CaCO₃)</td>
<td>242</td>
<td>40</td>
</tr>
<tr>
<td>pH</td>
<td>REL Units</td>
<td>7.879</td>
<td>7.0±</td>
</tr>
</tbody>
</table>

Analyses by Marine Analytical Specialists, November 9, 1993.
Figure 1
Location of Wells PW-7, PW-8, and PW-9
Figure 2
As-Built Dimensions of Wells PW-7, PW-8, and PW-9
Figure 3
Results of Step-Drawdown Pump Tests
Figure 4
Water Level in Well PW-7 During the Development and Test Pumping of Well PW-8
Figure 5
Recovery in Well PW-7 at the End of the 24-Hour Pump Test of Well PW-9
**Figure 6**

Salinity and Temperature Profiles of the Open Borehole of Well PW-7

October 8, 1993
Figure 7
Salinity Variation Through the 24-Hour Pump Tests at 850 GPM
Chairperson and Members
Commission on Water Resource Management
State of Hawaii
Honolulu, Hawaii

Gentlemen:

Kalaeloa Partners, L.P.
Amendment of a Water Use Permit and
Application for a Well Construction Permit
Kalaeloa Wells PW-7 to 9 (Well Nos. 1805-10 to 12), Ewa Beach, Oahu

Applciant: Landowner:
Kalaeloa Partners, L.P. Hawaiian Electric Company, Ltd.

Action Requested: Amendment of the Water Use Permit and permission to construct and test Kalaeloa Wells PW-7 to 9 (Well Nos. 1805-10 to 12) for industrial cooling water.

Well Location/Tax Map Key: The wells are located at Campbell Industrial Park, Oahu at Tax Map Key: 9-1-31: 23 (see attached map).

Description of Well (typical):

Ground elevation: 11 ft.
Casing diameter: 12 inches
Solid casing depth: 10 ft.
Screen casing depth: 30 ft.
Open hole: none
Total depth: 40 ft.
Grouted annulus: 0 to 8 ft.
Proposed pump capacity: 800 gpm

Background:

April 18, 1990 - The Commission approved a water use permit for 3.168 mgd from six wells (Well Nos. 1805-04 to 09) for industrial use from the caprock (salt water) aquifer, Pearl Harbor Ground Water Management Area.

October 2, 1990 - The Commission on Water Resource Management approved a pump installation permit for the six wells.

June 17, 1993 - Application for a well construction permit submitted for the three new wells.

Analysis: The applicant is requesting a permit to drill and test three wells to take the place of the existing six wells for operational efficiency. There will be no increase in pumpage nor change in use and the existing wells will provide backup capacity only.

Administrative rules of the State Water Code Section 13-171-23, Modification of water use permit, states that a permittee needs to apply to modify a water use permit if he or she "seeks to change the use of water subject to the permit, whether or not such change in use is of a material nature, or to change the place of use of the water or to use a greater quantity of water than allowed under the permit or to make any change in respect to the water resources". Staff is of the opinion that the applicant in this instance does not seek to change the use of water, nor the place of use, nor the quantity of use, nor make any change in respect to the water resources. Therefore, Section 13-171-23, Modification of water use permit, does not apply. Instead, staff recommends that the water use permit for the existing wells be amended to include the three new wells as part of the same water system. The total authorized use from the wells will remain 3.168 mgd. Further, that the Commission authorize the Chairperson to issue the necessary well construction/pump installation permit for the new wells.
Chairperson and Members
Commission on Water Resource Management
September 15, 1993

RECOMMENDATION:

1. The Commission approve amending the water use permit for Kalaeloa Partners, L.P. to include the three new wells (Well Nos. 1805-10 to 12) as part of the same water system, subject to the standard water use permit conditions listed in Attachment A.

2. The Commission authorize the Chairperson to issue the necessary well construction/pump installation permit for the three new wells, subject to the standard well construction permit conditions listed in Attachment B.

Respectfully submitted,

[Signature]

RAE M. LOUI
Deputy Director

Attach.

APPROVED FOR SUBMITTAL:

[Signature]

KEITH W. AHUE, Chairperson
STANDARD WATER USE PERMIT CONDITIONS

1. The ground water described in the water use permit may only be taken from the location described, used for the reasonable-beneficial use described, and at the location described above and in the attachments. Reasonable-beneficial use means "the use of water in such a quantity as is necessary for economic and efficient utilization, for a purpose, and in a manner which is not wasteful and is both reasonable and consistent with the state and county land use plans and the public interest." (HAR §13-171-2).

2. The right to use ground water is a shared use right.

3. The water use must at all times meet the requirements set forth in HAR §13-171-13 which means that it:
   a. Can be accommodated with the available water source;
   b. Is a reasonable-beneficial use as defined in section §13-171-2;
   c. Will not interfere with any existing legal use of water;
   d. Is consistent with the public interest;
   e. Is consistent with state and county general plans and land use designations;
   f. Is consistent with county land use plans and policies; and
   g. Will not interfere with the rights of the Department of Hawaiian Home Lands as provided in section 221 of the Hawaiian Homes Commission Act and 174C-101(a), HRS.

4. The ground water use approved must not interfere with surface or ground water rights or reservations.

5. The ground water use approved must not interfere with interim or permanent instream flow standards. If it does, then:
   a. A separate water use permit for surface water must be obtained in the case an area is also designated as a surface water management area;
   b. The interim or permanent instream flow standard, as applicable, must be amended.

6. The water use permit is subject to the requirements of the Hawaiian Homes Commission Act, as amended, if applicable.

7. The permit application and staff submittal approved by the Commission at its September 15, 1993 meeting are incorporated into the permit by reference.

8. Any modification of the permit terms, conditions, or uses can only be made with the express written consent of the Commission on Water Resource Management.

9. The water use permit may be modified by the Commission and the amount of water initially granted to the permittee may be reduced if the Commission determines it is necessary to:
   a. Protect water sources in quantity, quality, or both;
   b. Meet other legal obligations including other correlative rights;
   c. Insure adequate conservation measures;
   d. Require efficiency of water uses;
   e. Reserve water for future uses, provided that all legal existing uses of water as of June 1987, shall be protected;
   f. Meet legal obligations to the Department of Hawaiian Homes, if applicable; or
   g. Carry out such other necessary and proper exercise of the State’s and the Commission’s police powers under law as may be required.

   Prior to any reduction, the Commission shall give notice of its proposed action to the permittee and provide the permittee an opportunity to be heard.

10. If the ground water source does not presently exist, the new well shall be completed, i.e. able to withdraw water for the proposed use on a regular basis, within twenty-four (24) months from the date the water use permit is approved.

11. An approved flowmeter(s) must be installed to measure withdrawals and a monthly record of withdrawals, water-levels, salinity, and temperature must be kept and reported to the Commission on a yearly basis in accordance with the Commission’s September 16, 1992 action on reporting requirements;

ATTACHMENT A
12. The water use permit shall be subject to the Commission’s periodic review of the applicable aquifer’s sustainable yield. The amount of ground water use authorized by the permit may be reduced by the Commission if the sustainable yield of the Caprock Aquifer System, or relevant modified aquifer, is reduced;

13. The water use permit may not be transferred or the use rights granted by this permit sold or in any other way alienated. Pursuant to HAR §13-171-25 and the requirements of Chapter 174C, the Commission has the authority to allow the transfer of the permit and the use rights granted by the permit in a manner consistent with HAR §13-171-25. Any such transfer shall only occur with the Commission’s prior express written approval. Any sale, assignment, lease, alienation, or other transfer of any interest in this permit shall be void.

14. The use(s) authorized by law and by the water use permit do not constitute ownership rights.

15. The permittee shall request modification of the permit when necessary to comply with all applicable laws, rules, and ordinances which will affect the permittee’s water use.

16. The permittee shall prepare and submit a water shortage plan within 30 days of issuance of the permit to assist the Commission in fulfilling HAR §13-171-42(c). The permittee’s water shortage plan shall identify what the permittee is willing to do should the Commission declare a water shortage in the Pearl Harbor Ground Water Management Area.

17. The water use permit granted shall be an interim water use permit, pursuant to HAR §13-171-21. The final determination of the water use quantity shall be made within five years of the filing of the application to continue the existing use.

18. The water use permit shall be issued only after AG review.

ATTACHMENT A
STANDARD WELL CONSTRUCTION/PUMP INSTALLATION PERMIT CONDITIONS

1. The Commission shall be notified before work commences.

2. The well construction/pump installation permit shall be for construction, testing, and installation of 800 gpm capacity, or less, pumps in the wells, as determined by the pumping test results. The applicant shall coordinate with the Commission and conduct pumping tests in accordance with the protocol established by the Commission. A means to accurately measure water levels, acceptable to the Commission, shall also be provided. The applicant shall submit to the Commission the test results and proposed permanent pump information, based on the tests, for approval by the Chairperson. No permanent pumps may be installed and no water used from the wells without the Chairperson's approval.

3. The proposed use shall not adversely affect existing or future legal uses of water in the area, including any surface water or established instream flow standards. This permit or the authorization to construct and pump water from a well shall not constitute a determination of correlative water rights. The permittee is notified and by this provision understands that the quantity of water taken from the wells could be reduced by the Commission in the future. This permit is not a commitment that the pump capacities permitted here or even some lesser amounts are guaranteed in the future.

4. The applicant shall comply with all applicable laws, rules, and ordinances.

5. The applicant shall provide and maintain approved meters or other appropriate devices or means for measuring and reporting total water usage. Water usage shall be measured on a monthly basis and reported to the Commission.

6. The well construction/pump installation permit may be revoked if work is not started within six (6) months after the methodology and analysis of the test results are agreed upon. The work proposed in the well construction/pump installation permit application shall be completed within two years from the date of permit issuance.

7. That the pumping tests shall follow the aquifer pump testing protocol established by the Commission. Prior to conducting the aquifer pump tests, the applicant shall mutually agree with the Commission staff to a methodology and analysis of the test results.

8. The following shall be submitted to the Commission within thirty (30) days after completion of work:
   a. Well completion reports.
   b. Elevations of wells (referenced to mean sea level, msl) survey by a Hawaii-licensed surveyor.
   c. As-built sectional drawings of the wells.
   d. Plot plan and map showing the exact locations of the wells.
   e. Complete pumping test records, including time, pumping rate, drawdown, chloride content, and other water quality data.

ATTACHMENT B
REGULATION BRANCH
Commission on Water Resource Management

FROM: B
DATE: 9/27
FILE IN: 1805-10T012

TO: INIT: PLEASE: REMARKS:
1 E. SAKODA See Me
   K. Oshiro Call
   D. Higa Review & Comment
   R. Hardy Take Action
   J. Zhang Investigate & Report
   X: Investigate & Report
   X: Acknowledge Receipt
   X: Draft Reply
   X: Type Final
   X: Xerox ___ copies

FOR YOUR:
   R. LOUI Approval
   S. Kokubun Signature
   G. MATSUMOTO Information
   Y. SHIROMA

Ed,
Kohaku Partner
address in

I'm updated WVP database.
MINUTES

FOR THE MEETING OF THE COMMISSION ON WATER RESOURCE MANAGEMENT

DATE: September 15, 1993
TIME: 1:30 p.m.
PLACE: Mitchell Pauole Community Center
Conference Room
Kaunakakai, Molokai, Hawaii

ROLL CALL: Chairperson Ahue called the meeting of the Commission on Water Resource Management to order at 1:47 p.m.

The following were in attendance:

MEMBERS: Mr. Keith Ahue
Mr. Richard Cox
Mr. Guy Fujimura
Dr. John L. Lewin
Mr. Robert Nakata

EXCUSED: Mr. J. Douglas Ing

STAFF: Ms. Rae Loui
Mr. Edwin Sakoda
Mr. Roy Hardy
Ms. Lyann Mizuno
Ms. Lenore Nakama
Ms. Sharon Kokubun

COUNSEL: Mr. William Tam

OTHERS:

Dan Kuhn
Wilma Grambusch
Mike Foulkes
Edwin Miranda
Paul Matsuo
Robert Granger
Charley Ice
Gene Ferguson
Rick Ten Cate
Duane Cranney
June Kapuni-Dearson
Joseph Wampler
Daniel Bennet
Keli Kapuni
Neal Wu

All written testimonies submitted at the meeting are filed in the Commission office and are available for review by interested parties. Some items were taken out of sequence to accommodate requests by applicants or interested parties.

