WATER USE PERMIT NO. 180

This report has been prepared in accordance with 13-171-22(b) of the Hawaii Revised Statutes requiring a 20-year review of issued water use permits to determine permit compliance. Following is a summary of permit information, site characteristics, methodology, findings, and recommendations for this State permit file.

Permit Information

<table>
<thead>
<tr>
<th>Water User:</th>
<th>Honolulu Board of Water Supply 630 S. Beretania St. Honolulu, HI 96843</th>
</tr>
</thead>
<tbody>
<tr>
<td>Landowner of Source:</td>
<td>Hawaiian Electric Co., Inc. 820 Ward Avenue Honolulu, HI 96814</td>
</tr>
<tr>
<td>Permitted Withdrawal Rate:</td>
<td>N/A mgd (Based upon a 12-month moving average)</td>
</tr>
<tr>
<td>Water Management Area:</td>
<td>Waimalu</td>
</tr>
<tr>
<td>Island:</td>
<td>Oahu</td>
</tr>
<tr>
<td>Aquifer Sector/System:</td>
<td>Pearl Harbor/Waimalu</td>
</tr>
<tr>
<td>System Sustainable Yield:</td>
<td>45.0 mgd</td>
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<tr>
<td>Water Type:</td>
<td>Potable</td>
</tr>
<tr>
<td>Original CWRM Date:</td>
<td>December 16th, 1992</td>
</tr>
<tr>
<td>Standard Conditions:</td>
<td>1, 4, 6, 8, 10, 14, 26</td>
</tr>
<tr>
<td>Special Conditions:</td>
<td>96-98</td>
</tr>
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</table>

Water Source

<table>
<thead>
<tr>
<th>State Well Number(s):</th>
<th>2357-11, 2357-12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well Name:</td>
<td>HECO Waiau G-11 &amp; G-12</td>
</tr>
<tr>
<td>Water Source TMK Number(s):</td>
<td>1st Division, 9-8-003:010</td>
</tr>
<tr>
<td>State Land Use Classification(s):</td>
<td>Urban</td>
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<td>County Zoning Classification(s):</td>
<td>I-2</td>
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<tr>
<td>Geographical Coordinates:</td>
<td></td>
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</table>
| State Well No. 2357-11: | Latitude 21° 23' 34.7" North  
                           Longitude 157° 57' 50.3" West |
| State Well No. 2357-12: | Latitude 21° 23' 33.0" North  
                           Longitude 157° 57' 53.0" West |
Beneficial Use Explanation: Requested water use is 3.5 mgd but this is not part of sustainable yield, thus effect on WUP is effectively zero (see memos).

Background Information

State Well Nos. 2357-11 and 2357-12 are located on TMK parcel 9-8-003:010 and are used for municipal purposes on the island of Oahu. Consistent water use reporting records are available for at least the past four years. However, no salinity records are available. There is no given permitted withdrawal rate for these wells. There is free flow from the well into the sump, and the water is pumped from the sump into the BWS system. There should be no restriction on water use since the flows are counted as being water leakage that are used infrequently at the present time. The requested water use was 3.5 mgd but this is not part of sustainable yield. Thus, the effect on the WUP is effectively zero. Reference the permit file for more information on water reporting history.

Water Use Permit 180 was issued on December 16th, 1992 by the Commission on Water Resource Management. Standard conditions 1, 4, 6, 8, 10, 14, & 26 and special conditions 96-98 are the governing conditions for