ITEM 1 MINUTES OF THE SEPTEMBER 1, 1993 MEETING

Unanimously approved (Cox/Nakata).
ITEM 2  OLD BUSINESS/ANNOUNCEMENTS

Ms. Loui announced the public meeting which would be held that evening at Molokai High School to hear testimony for proposed reservations of water for the Department of Hawaiian Home Lands (DHHL).

ITEM 3  RESUBMITTAL: SEA LIFE PARK HAWAII APPLICATIONS FOR WATER USE PERMIT, WELLS 1, 2, 3, & A (WELL NOS 1939-01 & 02, 1940-11 & 02), WAIMANALO GROUND WATER MANAGEMENT AREA, OAHU

Mr. Steve Kaiser, representing the applicant, stated that a request was sent to the Department of Land and Natural Resources to determine if a water license is required.

Mr. Martin of Native Hawaiian Advisory Council presented testimony (copy in Commission files).

Unanimously approved as submitted (Lewin/Cox).

ITEM 4  APPOINTMENT OF HEARINGS MASTERS

Unanimously approved (Lewin/Nakata).

ITEM 5  HOUSING FINANCE AND DEVELOPMENT CORPORATION APPLICATION FOR A PUMP INSTALLATION PERMIT, WAHIKULI IRRIGATION WELL (WELL NO. 5440-01), WAHIKULI, MAUI

Mrs. Grambusch asked if any allotment for housing was made for native Hawaiians. Mr. Neal Wu, representing HFDC, had no response. Mrs. Grambusch asked for an allotment for native Hawaiians to go with the permit if water is approved for the project.

Chairperson Ahue stated that the matter was reviewed by OHA. If the project is on ceded lands and there are revenues, OHA would be entitled to 20% of the revenues.

Unanimously approved (Cox/Nakata).

ITEM 6  KALAELOA PARTNERS, L.P. AMENDMENT OF A WATER USE PERMIT AND APPLICATION FOR A WELL CONSTRUCTION PERMIT, KALAELOA WELLS PW-7 TO 9 (WELLS NOS. 1805-10-12), EWA BEACH, OAHU

Unanimously approved (Nakata/Cox).

ITEM 7  HAWAIIAN RESEARCH LTD. APPLICATION FOR A WATER USE PERMIT, KAMILOLOA GROUND WATER MANAGEMENT AREA, MOLOKAI

Unanimously approved (Nakata/Lewin).
ITEM 8  DAVID W. CURTIS, R.M. GRANGER, KAWELA PLANTATION
HOMEOWNERS ASSOCIATION, JOHN UAEA, SR., AND MAUI
DEPARTMENT OF WATER SUPPLY APPLICATIONS FOR WATER USE
PERMITS, KAWELA GROUND WATER MANAGEMENT AREA, MOLOKAI

Ms. Grambusch objected to the amount of water being requested by the
Kawela Plantation from the Kawela Aquifer. She felt the evening meeting
on reservation of water should have taken place before the Commission
meeting because all the applications being heard are affected by reservation
of water.

A Petition to Intervene was filed by Michael Foulkes on behalf of Wilma
Kamakana Grambusch, pursuant to the right to a contested case hearing
under Section 174C-60 (see Commission files). Mr. Foulkes reviewed the
petition asking for deferral of the applications.

Mr. Tam stated that the objector (Mrs. Grambusch) must file an application
to be a party in a contested case hearing within ten days detailing the grounds
for her objections so a determination on standing can be made. If she has
legal standing on all five applications a public hearing will be held.

Unanimously approved for deferral for a public hearing process to possibly
be held on November 10, 1993. Existing uses may continue. (Lewin/Cox).

ITEM 9  DEPARTMENT OF HAWAIIAN HOME LANDS AND MAUI DEPARTMENT
OF WATER SUPPLY APPLICATIONS FOR WATER USE PERMITS,
KUALAPUU GROUND WATER MANAGEMENT AREA, MOLOKAI

1. DHHL Well Nos. 0801-01 & 02: Mr. Charley Ice, representing the
   Department of Hawaiian Home Lands, stated that the existing amount
   is acceptable but they would eventually have to come back to the
   Commission to request additional irrigation and potable water for
   future developments.

2. DWS Well No. 1059-01: Ms. Ellen Kraftsow of the Maui Department
   of Water Supply requested an amendment to 36,000 gpd (the amount
   used to currently serve the customers in Kalae) instead of 25,000 gpd
   being recommended.

   NHAC presented testimony (see Commission files) asking that the
   Commission records reflect "DHHL's continuing and increasing reliance
   upon the principle that their right of first call will be effectuated with
   a sense of immediacy".

   1. Unanimously approved (Nakata/Cox).

   2. Unanimously approved with an amended water use of 36,000 gpd
      (Nakata/Cox).

ITEM 10  MOLOKAI RANCH, LTD. APPLICATION FOR WATER USE PERMIT,
MANAWAINUI GROUND WATER MANAGEMENT AREA, MOLOKAI

Mrs. Wilma Grambusch stated her concerns in regards to the wetland areas
that may be affected by the applicant's request.
Chairperson and Members
Commission on Water Resource Management

July 28, 1993

Mr. Ice (DHHL) said the first of the four wells appear to be an existing use, therefore they have no objections. The other three wells appear to be new uses and are upgradient of Hawaiian Home lands. Withdrawals could affect salinity for future uses on Hawaiian Home lands. DHHL recommends monitoring the salinity of water and conditioning any future use upon the means of future uses on Hawaiian Home lands.

Ms. Collette Machado asked Molokai Ranch what the plans were for the land because the community has not been kept informed of the development plans. Until plans are made known, their permits should be denied.

The applicant was asked to provide written information on the specific uses for the water use being requested. The following actions were taken on the four recommendations made by staff in regards to the issuance of interim water use permits:

1. Unanimously approved to deny without prejudice the issuance of an interim water use permit for 150,000 gpd from the Ooia Dug Well (Cox/Lewin).

2. Unanimously approved the issuance of an interim water use permit for use of 600,000 gpd for the Orca Shaft #1 and Orca #2 Wells (Cox/Lewin).

3. Unanimously approved the issuance of an interim water use permit for use of 40,000 gpd from Orca #3 (Cox/Lewin).

4. Unanimously approved for deferral to the November 10, 1993 meeting on Molokai, the request for 40,000 gpd of water from the Orca #3 Well (Cox/Lewin).

Mr. Urauchi asked that the acreage of land be corrected to 0.25 acre and not 25 acres.

Mrs. Osborne explained the water would be used to irrigate established plantings.

Chairperson Ahue stated that the resolution of the issues raised by the Historic Preservation Division is not determined by the Commission. He asked that Mrs. Osborne work with staff.

Ms. Collette Machado of the Molokai Burial Council asked that the application be denied because of pending charges and fines against Mrs. Osborne for deliberate disturbance of a burial site.

Dr. Lewin asked for A.G. opinion in regards to the burial site since the well in question does not affect the site. Mr. Tam stated that the Commission can act independently of any action with the burial council and the Historic Preservation Division.

Ms. Ellen Kraftsow of the Maui Department of Water Supply requested that the water use be amended to 185,000 gpd instead of the stated 171,000 gpd.
Ms. Grambusch was concerned that 1) the County of Maui needs to be more precise on the amount of water they need and 2) questioned if the County was conforming to the safe drinking water act.

Dr. Lewin stated that he did check with the Safe Drinking Water Program and since 1992 the County has complied with the Safe Drinking Water Act.

The following actions were taken on the above three applications:

1. Urauchi: defer to the November 10, 1993 meeting. Applicant to submit more detailed information for the proposed water use being requested (Lewin/Cox).

2. Osborne: defer to the November 10, 1993 meeting. Applicant to submit written plans for use of the water being requested and to supply information on the source of the existing irrigation system (Lewin/Cox).

3. Maui Department of Water Supply: Unanimously approved for the amended use of 185,000 gpd (Lewin/Nakata).

ITEM 12 KAINALU RANCH APPLICATION FOR A WATER USE PERMIT, WAIALUA GROUND WATER MANAGEMENT AREA, MOLOKAI

Dr. Lewin requested the applicant to submit a written request to continue the permit process for a well construction, pump installation, and water use permits. Recommendation was made to defer action until the next meeting to be held on Molokai.

Unanimously approved for deferral (Lewin/Nakata).

ITEM 13 DEPARTMENT OF AGRICULTURE APPLICATION FOR A WATER USE PERMIT, WAIKOLU GROUND WATER MANAGEMENT AREA, MOLOKAI

On the advice of the Attorney General, Chairperson Ahue called for a deferral of this application as recommended by staff due to objections raised and stated that a public hearing would need to be held. A tentative date of November 10, 1993 was set for the public hearing to be held on Molokai. The Department of Agriculture may continue pumpage of the existing source.

Testimonies were presented by parties for as well as against the project. All written testimonies received are on file in the Commission office.

ITEM 14 OTHER BUSINESS

1. In regards to the letter from Lanai Company raising questions on the sustainable yield and institutional problems with the Land Use Commission, Mr. Cox felt it should be reviewed with the staff, the Commission, and John Mink.

Ms. Loui said a briefing would be scheduled at a later date.
Chairperson and Members
Commission on Water Resource Management July 28, 1993

2. Dr. Lewin asked for the following items to be brought up for future action:

a. The Water Quality Plan - the Code Review Commission and the Commission should meet to review the recommended actions relating to overlapping enforcement and adding additional enforcement to certain areas of the Water Code so water quality work can be carried out more effectively.

b. Issues on the Caprock - a hearing will be held in the near future, suggest staff from the DOH and CWRM attend the hearing and register concerns. Long-term effects of the harbor should be considered in terms of caprock water resources.

ADJOURNMENT The meeting was adjourned at 5:20 p.m.

Respectfully submitted,

SHARON S. KOKUBUN
Secretary

APPROVED AS SUBMITTED:

RAE M. LOUI, Deputy Director
WELL SEALING/ABANDONMENT PERMIT

for

Kalaeloa-Campbell Well
No Well Number
Campbell Industrial Park, Oahu

TO: Estate of James Campbell

In accordance with Chapter 13-168, Water Use, Wells, and Stream Diversion Works, your application to seal and abandon an 8-inch diameter, uncased, 83 ft. deep well (No well number) at Tax Map Key: 9-1-15: 12, adjacent to the Desalination Plant on Kalaeloa Boulevard, is approved subject to the following conditions:

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

2. The Well Abandonment Report form shall be submitted to the Commission within 30 days after completion of the work.

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

4. This permit may be revoked if work is not started within six months of the date of approval or if work is suspended or abandoned for six months. The work shall be completed within two years of the date of approval.

KEITH W. AHUE, Chairperson
Commission on Water Resource Management
SEP 17 1993
Date of Approval

Enc. (Well Abandonment Report form)
cc: USGS
Department of Health
   Safe Drinking Water Branch
   Solid and Hazardous Waste Branch
   Ground Water Protection Program
Honolulu Board of Water Supply
APPLICATION FOR PERMIT

1. APPLICANT: (may be a, b, or c, but all must be filled in)
   (a) WELL OWNER
   Firm/Name: Estate of James Campbell
   Contact Person: Los Hoag
   Address:

   (b) LANDOWNER
   Firm/Name: same as well owner
   Contact Person: 
   Address:

   (c) CONTRACTOR
   Firm/Name: Roscoe Moss Hawaii, Inc.
   Address:
   Contractor's C-57 License No: C-16437

2. WELL LOCATION/NAME: Kalaeloa Blvd.
   Island: Oahu
   Address: Adjacent to Desalination Plant

3. (a) PROPOSED WORK: 
   □ Drill New Well
   □ Modify Existing Well
   □ Redrill
   □ Install New Pump
   □ Replace Pump
   □ Modify Pump
   □ Alter Location
   * Be sure to complete and submit well abandonment report upon completion of work.

(b) WELL TYPE: 
   □ Dug
   □ Bored
   □ Driven
   □ Drilled
   □ Radial
   Is this well a part of a battery of wells?
   □ Yes
   □ No
   (Briefly describe and fill in the diagram on the back of this form.)

4. PROPOSED PUMP INFORMATION:
   Rated Pump Capacity: N/A gallons per minute
   Pump Type: □ Deep Well Turbine □ Rotary
   Submersible □ Rotary-Displacement □ Reciprocating
   Centrifugal □ Rotary-Gear □ Impulse
   Motor: □ Diesel □ Gas
   □ Electric, rated horsepower of:

5. PROPOSED USE: 
   □ Municipal (including hotels, stores, etc.)
   □ Domestic (individual, noncommercial water use)
   □ Irrigation (crop)
   □ Other (explain):
   State Land Use District: □ Urban □ Agriculture □ Rural □ Conservation
   County Zoning (describe):

   (If more space is needed, continue below under remarks, explanations.)

6. (a) PROPOSED AMOUNT OF WITHDRAWAL:
   □ N/A gallons per day
   (If more space is needed, continue on back)

(b) METHOD OF FLOW MEASUREMENT:
   □ Flow-meter □ Open-pipe □ Office Plate □ Weir

7. PENDING ACTIONS: □ CDUA □ SMA □ EIS □ EA □ NONE □ Other (explain)

8. REMARKS, EXPLANATIONS:
   This well was discovered during grading operations of property. It is of unknown origin possibly drilled by Oahu Sugar years ago.
   There is no casing in well. Total depth 83' Diameter 8".

Well Owner: Estate of James Campbell
Landowner: Estate of James Campbell
Contractor: Roscoe Moss Hawaii

Signature: ____________________________
Date: ____________________________

For Official Use Only:
Date Received: ____________________________
Date Accepted: ____________________________
Filed Checked By: ____________________________
Date: ____________________________

Longitude: ____________________________
Latitude: ____________________________
Aquifer System Name: ____________________________
State Well No. 5644 WCR Fe
Briefly describe the proposed work: Sealing

We propose to abandon this well by sealing its entirety with neat cement.

PROPOSED SECTION OF WELL

Elevation at top of casing ________ ft., msl.

Ground Elev. Approx. 60 ft., msl.

Cement Grout 83 ft.

Hole Dia. 8 in.

Total Depth 83 ft.

Rock Packing 0 ft.

Solid Casing:

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Casing: / Perforated / Screen

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<td>Openings</td>
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Open Hole:

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<td>Diameter</td>
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**WELL COMPLETION REPORT**

1. **STATE WELL NO.**: 1805-12  
   **WELL NAME**: South Well #9  
   **ISLAND**: Oahu

2. **LOCATION**: Address  
   **Tax Map Key**: 9-1-31:23

3. **DRILLING OR PUMP INSTALLATION CONTRACTOR**: Roscoe Moss Hawaii, Inc.

4. **CONTRACTOR'S C-57 LICENSE NUMBER**: C-16437

5. **NAME OF DRILLER WHO PERFORMED WORK**: Tom Leheli

6. **TYPE OF RIG/CONSTRUCTION**: Auger, Core Barrel

7. **DATE OF WELL DRILLING COMPLETION**: 01/10/94  
   **NOTES**: Report must be submitted within 30 days after this date.

8. **GROUND ELEVATION (msl)**: 10 ft.  
   - **Top of Drilling Platform (msl)**: 0 ft.  
   - **Height of Drilling Platform above Ground surface**: 0 ft.  
   - **Bench Mark and Method Used to Determine Ground Elevation**: Estimated -

9. **DRILLER'S LOG**:
   - **Depth (ft.)**:  
     - 0 to 2: **Dirt Fill**  
     - 2 to 20: **Solid Coral Pink**  
     - 20 to 26: **Broken Coral White**  
     - 26 to 34: **Solid Coral White**  
     - 34 to 45: **Loose Coral White**
   - **Rock Description, Remarks, Dates**
   - **Water Level (ft.)**:  
     - 0 to 2:  
     - 2 to 20: 9.6  
     - 20 to 26:  
     - 26 to 34:  
     - 34 to 45:  
   - **Rock Description, Remarks, Dates**
   - **Water Level (ft.)**:  
     - 0 to 2:  
     - 2 to 20:  
     - 20 to 26:  
     - 26 to 34:  
     - 34 to 45:  

   *(If more space is needed, continue on back.)*

10. **TOTAL DEPTH OF WELL BELOW GROUND**: 45 ft.

11. **HOLE SIZE**: 20 inch dia. from 0 ft. to 45 ft. below ground
    - **Dirt Fill**: 0 ft. to 2 ft.
    - **Solid Coral Pink**: 2 ft. to 20 ft.
    - **Broken Coral White**: 20 ft. to 26 ft.
    - **Solid Coral White**: 26 ft. to 34 ft.
    - **Loose Coral White**: 34 ft. to 45 ft.

12. **CASING INSTALLED**:  
    - **11.37 in. I.D. x 0.687 in. wall solid section** to 20 ft. below ground
    - **11.37 in. I.D. x 0.687 in. wall perforated section** to 45 ft. below ground
    - **Type of Perforation**: Saw Slot 53.76 sq. in. ft. openings

13. **ANNULUS**:  
    - **Grout filled from**: 0 ft. below ground to 18 ft. below ground
    - **Gravel packed from**: 18 ft. below ground to 45 ft. below ground

14. **INITIAL WATER LEVEL**: 9.6 ft. below ground. Date and time of measurement

15. **INITIAL CHLORIDE**: ppm  
    **Date and time of sampling**

16. **INITIAL TEMPERATURE**: °F  
    **Date and time of sampling**

17. **DATE OF PUMP INSTALLATION**:  

18. **PUMP INSTALLATION**:  
    - **Pump Type, Make, Serial No.**
    - **Capacity**: gpm
    - **Motor type, H.P., Voltage, rpm**
    - **Depth of Pump intake**: ft. below, which elevation is ft.
    - **Depth of bottom of airline**: ft. below, which elevation is ft.
    - **Pumping Head is**: ft.

19. **PUMPING TESTS**:  
    - **Reference Point (R.P.) used**: , which elevation is ft.
    - **Date**: 01/07/94  
      - **Start water level**: 9.6 ft. below R.P.  
      - **End water level**: 9.6 ft. below R.P.  
      - **Depth of well**: 45 ft. below R.P.

   - **Elapsed Time (hours)**:  
     - **Ave. Q. (gpm)**:  
     - **Draw-down (ft.)**:  
     - **Temp. °F**:  
     - **Start water level**:  
     - **End water level**:  
     - **Depth of well**:  

   *(If more space is needed, continue on back.)*

Remarks:  
*(If more space is needed, continue on back.)*

Contractor (print): Roscoe Moss Hawaii, Inc.  
Title: Field Superintendent

Signature: [Signature]

Date: 2/2/94

---

For Driller's Use:  
Job Name:  
Job No:  

For Official Use:  
Well No: 1805-12  
Well No:  

Longitude: 188 55 77  
Latitude: 21 18 13
Well #9

(1805-12)

2' stick up

18' of cement

20' of solid PVC schedule 80 12'' Pipe

25' slotted PVC schedule 80 12'' Pipe

27' of gravel packing

1 foot cement grout

Total depth 45'

JOB 27-98
Valuela, Pahoa
PUMPING TEST RECORD
for Kalgeler Partners Well 9 (1805-12)

Date: 1/7/94

Description of Well:
1. Elevation: ground surface ____ ft., top of casing ____ ft.,
   rotary table ____ ft., referenced to ____ ft. elevation, msl.
2. Total depth of well ____ ft.; or ____ ft. depth, perforated to ____ ft. depth.
3. ____ in. solid casing to ____ ft. depth, perforated to ____ ft. depth.
4. Static water level on ____ ft. below ground surface, top of casing; or ____ ft. elevation msl
   measured ____ method.

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

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<th>Sample No.</th>
<th>Pumping Rate (gpm)</th>
<th>Airline (feet)</th>
<th>Drawdown (feet)</th>
<th>Chlorides (ppm)</th>
<th>Temp. (C)</th>
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</table>
KNUELOA (ARB) POWER
WELLS 7, 8, & 9
(1805 - 10,11,12)

2' ABOVE GROUND

45' OF TOTAL DEPTH

20' OF SCHEDULE 80 PVC CASING

18' OF GRAVITY KNOCK-OUT

12'' SCHEDULE 80 PVC CASING

26' OF GRAVEL PACK IN THE ANNUITIES

1' OF GRAVITY AT BOTTOM
1. STATE WELL NO. 1805-11 WELL NAME North Well #8 ISLAND Oahu
2. LOCATION: Address [Redacted] Tax Map Key 2-9-3-323
3. DRILLING OR PUMP INSTALLATION CONTRACTOR Roscoe Moss Hawaii, Inc.
4. CONTRACTOR'S C-57 LICENSE NUMBER C-16437
5. NAME OF DRILLER WHO PERFORMED WORK Tom Lehel
6. TYPE OF RIG/CONSTRUCTION Auger, Core Barrel
7. DATE OF WELL DRILLING COMPLETION 01/06/94
8. GROUND ELEVATION (msl) 10.5 ft.
9. DRILLER'S LOG:

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Rock Description, Remarks, Dates</th>
<th>Water Level</th>
<th>Depth (ft)</th>
<th>Rock Description, Remarks, Dates</th>
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<tbody>
<tr>
<td>0 to 2</td>
<td>Dirt Fill</td>
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<td>to</td>
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<tr>
<td>2 to 18</td>
<td>Solid Coral Brown, 9.5</td>
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<td>to</td>
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<tr>
<td>18 to 25</td>
<td>Loose Muddy Coral</td>
<td></td>
<td>to</td>
<td></td>
</tr>
<tr>
<td>25 to 40</td>
<td>Weatherd Coral Brown</td>
<td></td>
<td>to</td>
<td></td>
</tr>
<tr>
<td>40 to 45</td>
<td>Loose Sandy Coral</td>
<td></td>
<td>to</td>
<td></td>
</tr>
</tbody>
</table>

(If more space is needed, continue on back.)

10. TOTAL DEPTH OF WELL BELOW GROUND 45 ft.
11. HOLE SIZE: 20 inch dia. from 0 ft. to 45 ft. below ground

12. CASING INSTALLED:

- 11.37 in. I.D. x .687 in. wall solid section to 20 ft. below ground
- 11.37 in. I.D. x .687 in. wall perforated section to 45 ft. below ground

Type of Percussion: Saw Slot 53.76 sq.in per ft. openings

13. ANNUAL: Grouted from 0 ft. below ground to 18 ft. below ground

Gravel packed from 18 ft. below ground to 45 ft. below ground

14. INITIAL WATER LEVEL 10 ft. below ground. Date and time of measurement 01/03/94
15. INITIAL CHLORIDE ppm Date and time of sampling
16. INITIAL TEMPERATURE °F Date and time of sampling
17. DATE OF PUMP INSTALLATION
18. PUMP INSTALLATION:

Pump Type, Make, Serial No. Capacity ppm
Motor type, H.P., Voltage, rpm
Depth of Pump Intake Setting ft. below ground, which elevation is ft.
Depth of bottom of airline ft. below ground, which elevation is ft.
Pumping Head is ft.

19. PUMPING TESTS:

<table>
<thead>
<tr>
<th>Reference Point (R.P.) used:</th>
<th>which elevation is ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date 01/15/94</td>
<td></td>
</tr>
<tr>
<td>Start water level 10 Ft. below R.P.</td>
<td>Start water level ft. below R.P.</td>
</tr>
<tr>
<td>End water level 10 Ft. below R.P.</td>
<td>End water level ft. below R.P.</td>
</tr>
<tr>
<td>Depth of well 45 Ft. below R.P.</td>
<td>Depth of well ft. below R.P.</td>
</tr>
<tr>
<td>Elapsed Time (hours) Pass PUMP-TEST-DATA ATTACHED</td>
<td></td>
</tr>
<tr>
<td>Draw-down (ft) Cl- Temp.</td>
<td></td>
</tr>
<tr>
<td>Eased Time (hours) Pass PUMP-TEST-DATA ATTACHED</td>
<td></td>
</tr>
<tr>
<td>Draw-down (ft) Cl- Temp.</td>
<td></td>
</tr>
<tr>
<td>0 to 725</td>
<td>650</td>
</tr>
</tbody>
</table>

(If more space is needed, continue on back.)

Remarks:

 Contractor (print) ROSCOE MOSS HAWAII, INC. Title Field Superintendent
Signature For Official Use: 1805-11

For Official Use: 0 Wall No. 1805-11

For Official Use: 1805-11

For Official Use: 1805-11

For Official Use: 1805-11
Well #8 (1805-11)

2' stick up

18' of cement

20' of solid PVC schedule 80 12" pipe

25' slotted PVC schedule 80 12" pipe

27' of gravel packing

1 foot cement grout

Total depth 45'
**PUMPING TEST RECORD**

for

Kualoa Ranches Well 8 (1805-11)

Oralu Island 27-92-1 Project or Job No. 15-1994

---

**Description of Well**

1. Elevation: ground surface ft., top of casing ft., rotary table ft., referenced to benchmark.
2. Total depth of well 45 ft.; or ft. elevation, msl
3. 12" in. solid casing to 20' ft. depth, perforated to 45' ft. depth
4. Static water level on 19 ft. below ground surface, top of casing; or ft. elevation msl measured method

**Description of Pump and Pump Setting**

5. 6" type pump with stage bowl assembly
6. Gasoline (diesel) electric, power with horsepower
7. Shaft speed: rpm at gpm flow
8. Depth of pump intake: 33'10" ft. below; or ft. elev. msl
9. Depth of airline bottom: 31'7 ft. below; or ft.elev. msl
10. Center of gage: ft. elev., msl. Flow measured with,

**Date & Time | Sample No. | Pumping rate (gpm) | Airline (feet) | Drawdown (feet) | Chlorides (ppm) | Temp. (°F) | Cond. (mmhos 25°C)**
---|---|---|---|---|---|---|---
7:40am | | 0 | 9.1 A1 | meter reading | 72 | 3 | 365.00 |
7:45 | Started Pumping | | | | | |
7:48 | | 5 | 7.4 | | | |
7:52 | | 735 | 6 | | | |
7:55 | | 920 | 4.4 | | | |
8:00 | | 1070 | 2.1 | | | |
8:05 | Surged the Well | | | | | |
8:15 | | 1070 | 2.5 | | | |
8:20 | Surged the Well | | | | | |
8:25 | | 1070 | 2.65 | | | |
8:30 | Surged well | | | | | |
8:35 | | 1070 | 2.85 | | | |
8:45 | Surged well | | | | | |
8:50 | | 1070 | 3.05 | | | |
9:00 | Surged Well | | | | | |
9:10 | | 1070 | 3.2 | pumped clean | | |
9:10 | Surged well | | | | | |
9:35 | | 1070 | 3.35 | | | |
10:00 | Surged well | | | | | |
10:05 | | 1070 | 3.35 | | | |
10:30 | Surged well | | | | | |

Sheet No. 1 of _____ Sheets
<table>
<thead>
<tr>
<th>Date &amp; Time</th>
<th>Sample No.</th>
<th>Pumping rate (qpm)</th>
<th>Airline Psi (feet)</th>
<th>Drawdown (feet)</th>
<th>Chlorides (ppm)</th>
<th>Temp. (°F)</th>
<th>Cond. (mmhos 25°C)</th>
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<td>11:30</td>
<td>start test pump</td>
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</tr>
<tr>
<td>11:32</td>
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<td>11:35</td>
<td>853</td>
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<tr>
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<td>850</td>
<td>5.45</td>
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<tr>
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<td>800 gal</td>
<td>56.47 psi 5.45</td>
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<tr>
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<td>1000 gal</td>
<td>55.25</td>
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</tr>
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10:57 shut down Air line recovery 9.1 instantly meter reading
**WELL COMPLETION REPORT**

**State of Hawaii**  
**COMMISSION ON WATER RESOURCE MANAGEMENT**  
**Department of Land and Natural Resources**

**1. STATE WELL NO.** 1805-10  
**WELL NAME** KALAKOA P-7  
**ISLAND** Oahu  
**2. LOCATION:** Address [redacted]  
**Tax Map Key** 9-1-31:23

**3. DRILLING OR PUMP INSTALLATION CONTRACTOR**  
Roscoe Moss Hawai`i, Inc.  
**Contractor (print)** Roscoe Moss Hawai`i, Inc.

**4. CONTRACTOR'S C-57 LICENSE NUMBER** C-16437  
**5. NAME OF DRILLER WHO PERFORMED WORK** Lance Mattson  
**6. TYPE OF RIG/CONSTRUCTION** Auger, Core Barrel

**7. DATE OF WELL DRILLING COMPLETION** 12/07/93  
**(NOTE Report must be submitted within 30 days after this date)**

**8. GROUND ELEVATION (msl)** 9.7 ft.  
Top of Drilling Platform (msl) 10 ft.

**9. DRILLER'S LOG:**

<table>
<thead>
<tr>
<th>Depth (ft.)</th>
<th>Rock Description, Remarks, Dates</th>
<th>Water Level (ft.)</th>
<th>Depth (ft.)</th>
<th>Rock Description, Remarks, Dates</th>
<th>Water Level</th>
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<tr>
<td>2 to 14</td>
<td>Solid Coral Brown</td>
<td>9.5</td>
<td>34 to 45</td>
<td>Loose Coral White</td>
<td>9.5</td>
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<td>14 to 18</td>
<td>Solid Coral Pink</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>18 to 24</td>
<td>Loose Coral Pink</td>
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</tr>
<tr>
<td>24 to 27</td>
<td>Loose Coral White</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24 to 34</td>
<td>Weathered Coral Tan</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**(If more space is needed, continue on back.)

**10. TOTAL DEPTH OF WELL BELOW GROUND** 45 ft.  
**HOLE SIZE:** 20 inch dia. from 0 ft. to 45 ft. below ground

**11. CASING INSTALLED:**  
11.37 in. I.D. x 0.687 in. wall solid section to 20 ft. below ground  
11.37 in. I.D. x 0.687 in. wall perforated section to 45 ft. below ground

**12. ANNULUS:**  
Grouted from 0 ft. below ground to 18 ft. below ground  
Gravel packed from 0 ft. below ground to 45 ft. below ground

**14. INITIAL WATER LEVEL** 10 ft. below ground. Date and time of measurement 11/01/93  
**15. INITIAL CHLORIDE** ppm Date and time of sampling  
**16. INITIAL TEMPERATURE** 80°F Date and time of sampling  
**17. DATE OF PUMP INSTALLATION**

**18. PUMP INSTALLATION:**

**Pump Type, Make, Serial No.**  
**Motor type, H.P., Voltage, rpm**  
**Depth of Pump Intake Setting** ft. below ground, which elevation is ft.  
**Depth of bottom of airline** ft. below ground, which elevation is ft.

**Pumping Head is ft.**

**19. PUMPING TESTS:**

**Reference Point (R.P.) used:** Ground, which elevation is 10 ft.  
**Start water level** 10.2 ft. below R.P.  
**End water level** 10.2 ft. below R.P.

**Depth of well** 45 ft. below R.P.  
**Elapsed Time (hours)**  
**Rate (gpm)**  
**Draw-down (ft.)**  
**Ch. (ppm)**  
**Temp. **  
**Elapsed Time (hours)**  
**Rate (gpm)**  
**Draw-down (ft.)**  
**Ch. (ppm)**  
**Temp. **  

**STE TEST DATA ATTACHED**  
**LONG TERM DATA ATTACHED**

**(If more space is needed, continue on back.)

**Remarks:**

**(If more space is needed, continue on back.)

**Contractor (print)** ROSCOE MOSS HAWAI`I, INC.  
**Title** Field Superintendent

**Signature** [Signature]

**Date** 2/2/94

**For Officials Use:**  
**For Official Use:** Q  
**Well No.** 1805-10  
**Long.** 158° 05' 58"  
**Lati.** 21° 18' 13"
Well #7 (1809-10)

2' stick up

18' of cement

20' of solid PVC schedule 80
12" pipe

25' slotted PVC schedule 80
12" pipe

27' of gravel packing

1 foot cement grout

Total depth 45'
PUMPING TEST RECORD
for

KALAELOA PARTNERS  Well 7 (1805-10)
(Name)  (No.)

OAHU  Island  KALAELOA  Project or Job No. 27-93R1993

1. Elevation: ground surface _____ ft., top of casing _____ ft.,
   rotary table _____ ft., referenced to ____ ft. benchmark.
2. Total depth of well 45' ft.; or ft. elevation, msl
3. ____ in. solid casing to 20 ft. depth, perforated to 45 ft. depth
4. Static water level on 19:19 ft. below ground
   surface, top of casing; or ____ ft. elevation msl
   measured ______ method

Description of Pump and Pump Setting--
5. ______ type pump with ______ stage bowl assembly
6. Gasoline diesel, electric, power with ______ horsepower
7. Shaft speed: ______ rpm at ______ qpm flow
8. Depth of pump intake: 33' 10" ft. below ground or ______ ft. elev. msl
9. Depth of airline bottom: 32' 7" ft. below ground or ______ ft. elev. msl
10. Center of gage: ______ ft. elev., msl. Flow measured with ______
11. Test conducted by ______

<table>
<thead>
<tr>
<th>Date &amp; Time</th>
<th>Sample No.</th>
<th>Pumping rate</th>
<th>Airline</th>
<th>Drawdown</th>
<th>Chlorides</th>
<th>Temp.</th>
<th>Cond.</th>
</tr>
</thead>
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<td>0</td>
<td>8.8</td>
<td>8.8</td>
<td>meter</td>
<td>reading</td>
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</tr>
<tr>
<td></td>
<td>8:20</td>
<td>540</td>
<td>8.3</td>
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<td></td>
</tr>
<tr>
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<tr>
<td></td>
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<tr>
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<td>900</td>
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<td>12:15 am</td>
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<td>1:00 pm</td>
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Sheet No. 1 of ____ Sheets
**PUMPING TEST RECORD**

for

**Kaaheleloa – Well 7**

**Oahu Island Kaaheleloa**

**Project or Job No. 17-98 R 19**

<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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**Shut down meter reading:** 72475400
First Kalezela Well (PW-7 or 1805-10)

<table>
<thead>
<tr>
<th>GPM</th>
<th>Drawdown (ft)</th>
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</thead>
<tbody>
<tr>
<td>500</td>
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<td>715</td>
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<tr>
<td>840</td>
<td>2.66</td>
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<tr>
<td>1100</td>
<td>4.27</td>
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</table>

Step-Drawdown after pump started, Dec. 6, 1993

<table>
<thead>
<tr>
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<th>Drawdown (ft)</th>
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</thead>
<tbody>
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<td>540</td>
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<td>705</td>
<td>2.01</td>
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<tr>
<td>920</td>
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<tr>
<td>1145</td>
<td>5.54</td>
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</tbody>
</table>
WELL CONSTRUCTION AND PUMP INSTALLATION PERMIT

for

Kalaeloa Wells PW-7 to 9
Well Nos. 1805-10 to 12
Ewa Beach, Oahu

TO: Kalaeloa Partners, L.P.

In accordance with the Department of Land and Natural Resources Administrative Rules, Section 13-168, entitled "Water Use, Wells, and Stream Diversion Works", your application to construct, test, and install pumps in Kalaeloa Wells PW-7 to 9 (Well Nos. 1805-10 to 12), for industrial cooling water use, is approved subject to the following conditions:

1. The Commission shall be notified before work commences.

2. The well construction/pump installation permit shall be for construction, testing, and installation of 800 gpm capacity, or less, pumps in the wells, as determined by the pumping test results. The applicant shall coordinate with the Commission and conduct pumping tests in accordance with the protocol established by the Commission. A means to accurately measure water levels, acceptable to the Commission, shall also be provided. The applicant shall submit to the Commission the test results and proposed permanent pump information, based on the tests, for approval by the Chairperson. No permanent pumps may be installed and no water used from the wells without the Chairperson's approval.

3. The proposed use shall not adversely affect existing or future legal uses of water in the area, including any surface water or established instream flow standards. This permit or the authorization to construct and pump water from a well shall not constitute a determination of correlative water rights. The permittee is notified and by this provision understands that the quantity of water taken from the wells could be reduced by the Commission in the future. This permit is not a commitment that the pump capacities permitted here or even some lesser amounts are guaranteed in the future.

4. The applicant shall comply with all applicable laws, rules, and ordinances.

5. The applicant shall provide and maintain approved meters or other appropriate devices or means for measuring and reporting total water usage. Water usage shall be measured on a monthly basis and reported to the Commission.
6. The well construction/pump installation permit may be revoked if work is not started within six (6) months after the methodology and analysis of the test results are agreed upon. The work proposed in the well construction/pump installation permit application shall be completed within two years from the date of permit issuance.

7. That the pumping tests shall follow the aquifer pump testing protocol established by the Commission. Prior to conducting the aquifer pump tests, the applicant shall mutually agree with the Commission staff to a methodology and analysis of the test results.

8. The following shall be submitted to the Commission within thirty (30) days after completion of work:
   a. Well completion reports.
   b. Elevations of wells (referenced to mean sea level, msl) survey by a Hawaii-licensed surveyor.
   c. As-built sectional drawings of the wells.
   d. Plot plan and map showing the exact locations of the wells.
   e. Complete pumping test records, including time, pumping rate, drawdown, chloride content, and other water quality data.

KEITH W. AHUE, Chairperson
Commission on Water Resource Management
SEP 29 1993
Date of Issuance

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.

Applicant's Signature: ___________________________ Date: ________________

Printed Name: __________________________________________

Firm or Title: __________________________________________

Please sign and return one copy of this permit to the Commission and retain a copy for your record.

cc: USGS
   Department of Health
   Safe Drinking Water Branch
   Ground Water Protection Program
   Solid and Hazardous Waste Branch
   Honolulu Board of Water Supply
MEMORANDUM

TO: Rae M. Loui, Deputy Director
Commission on Water Resource Management

FROM: Don Hibbard, Administrator
Historic Preservation Division

SUBJECT: Well Construction Permits, Well Nos. 1805-10, -11, and -12, (Kalaeloa Partners)
Honouliuli, Ewa, O'ahu
TMK: 9-1-31: 23

A review of our records shows that this parcel has been inventoried for historic sites and that data recovery excavations have been successfully completed at the sites that were determined to be significant. A report of these excavations can be found in "Archaeological and Paleontological Investigations at the Proposed HECO Barbers Point Generating Station," by Bertell D. Davis. Data recovery excavations have mitigated the effects of development on historic sites at this parcel.

TD:jt
The Honorable Keith W. Ahue, Chairperson
Commission on Water Resource Management
Department of Land and Natural Resources

Dear Mr. Ahue:

Thank you for the opportunity to respond to this application for the following well construction and pump installation permits:

O'ahu
   Kalaeloa PW 7-9 Wells (1805-10,11,12)
   Makaha IV (3010-12)
Hawaii
   Keopu Mauka (3957-01)
   Onomea-Lutkenhouse (4905-02)
   Big Island Country Club (4950-01)

The Department of Hawaiian Home Lands has no objections to these projects. We are unable to evaluate the Kalaeloa applications, however, without additional information. The application does not explain why existing wells are being replaced. Also, we understand that a Caprock Aquifer Study was intended to establish a better understanding of proper management of this resource; we are unaware how these wells might be affected by the findings of this study.

Please direct any questions to Ben Henderson in our Planning Office.

Warmest aloha,

Hoaliku L. Drake, Chairman
Hawaiian Homes Commission
Mr. Thomas Arizumi, Chief
Environmental Management Division
State Department of Health
Five Waterfront Plaza

Attn: Mr. Dennis Tulang

Dear Mr. Tulang:

Well Construction and Pump Installation Permit Application

Please review the following permit applications pursuant to your area of concern and submit your comments to us by AUG - 2 1993

<table>
<thead>
<tr>
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</tbody>
</table>

Should you have any questions, please contact the Commission on Water Resource Management staff at 587-0225.

Sincerely,

[Signature]

RAE M. LOUI
Deputy Director

Response:
( ) We have no comments
( ) We have no objections
( ) Comments attached
( ) Additional information requested
( ) Extended review period requested

Contact Person: __________________________ Phone: _______________________
Signed: ________________________________ Date: ________________________
Mr. Thomas Arizumi, Chief
Environmental Management Division
State Department of Health
Five Waterfront Plaza
Attn: Mr. William Wong

Dear Mr. Arizumi:

Well Construction and Pump Installation Permit Application

Please review the following permit applications pursuant to your area of concern and submit your comments to us by Aug 2, 1993.

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Should you have any questions, please contact the Commission on Water Resource Management staff at 587-0225.

Sincerely,

RAE M. LOUI
Deputy Director

JZ:ky
Enc.

Response:
( ) We have no comments
( ) We have no objections
( ) Comments attached
( ) Additional information requested
( ) Extended review period requested

Contact Person: ____________________________ Phone: ____________________________
Signed: ____________________________ Date: ____________________________
MEMORANDUM

TO: Honorable Hoaliku L. Drake, Director
   Department of Hawaiian Home Lands

   Mr. Clayton H.W. Hee, Chairman & Trustee At Large
   Office of Hawaiian Affairs

FROM: Keith W. Ahue, Chairperson

SUBJECT: Well Construction & Pump Installation Permit Applications

Please review the following permit applications and submit your comments to us by AUG - 2 1993

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Should you have any questions, please contact the Commission on Water Resource Management staff at [contact information]

JZ:ky
Enc.

Response:
( ) We have no comments
( ) We have no objections
( ) Comments attached
( ) Additional information requested
( ) Extended review period requested

Contact Person: ____________________________ Phone: ____________________________
Signed: ____________________________ Date: ____________________________
MEMORANDUM

TO: Don Hibbard, Director
   Historic Preservation Program

FROM: Rae M. Loui, Deputy Director
      Commission on Water Resource Management

SUBJECT: Well Construction & Pump Installation Permit Applications

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Should you have any questions, please contact the Commission on Water Resource Management staff at [REDACTED]

JZ:ky
Enc.

Response:
( ) We have no comments
( ) We have no objections
( ) Comments attached
( ) Additional information requested
( ) Extended review period requested

Contact Person: ___________________________ Phone: _______________
Signed: ___________________________ Date: _______________
Ms. Marjorie Ziegler  
Sierra Club Legal Defense Fund, Inc.  

Dear Ms. Ziegler:

Well Construction and Pump Installation Permit Application

Please review the following permit applications pursuant to your area of concern and submit your comments to us by AUG - 2 1993

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Should you have any questions, please contact the Commission on Water Resource Management staff at ...  

Sincerely,

RAE M. LOUI  
Deputy Director

JZ:ky  
Enc.

Response:
( ) We have no comments  
( ) We have no objections  
( ) Comments attached  
( ) Additional information requested  
( ) Extended review period requested

Contact Person: ______________________  
Phone: _____________________________

Signed: ____________________________  
Date: _____________________________
Mr. Kazu Hayashida  
Manager & Chief Engineer  
Board of Water Supply  
City & County of Honolulu

Dear Mr. Hayashida:

Well Construction and Pump Installation Permit Application

Please review the following permit applications pursuant to your area of concern and submit your comments to us by AUG - 2 1993.

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Should you have any questions, please contact the Commission on Water Resource Management staff at [contact information]

Sincerely,

[Signature]

RAE M. LOUI  
Deputy Director

Response:
( ) We have no comments  
( ) We have no objections  
( ) Comments attached  
( ) Additional information requested  
( ) Extended review period requested

Contact Person: ___________________________ Phone: ___________________________

Signed: ___________________________ Date: ___________________________
Mr. Tom Nance
Tom Nance Water Resource Engineering

Dear Mr. Nance:

We have received your applications and filing fee ($75.00) for permits to construct Kalaeloa Wells PW-7, 8, 9 (Well Nos. 1805-10, 11, 12) at Ewa Beach, Oahu, (TMK 9-1-31:23). We are reviewing the applications for completeness.

Should you have questions, please call the Commission on Water Resource Management staff at

Sincerely,

RAE M. LOUI
Deputy Director

cc: Mr. Jeffrey W. Moore, Kalaeloa Partners, L.P.
REGULATION BRANCH
Commission on Water Resource Management

FROM: __________________________ DATE: ___________ FILE IN: ______________

TO:  
   __ __ E. SAKODA  
   __ __ K. Oshiro  
   __ __ D. Higa  
   __ __ R. Hardy  
   __ __ J. Zhang  
   __ __ _______  
   __ __ _______  
   __ __ _______  
   __ __ _______  

INIT:  
   __ __ E. SAKODA  
   __ __ K. Oshiro  
   __ __ D. Higa  
   __ __ R. Hardy  
   __ __ J. Zhang  
   __ __ _______  
   __ __ _______  
   __ __ _______  
   __ __ _______  

PLEASE:  
   __ __ See Me  
   __ __ Call  
   __ __ Review & Comment  
   __ __ Take Action  
   __ __ Investigate & Report  
   __ __ Draft Reply  
   __ __ Acknowledge Receipt  
   __ __ Type Draft  
   __ __ Type Final  
   __ __ Xerox ___ copies

REMARKS:  
   Kalaelea Co-generation Plant  
   (1805-04 to 09)  
   WUP approved 4/18/90

FOR YOUR:  
   __ __ Approval  
   __ __ Signature  
   __ __ Information  
   Handle as WCP — spoken/last  
   7/6/93. Take to CWRM as  
   WCP — no WUP modif. nec. as no  
   change in use, amt, etc. (see Mililani 8 PIP submit)  
   4/2/93
Ms. Rae Loui  
Commission on Water Resource Management  
Department of Land and Natural Resources  
State of Hawaii

Dear Ms. Loui:

Well Drilling Permit Applications for  
Three New Cooling Water Wells

On behalf of Kalaeloa Partners, L.P., we are pleased to submit the enclosed well drilling permit applications and $25 filing fee for Well Nos. PW-7, PW-8, and PW-9 to be located on the power plant site in Campbell Industrial Park. The power plant now operates six cooling water wells which are designated PW-1 through PW-6. The three new wells would not result in an increase in withdrawal rate nor would it be a change in use. Subject to the results of drilling and pump testing, the plant's cooling water requirements would be transferred to the three new wells. Wells PW-1 through PW-6 would provide backup capacity only.

If you have questions or need additional information, please call Jeff Moore (682-5288) at the power plant or me. Thank you for your attention to this matter.

Sincerely,

Tom Nance

Enclosures

cc: Jeff Moore - Kalaeloa Partners, L.P.
PAY $75.00

TO THE ORDER OF Department of Land and Natural Resources

DETACH AND RETAIN THIS STATEMENT

THE ATTACHED CHECK IS IN PAYMENT OF ITEMS DESCRIBED BELOW. IF NOT CORRECT PLEASE NOTIFY US PROMPTLY. NO RECEIPT DESIRED.

**DELUXE FORM WVC-3 V-2**

<table>
<thead>
<tr>
<th>DATE</th>
<th>DESCRIPTION</th>
<th>AMOUNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-16-93</td>
<td>Filing Fee: Well Nos. PW-7, PW-8, and PW-9 Kalaeloa Partners, L.P. (Job No. 93-37)</td>
<td>$75.00</td>
</tr>
<tr>
<td></td>
<td>Well No. 1805-10</td>
<td></td>
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<tr>
<td></td>
<td>1805-11</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1805-12</td>
<td></td>
</tr>
</tbody>
</table>
APPLICATION FOR PERMIT

1. APPLICANT: (may be a, b, or c, but all must be filled in)
   (a) WELL OWNER
   Firm/Name: Kalaeloa Partners, L.P.
   Contact Person: Jeffrey W. Moore,
   (b) LANDOWNER
   Firm/Name: Hawaiian Electric Company Ltd.
   Contact Person: James Kerber
   (c) CONTRACTOR
   Firm/Name: Roscoe Moss Hawaii, Inc.
   Address: 545 Kapiolani Blvd., Ste. 1600, Honolulu, HI 96813
   License No.: C-16437

2. WELL LOCATION/NAME: Well PW-7 (1805 - 10) Island Oahu
   Address: __________________________________________________________________
   Tax Map Key: __________________________________________________________________
   (Attach a USGS map, scale 1" = 2000', and a property tax map showing well location referenced to established property boundaries.)

3. (a) PROPOSED WORK:
   □ Drill New Well
   □ Modify Existing Well
   □ Redrill
   □ Install New Pump
   □ Replace Pump
   □ Deepen
   □ * Abandon/Seal
   * Be sure to complete and submit well abandonment report upon completion of work.

   (b) WELL TYPE:
   □ Dog
   □ Bored
   □ Driven
   □ Drilled
   □ Radial
   Is this well a part of a battery of wells? □ Yes □ No
   (Briefly describe and fill in the diagram on the back of this form.)

4. PROPOSED PUMP INFORMATION:
   Rated Pump Capacity: 800 gallons per minute
   Pump Type:
   □ Deep Well Turbine
   □ Submersible
   □ Centrifugal
   □ Rotary
   □ Rotary-Displacement
   □ Reciprocating
   □ Rotary-Gear
   □ Impulse
   Motor:
   □ Diesel
   □ Gas
   □ Electric, rated horsepower of __________

5. PROPOSED USE:
   □ Municipal (including hotels, stores, etc.)
   □ Domestic (individual, noncommercial water sys.)
   □ Irrigation (crop)
   State Land Use District:
   Quadrant/Zone
   (If more space is needed, continue below under remarks, explanations.)

6. (a) PROPOSED AMOUNT OF WITHDRAWAL:
   1,056,000 gallons per day
   (b) METHOD OF FLOW MEASUREMENT:
   □ Flow-meter
   □ Open-pipe
   □ Orifice Plate
   □ Weir

7. PENDING ACTIONS:
   □ CDUA
   □ SMA
   □ EIS
   □ EA
   □ NONE
   □ Other (explain)

8. REMARKS, EXPLANATIONS:
   Explanation on Back Side

   (If more space is needed, continue on back)

OTE: Signing below indicates that the applicant understands that, if the permit is granted by the Commission on Water Resource Management, the proposed work is to be complete within two (2) years of the approval date. In addition, the contractor shall submit to the Commission a well completion report, well abandonment report, or both, within 30 days after the completion date of the permitted work. The applicant also understands that monthly water use data shall be submitted to the Commission. The applicant further understands that approval of a proposed permit shall constitute a determination of correlative water rights and shall not guarantee the pump capacity or future use up to the permitted pump capacity.

Well Owner
Firm/Name: KALEAJO PARTNERS, L.P.
Date: 5/28/93
Signature: J.W. Moore, General Mgr.

Landowner
Firm/Name: Brenner Munger, Manager, Eng. Dept.
Date: 6/18/93
Signature: Brenner Munger

Contractor
Firm/Name: Hawaiian Electric Company, Inc.
Date: 
Signature: 

For Official Use Only:
Date Received
Date Accepted
Field Checked By
Date

Longitude
Latitude
Aquifer System Name
State Well No.: 1805-10

K92600 WCR Form
Remarks, Explanation (cont'd): This well is one of three new wells to be developed on the Kalaeloa Cogeneration Power Plant site in Campbell Industrial Park. Water from these wells will be used for cooling purposes. It is intended that these three new wells will replace the cooling water supply now provided by six existing wells onsite. There will be no increase in draft from the aquifer.

9. PROPOSED WELL SECTION

Elevation at top of casing 13 ft., msl.

Cement Grout: 8 ft.

Rock Packing 32 ft.

Hole Diameter: 19 in.

Total Depth 40 ft.

Ground Elevation: 11 ft., msl*

Solid Casing:
- Material: PVC
- Length: 10 ft.
- Diameter: 12 in.
- Wall thickness

Casing: • Perforated □ Screen
- Material: PVC
- Length: 30 ft.
- Diameter: 12 in.
- Wall thickness
- Openings sq. in./l.f.

Open Hole: Not Anticipated
- Length
- Diameter

*Approximate elevation at time of filing application. Ground elevation above mean sea level (msl) by a surveyor licensed by the State must be submitted at start of construction. Final elevations of well components shall be submitted in the well completion/well abandonment reports.
# APPLICATION FOR PERMIT

## Instructions
- Please print in ink or type and send completed application with attachments to the Commission on Water Resource Management, P.O. Box 821, Honolulu, Hawaii 96808. Application must be accompanied by a non-refundable filing fee of $25.00 payable to the Dept. of Land and Natural Resources. The Commission may not accept incomplete applications. For assistance, call the Regulation Station at 587-0228.

## 1. APPLICANT: (may be a, b, c, or b, all must be filled)

- **(a) WELL OWNER**
  - **Firm/Name**: Kalaeloa Partners, L. P.
  - **Contact Person**: Jeffrey Moore.
  - **Address**: 

- **(b) LANDOWNER**
  - **Firm/Name**: Hawaiian Electric Company, Ltd.
  - **Contact Person**: James Kerber.
  - **Address**: 

- **(c) CONTRACTOR**
  - **Firm/Name**: Roscoe Moss Hawaii, Inc.
  - **Address**: 

## 2. WELL LOCATION/NAME:
- **Well PW-8/1805-1**
- **Island**: Oahu
- **Address**: Ewa Beach, HI
- **Tax Map Key**: 9-1-31:23

## 3. (a) PROPOSED WORK:
- **Drill New Well**
- **Modify Existing Well**
- **Redirect**
- **Deepen**
- **Install New Pump**
- **Replace Pump**
- **Pump**

## 4. PROPOSED PUMP INFORMATION:
- **Rated Pump Capacity:** 800 gallons per minute
- **Type:** Deep Well Turbine
- **Motor:** Electric, rated horsepower of 15

## 5. PROPOSED USE:
- **Industri**
- **Type:** Domestic
- **Method of Flow Measurement:** Flow-meter
- **Method of Flow Measurement:** Open-pipe

## 6. PROPOSED AMOUNT OF WITHDRAWAL:
- **1,056,000 gallons per day**

## 7. PENDING ACTIONS:
- **CDUA**
- **SMA**
- **ES**
- **EA**
- **NONE**

## 8. REMARKS, EXPLANATIONS:
- **Explanation on Back Side**

---

**NOTE:** Signing below indicates that the applicant understands that, if the permit is granted by the Commission on Water Resource Management, the proposed work is to be completed within two (2) years of the approval date. In addition, the contractor shall submit to the Commission a well completion report, well abandonment report, or both, within 30 days after the completion date of the permitted work. The applicant also understands that monthly water use data shall be submitted to the Commission. The applicant further understands that approval of the proposed permit is subject to any existing water rights and shall not guarantee the pump capacity or future use up to the permitted pump capacity.

---

**For Official Use Only:**
- **Date Received:**
- **Date Accepted:**
- **Field Checked By:**
- **Longitude:**
- **Latitude:**
- **Aquifer System Name:** State Water No.
Remarks, Explanation (cont'd): This well is one of three new wells to be developed on the Kalaeloa Cogeneration Power Plant site in Campbell Industrial Park. Water from these wells will be used for cooling purposes. It is intended that these three new wells will replace the cooling water supply now provided by six existing wells onsite. There will be no increase in draft from the aquifer.

9. PROPOSED WELL SECTION

*Approximate elevation at time of filing application. Ground elevation above mean sea level (msl) by a surveyor licensed by the State must be submitted at start of construction. Final elevations of well components shall be submitted in the well completion/well abandonment reports.
State of Hawaii
COMMISSION ON WATER RESOURCE MANAGEMENT
Department of Land and Natural Resources

APPLICATION FOR PERMIT

**Well Construction or Pump Installation**

Instructions: Please print in ink or type and send completed application with attachments to the Commission on Water Resource Management, P.O. Box 821, Honolulu, Hawaii 96825. Application must be accompanied by a non-refundable filing fee of $25 payable to the Dept. of Land and Natural Resources. The Commission may not accept incomplete applications. For assistance, call the Regulation Branch at 808-586-2425.

1. **APPLICANT:** (may be a, b, or c, but all must be filled in)
   - (a) **WELL OWNER**
     - Firm/Name: Kalaeloa Partners, L.P.
     - Contact Person: Jeffrey W. Moore
     - Address: 
   - (b) **LANDOWNER**
     - Firm/Name: Hawaiian Electric Company, Ltd.
     - Contact Person: James Kerber
     - Address: 
   - (c) **CONTRACTOR**
     - Firm/Name: Roscoe Moss Hawaii, Inc.
     - Address: 

2. **WELL LOCATION/NAME:** Well PW-9 (1805-12) Island: Oahu
   - Address: ____________________________
   - Tax Map Key: 9-1-31-23
   - (Attach a USGS map, scale 1:2000, and a property tax map showing well location referenced to established property boundaries.)

3. (a) **PROPOSED WORK:**
   - Drill New Well
   - Modify Existing Well
   - Install New Pump
   - Redrill
   - Replace Pump
   - * Alter Location
   - * Abandon/Seal

4. **PROPOSED PUMP INFORMATION:**
   - Rated Pump Capacity: 800 gallons per minute
   - Pump Type:
     - Deep Well Turbine
     - Submersible
     - Centrifugal
     - Rotary
     - Rotary-Displacement
     - Rotary-Gear
   - Motor:
     - *Electric*, rated horsepower of 15

5. **PROPOSED USE:**
   - Municipal (including hotels, stores, etc.)
   - Military
   - Domestic (individual, noncommercial water sys.)
   - Industrial (Cooling Water)
   - Other (explain)
   - Irrigation (prop)
   - Rural
   - Conservation
   - State Land Use District:
     - Urban
     - Agriculture
     - Industrial
   - County Zoning (describe):

6. (a) **PROPOSED AMOUNT OF WITHDRAWAL:** 1,056,000 gallons per day
   - Method of Flow Measurement:
     - Flow-meter
     - Open-pipe
     - Orifice Plate
     - Weir
   - Other:

7. **PENDING ACTIONS:**
   - CDUA
   - SMA
   - EIS
   - EA
   - NONE
   - Other (explain)

8. **REMARKS, EXPLANATIONS:**
   - Explanation on Back Side

(Note: Signing below indicates that the applicant understands that, if the permit requested is granted by the Commission on Water Resource Management, the proposed work is to be completed within two (2) years of the approval date. In addition, the contractor shall submit to the Commission a well completion report, well abandonment report, or both, within 30 days after the completion date of the permitted work. The applicant also understands that monthly water use data shall be submitted to the Commission. The applicant further understands that approval of the proposed work shall not constitute the applicant or contractor as owner or lessee of water rights and shall not guarantee the pump capacity or future use up to the permitted pump capacity.)

**Signature:**
**Date:** 7/24/93

**Signature:**
**Date:** 6/8/93

For Official Use Only:

<table>
<thead>
<tr>
<th>Date Received</th>
<th>Date Accepted</th>
<th>Field Checked By</th>
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<table>
<thead>
<tr>
<th>Longitude</th>
<th>Latitude</th>
<th>Aquifer System Name</th>
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<tbody>
<tr>
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<td>1805-12</td>
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</tbody>
</table>
Remarks, Explanation (cont'd): This well is one of three new wells to be developed on the Kalaeloa Cogeneration Power Plant site in Campbell Industrial Park. Water from these wells will be used for cooling purposes. It is intended that these three new wells will replace the cooling water supply now provided by six existing wells onsite. There will be no increase in draft from the aquifer.

9. PROPOSED WELL SECTION

*Approximate elevation at time of filing application. Ground elevation above mean sea level (msl) by a surveyor licensed by the State must be submitted at start of construction. Final elevations of well components shall be submitted in the well completion/well abandonment reports.
<table>
<thead>
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<th>FROM</th>
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<tr>
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<table>
<thead>
<tr>
<th>TO</th>
<th>INIT</th>
<th>PLEASE</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>E. SAKODA</td>
<td>See Me</td>
<td>Tom Nance called, apparently Hawaiian Refinery, Inc. well HIRI 1 (well no. 1805-03) in Maahile Section of Kapoho is polluting Kalaeloa Partners wells. HIRI has WUP for 0.000 mgd (fire emergency only) granted 10/11/85. Also, EPA action is pending on this problem. Tom said 'Kalaeloa is going to come in w/ 3 new wells construction permits to take care of problem.</td>
</tr>
<tr>
<td>2</td>
<td>R. LOUI</td>
<td>Approval</td>
<td></td>
</tr>
<tr>
<td></td>
<td>S. Kokubun</td>
<td>Signature</td>
<td></td>
</tr>
<tr>
<td></td>
<td>G. MATSUMOTO</td>
<td>Information</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Y. SHIROMA</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Chairperson and Members
Commission on Water Resource Management
State of Hawaii
Honolulu, Hawaii

Gentlemen:

Kalaeloa Partners, L.P.
Application for a Water Use Permit
Campbell Industrial Park, Oahu

Applicant:
Kalaeloa Partners, L.P.
c/o Energy Ventures, Inc.

Landowner:
Hawaiian Independent Refinery, Inc.

Action Requested: Approval of a water use permit to use 3.168 million gallons per day (mgd) for industrial use.


Project Location: The project site and wells are at Campbell Industrial Park, near the corner of Kalaeloa Blvd and Olai Street, Barbers Point, Oahu. The project area is about 2,500 feet east of the AES Barbers Point Cogeneration Plant and the H-POWER Plant.

Proposed Water Use: The proposed Kalaeloa Cogeneration Power Plant will utilize salt water from the caprock aquifer for plant cooling requirements. Four wells, each pumping at a nominal rate of about 330 gpm, will satisfy normal plant cooling requirements of 1,330 gpm. A fifth well will be for standby use; and a sixth well will be used for emergency bypass cooling at 870 gpm, bringing the peak system capacity to about 2,200 gpm (3.168 mgd).

Water Availability and Impact on Surrounding Wells: The Kalaeloa Project, the AES Project, and the H-POWER Project will draw water from the same aquifer. Data from test wells indicate that the use from the projects will not interfere with each other. The H-POWER Project has a water use permit for 2.26 mgd and the AES Project has a water use permit for 13 mgd.

Public Notice: In accordance with DLNR Administrative Rules, a public notice was published in the Star Bulletin on February 14 and 21, 1990. In addition, copies of the public notice were sent to the Mayor's office, the Department of Health, the Honolulu BWS, the H-POWER Project, the AES Project, Oahu Sugar Company, and to The Estate of James Campbell. Written objections to the proposed permit were to be submitted to the Commission by March 7, 1990. Campbell Estate expressed concerns about the long-term quality of the caprock water but did not object to the quantity of water requested. No objections have been filed.

Approved by Commission on Water Resource Management at the meeting held on April 18, 1990.

ITEM 3
Chairperson and Members
Commission on Water Resource Management

April 18, 1990

RECOMMENDATION:

That the Commission approve the issuance of a water use permit to Kalaeloa Partners, L.P. to use 3.168 mgd of salt water for industrial use from Well Nos. 1805-04 to 09, subject to the following conditions:

General Conditions:

(1) the water use authorized by the permit must be for the reasonable-beneficial use described in the permit;

(2) the use must not interfere with any existing legal uses of water;

(3) modification of any permit condition must be approved by the Commission; and

(4) the applicant must comply with all other applicable laws, rules, and ordinances.

Additional Conditions:

(1) Approved flowmeters must be installed to measure withdrawals and a record of the withdrawals must be kept and reported;

(2) The development of the ground water source shall be completed within 2 months from the date of permit issuance.

Respectfully submitted,

MANABU TAGOMORI
Deputy Director

APPROVAL FOR SUBMITTAL:

WILLIAM W. PATY, Chairperson
Gentlemen:

Well Completion Report
Well 1805-10M
Kalaeloa Cogeneration Plant
Campbell Industrial Park
Ewa Beach, Oahu, Hawaii

In compliance with the Well Construction Permit issued February 27, 1989, for the subject well, we are submitting the enclosed Well Completion Report. Additionally, we are enclosing a copy of our report dated May 5, 1989, which includes data required at Items 3b through 3f of the Well Construction Permit.

The report also presents recommendations for supply wells for the subject project. We believe the field data in the report will be of interest to you in your processing of a Beneficial Use Permit for the project.

If you have any questions about the enclosed materials, please call on us.

Sincerely Yours,

HARDING LAWSON ASSOCIATES

Damon R. Runyan
Associate Engineer

Enclosures

cc: Kalaeloa Partners, L.P./Mr. William Snarponis (w/out report)
ABB Energy Services/Mr. Jim Harreslon (w/out report)
Belt Collins & Associates/Mr. John Goody (w/out report)
WELL COMPLETION REPORT

STATE WELL NO. 1805-10M
LOCATION KALAELOA COGENERATION PLANT
WELL NAME KALAELOA
ISLAND OAHU

B. LOCATION KALAELOA COGENERATION PLANT
TAX MAP KEY 9-1-31123

C. WELL OWNER KALAELOA PARTNERS, L.P.

D. DRILLING OR PUMP INSTALLATION CONTRACTOR P.R. DRILLING CO.

E. TYPE OF RIG MOBIL B 61
DRILLER SAM LEALAIMATAFATU

F. DATE OF WELL COMPLETION 03/30/89
DATE OF PUMP INSTALLATION N/A

G. GROUND ELEVATION
Top of Drilling Platform (mal) 12.6 ft.
Height of drilling platform above ground surface 50.5 ft.

H. TOTAL DEPTH OF WELL BELOW GROUND

I. HOLE SIZE:
5 inch dia. from 0 ft. to 50.5 ft. below ground

J. CASING INSTALLED:
4 in. i.d. x 0.237 in. wall solid section to 9.5 ft. below ground
4 in. i.d. x 0.237 in. wall perforated section to 49.5 ft. below ground

K. ANNULUS:
GROUTED FROM 0 ft. to 2.0 ft. below ground
Gravel packed from 5.0 ft. to 50.5 ft. below ground

L. PERMANENT PUMP INSTALLATION:
N/A

M. PROPOSED USE MONITORING

N. INITIAL WATER LEVEL + 11.5 ft. below ground.
Date and time of measurement 03/24/89 1:200

O. INITIAL CHLORIDE 4000 ppm, SALINITY
Date and time of sampling 03/28/89 14:50

P. PUMPING TESTS: Reference point (R.P.) used: 0 ft. below ground

Q. DRILLER'S LOG:

R. REMARKS:

Submitted by (print) HARDING LAWSON ASSOCIATES

Signature

State of Hawaii
COMMISSION ON WATER RESOURCE MANAGEMENT
Department of Land and Natural Resources
Division of Water Resource Management

INSTRUCTIONS: Please print or type and submit completed report within 30 days of well completion to the Division of Water & Land Development. An as-built drawing of the well and chemical analysis, if available, should also be submitted. If necessary, phone 548-7543, Hydrology, Geology Section for assistance.

A. STATE WELL NO. 1805-10M
B. LOCATION KALAELOA COGENERATION PLANT
C. WELL OWNER KALAELOA PARTNERS, L.P.
D. DRILLING OR PUMP INSTALLATION CONTRACTOR P.R. DRILLING CO.
E. TYPE OF RIG MOBIL B 61
DRILLER SAM LEALAIMATAFATU
F. DATE OF WELL COMPLETION 03/30/89
DATE OF PUMP INSTALLATION N/A
G. GROUND ELEVATION
Top of Drilling Platform (mal) 12.6 ft.
Height of drilling platform above ground surface 50.5 ft.

H. TOTAL DEPTH OF WELL BELOW GROUND

I. HOLE SIZE:
5 inch dia. from 0 ft. to 50.5 ft. below ground

J. CASING INSTALLED:
4 in. i.d. x 0.237 in. wall solid section to 9.5 ft. below ground
4 in. i.d. x 0.237 in. wall perforated section to 49.5 ft. below ground

K. ANNULUS:
GROUTED FROM 0 ft. to 2.0 ft. below ground
Gravel packed from 5.0 ft. to 50.5 ft. below ground

L. PERMANENT PUMP INSTALLATION:
N/A

M. PROPOSED USE MONITORING

N. INITIAL WATER LEVEL + 11.5 ft. below ground.
Date and time of measurement 03/24/89 1:200

O. INITIAL CHLORIDE 4000 ppm, SALINITY
Date and time of sampling 03/28/89 14:50

P. PUMPING TESTS: Reference point (R.P.) used: 0 ft. below ground

Q. DRILLER'S LOG:

R. REMARKS:

Submitted by (print) HARDING LAWSON ASSOCIATES

Signature

Title ASSOC. ENGR.

Date 5/10/89
Gentlemen:

Letter Report
Exploratory Water Supply Well
Kalaeloa Cogeneration Plant,
Campbell Industrial Park, Oahu, Hawaii

INTRODUCTION

This report presents the results obtained from the exploratory water well recently drilled at your cogeneration project at Campbell Industrial Park. We have designated this well to be No. 1805-10M in accordance with the state well permitting system. This well was drilled as requested by ABB Energy Services and authorized by you to obtain water quality samples from depths similar to those proposed for the supply wells for the project. We also used the opportunity to obtain core samples of the subsurface materials for better understanding of the shallow caprock aquifer. Water quality data were submitted to you by telecopier on April 4, 1989. A second set of water quality data was obtained later, and the results were telecopied to ABB Energy Services in Baden, Switzerland, with a copy to you, on April 27, 1989.

EXPLORATORY WELL

The exploratory well was drilled approximately 15 feet east of the planned location of the western-most supply well along the northern site property line. The location of the exploratory well is shown on the Site Plan, Plate 1. Drilling took place on March 24 to 27, 1989, and well installation was completed on March 30. Drilling was done primarily by continuous coring. The core was logged in the field by our geologist, and the field log was then edited for presentation on the Log of Boring, Plate 2. Four-inch-diameter core was obtained, and the percent recovery for each 5-foot run is shown on Plate 2. The core was retained at the project site and is now under the care of Mr. Jim Harrelson, the project supervisor for ABB Energy Services.
May 2, 1989
19032,002.06
Mr. William Snarponis
Kalaeloa Partners, L.P
Page 2

The subsurface materials generally consist of a coralline reef complex, including zones of in situ coral and weakly cemented coralline rubble, apparently containing limited amounts of fines and sand-sized particles. Water level was observed to be at approximately 11.5 feet below the ground surface, which is approximately Elevation 12.5 feet (Mean Sea Level datum). The ground-water surface fluctuates with the tides, as observed elsewhere on the site. Salinity of the ground water increased with depth as discussed in the next section.

It is intended that the well be retained as an observation well to assist in interpretation of data obtained during test pumping of the supply wells, and for continued observation during the lifetime of the project. Four-inch-diameter PVC screen (0.020-inch slots) was installed in the bottom 40 feet from a depth of 49.5 feet. Solid 4-inch PVC casing was installed above the screen to 2 feet above the ground surface. Gravel packing was placed between the casing and the surrounding hole. Details of the well completion are presented on Plate 3. After the casing was installed, the well was developed on March 29 by pumping for a period of approximately 5 hours.

WATER QUALITY

Several chemical parameters were monitored during development pumping on March 29, or had serial samples collected for chemical analysis. The parameters and their statistics are as follows:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Number Meas.</th>
<th>Average Value</th>
<th>Range</th>
<th>Final Value</th>
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<tbody>
<tr>
<td>Temperature (°C)</td>
<td>9</td>
<td>28.1</td>
<td>28.0 - 28.5</td>
<td>28.00</td>
</tr>
<tr>
<td>Dissolved O₂ (mg/l)</td>
<td>4</td>
<td>4.46</td>
<td>3.50 - 5.00</td>
<td>5.00</td>
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<tr>
<td>Chloride (mg/l)</td>
<td>3</td>
<td>1940</td>
<td>1890 - 2005</td>
<td>1890</td>
</tr>
<tr>
<td>TDS (mg/l)</td>
<td>3</td>
<td>4080</td>
<td>3373 - 4462</td>
<td>4462</td>
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<tr>
<td>Spec. Cond. (umhos @ 25°C)</td>
<td>8</td>
<td>5955</td>
<td>4715 - 6415</td>
<td>6130</td>
</tr>
<tr>
<td>pH (pH Units)</td>
<td>5</td>
<td>7.13</td>
<td>7.06 - 7.22</td>
<td>7.13</td>
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<tr>
<td>Alkalinity (mg/l @ CaCO₃)</td>
<td>4</td>
<td>310</td>
<td>290 - 330</td>
<td>300</td>
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</tbody>
</table>
May 2, 1989
19032,002.06
Mr. William Snarponis
Kalaeloa Partners, L.P
Page 3

A final sample was collected for chemical analysis. The report of analysis is attached at Table 1.

On April 3, 1989, samples were collected by bailing from the top and bottom of the water column (10-foot and 50-foot depths below ground surface) so that any chemical stratification could be noted. Specific conductance and temperature were measured in the bailed samples, as follows:

<table>
<thead>
<tr>
<th>Depth</th>
<th>Temp. (°C)</th>
<th>Spec. Cond. (umhos @ 25°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 ft</td>
<td>28.0</td>
<td>4420</td>
</tr>
<tr>
<td>50 ft</td>
<td>27.0</td>
<td>20200</td>
</tr>
</tbody>
</table>

As mentioned, these results were transmitted to you by telex on April 6, 1989, including discussion of the results.

During a site visit on April 6, 1989, representatives of ABB Energy Services requested that two additional samples be obtained, one shallow and one deep, to check on specific water quality parameters. These samples were obtained on April 7, and the test results were transmitted to ABB Energy Services and yourselves on April 26, 1989. Those water quality data are presented on the second page of Table 1.

The water samples would be classified as a sodium-chloride type. The test data indicate a mixing of sea water and terrestrial ground water, further modified by the calcium carbonate of the caprock. In general, water from greater depths becomes more like sea water, except that nitrate, bicarbonate and total organic carbon concentrations are higher than typical sea water. Silica was lower than sea water in the first sample, but higher in the later two samples. We do not know the reason for this apparent discrepancy.

The stratification found in the well several days after pumping ceased was due to the normal increase in salinity with depth. On the basis of the correlation between specific conductance and chloride concentrations measured during pumping, we estimated chlorides in the well to range from 1300 mg/l at 10 feet to 6830 mg/l at 50 feet. These estimates can be compared to the values on Table 1, page 2, of 1000 mg/l at 10 feet and 8750 mg/l at 50 feet. The latter value is about 45 percent of sea water concentration.

The results of the chemical analyses for this well should not be interpreted as representative of the general water quality of the caprock aquifer. Water quality of this aquifer is strongly dependent on location, depth, and even time. Saline water occurs beneath a lens of brackish water in the caprock, at a probable depth near 50 feet at this well site.
May 2, 1989
19032,002.06
Mr. William Narponis
Kalaeloa Partners, L.P
Page 4

These chemical results should also not be interpreted as indicative of the water quality expected from a well that is discharging water at different rates. A well pumping at 1300 gpm is expected to have a chemical quality more saline than if pumped at lesser rates. Test pumping the supply well installed adjacent to this exploratory well was completed on April 30, and additional test results will be available shortly.

PUMP TEST DATA

Observations during well development assisted in obtaining additional geohydrologic data for the shallow caprock aquifer. Pumping was conducted at a rate of approximately 61 gallons per minute over a period of approximately 5 hours. During that time drawdown of approximately 0.1 feet was observed. These data indicate that the specific capacity for the upper part of the aquifer is on the order of 600 gallons per minute per foot for relatively low pumping rates. This figure is the same as that reported from our previous observations in our letter report dated February 24, 1989.

SUMMARY

The water quality data indicate a gradual increase in salinity with depth as expected. The salinity at the 50-foot depth is approximately 45 percent of sea water, but we expect that pumping at the project design rate of 1,300 gallons per minute will quickly induce more saline water to be drawn into the well. The long-term salinity is likely to be higher than that measured from short-term pumping at low rates. We understand that some of the other water quality parameters are also of importance to the plant designers. We have noted that several of the parameters are significantly higher than typical for sea water. This presumably represents contribution to the ground water from terrestrial sources, as the values are more typical for fresh ground water. At this time, we do not believe it is possible to predict with confidence the changes, if any, in these parameters with long-term high-capacity pumping. Water quality data obtained in conjunction with test pumping of the supply wells themselves may help to provide guidance on this matter.

Based on the limited pump test data available so far, it appears that 50-foot-deep supply wells will be adequate for the 1,300-gallon-per-minute capacity wells, as previously recommended. Results from the recently drilled first supply well appear to confirm this.
May 2, 1989
19032,002.06
Mr. William Sharponis
Kalaeloa Partners, L.P
Page 5

We recommend that this letter accompany our Well Completion Report which must be submitted to the state Commission on Water Resource Management as part of the well permitting procedure. Such information will help serve as background data for their staff to review in processing the Beneficial Use Permit which will be submitted with results from the first supply well.

If you have any questions concerning the contents of this letter, please contact us.

Sincerely,

Harding Lawson Associates

[Signature]

Damon R. Runyan
Associate Engineer - 3121

DRR/ms-h:KALAELOA

Attachments: Table 1 - Water Quality Data
Plate 1 - Site Plan
Plate 2 - Log of Boring ABBEX-1
Plate 3 - Well Details

cc: ABB Energy Services/Mr. Duke Hauck
ABB Energy Services/Mr. Jim Harrelson
Belt, Collins & Associates/Mr. John Goody
<table>
<thead>
<tr>
<th>DATE SAMPLE ANALYZED</th>
<th>03/30-31/89</th>
<th>03/30-31/89</th>
<th>03/30-31/89</th>
<th>03/30-31/89</th>
<th>03/30-31/89</th>
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</thead>
<tbody>
<tr>
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<td></td>
<td></td>
<td></td>
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<td>SAMPLE TYPE</td>
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<td>SAMPLE DESCRIPTION</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chlorides</td>
<td>mg/L</td>
<td>1055</td>
<td>1330</td>
<td>1330</td>
<td>1430</td>
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<tr>
<td>Total Dissolved Solids</td>
<td>mg/L</td>
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<td>150</td>
<td>1925</td>
<td>1430</td>
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<tr>
<td>Total Organic Carbon</td>
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<td>4405</td>
<td>537</td>
<td>3373</td>
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<tr>
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</tr>
<tr>
<td>Bicarbonate</td>
<td>mg/L as CaCO₃</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Nitrates</td>
<td>mg/L</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sulfates</td>
<td>mg/L</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Hardness</td>
<td>mg/L as CaCO₃</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Carbonate Hardness</td>
<td>mg/L as CaCO₃</td>
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<td></td>
</tr>
<tr>
<td>C.O.D.</td>
<td>mg/L</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suspended Solids</td>
<td>mg/L</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Iron</td>
<td>mg/L</td>
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</tr>
<tr>
<td>Manganese</td>
<td>mg/L</td>
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</tr>
<tr>
<td>Ammonia</td>
<td>mg/L</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silica</td>
<td>mg/L</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

LABORATORY REMARKS: Samples analyzed according to "Test Methods for the Evaluation of Solid Waste Physical/Chemical

Date: 03-31-89 / 04-04-}

Page 1 of 2

LABORATORY ANALYSIS REPORT (2) HARDING LAWSON ASSOCIATES HONOLULU, HAWAII

TO: HARDING LAWSON ASSOCIATES
ADDRESS: ROOM 404
SAMPLES OF: Water -- Kalaeloa
SAMPLED BY: J. Ward  SAMPLING DATE: 03-29-89  TIME: as noted
RECEIPT DATE: 03-30-89  TIME: }

Table 1

JOE NO. 3118
DATE 03-31-89 / 04-04-
**Table 1**

<table>
<thead>
<tr>
<th>SAMPLE DESCRIPTION</th>
<th>UNITS</th>
<th>89140003</th>
<th>89140005</th>
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<tr>
<td>Total Dissolved Solids</td>
<td>mg/L</td>
<td>2,657</td>
<td>21,672</td>
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<tr>
<td>C.O.D.</td>
<td>mg/L</td>
<td>15</td>
<td>101</td>
</tr>
<tr>
<td>Chlorides</td>
<td>mg/L</td>
<td>1000</td>
<td>8750</td>
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<tr>
<td>Calcium</td>
<td>mg/L</td>
<td>78.6</td>
<td>230.0</td>
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<tr>
<td>Iron</td>
<td>mg/L</td>
<td>1.31</td>
<td>0.43</td>
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<tr>
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<td>mg/L</td>
<td>109</td>
<td>602</td>
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<tr>
<td>Manganese</td>
<td>mg/L</td>
<td>0.03</td>
<td>0.06</td>
</tr>
<tr>
<td>Potassium</td>
<td>mg/L</td>
<td>36</td>
<td>226</td>
</tr>
<tr>
<td>Sodium</td>
<td>mg/L</td>
<td>640</td>
<td>4550</td>
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<tr>
<td>Bicarbonate</td>
<td>mg/L as CaCO₃</td>
<td>291</td>
<td>298</td>
</tr>
<tr>
<td>Nitrates</td>
<td>mg/L</td>
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<td>3.87</td>
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<tr>
<td>Sulfates</td>
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<td>1175</td>
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<tr>
<td>Ammonia</td>
<td>mg/L</td>
<td>0.04</td>
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<tr>
<td>Silica</td>
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<td>Total Hardness</td>
<td>mg/L as CaCO₃</td>
<td>645</td>
<td>3053</td>
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<td>Carbonate Hardness</td>
<td>mg/L as CaCO₃</td>
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<td>298</td>
</tr>
<tr>
<td>Total Organic Carbon</td>
<td>mg/L</td>
<td></td>
<td>2.78</td>
</tr>
</tbody>
</table>

WHITE SILTY GRAVEL (GP)
dry, loose, (fill)

WHITE LIMESTONE – blocky, moderately fractured, moderately hard, moderately weathered
at 2.5 feet, hard
at 5.0 feet, very fine- to coarse-grained, porosity < 5 percent, calcite cement inclusions, iron oxide staining
very soft drilling 8 to 9.5 feet
at 10.0 feet, skeletal grains, many small cavities, 1 percent clay infilling, moderately hard, moderately weathered
at 11.6 feet, highly cemented with cryptocrystalline calcite, solution vugs
at 13 to 13.5 feet, micrite partings with medium grained sand and iron oxide
at 15.1 feet, color change to GRAYISH ORANGE
at 16.1 feet, fracture at 45 degrees to vertical
at 17.9 feet, color change to WHITE, large vugs up to 1/2-inch diameter, solution channels, moderately well cemented
at 23.3 feet, large mollusk shell imprints, increase in porosity to 25 percent, white sparry calcite infilling 1 percent
at 27.3 feet, becoming very hard, < 10 percent fine- to coarse-grained sand, infilling in cavities, very well cemented
at 29.1 feet, cavities up to 2-inch diameter with secondary aragonite crystals, iron oxide staining
WHITE LIMESTONE — blocky, moderately hard, moderately weathered

at 34.0 feet, becoming poorly cemented, very fine-grained matrix, clay, white, plastic in bottom of sample

at 39.6 feet, decreasing clay content, increasing calcite concentration

at 42.6 feet, becoming well cemented, no clay, shell fragments, minor iron oxide staining

at 46.3 feet, color change to PALE YELLOWISH ORANGE, moderately well cemented

Core to 49.6 feet, drill to 50.5 feet and install 4-inch PVC well casing.
Ground surface elevation ± 12.5 feet

- Steel well housing with locking cover
- Well slip cap
- Concrete surface seal
- 6-inch diameter boring
- Type I-II cement grout
- Drill cuttings
- 4-inch diameter schedule 40 PVC well casing
- Gravel pack, 3/8-in. river gravel
- Static water level
- 4-inch diameter schedule 40 PVC well screen (flush-thread and 0.020 slot size)
- Threaded bottom cap
- Bottom of borehole

NOT TO SCALE

Well Details
Exploratory Well ABBEX-1
Kalaeloa Cogeneration Plant
Campbell Industrial Park, Oahu, Hawaii

Harding Lawson Associates
Engineers and Geoscientists

Drawn: gwl
Job Number: 19032.002.06
Approved: PEA
Revised Date: 05/89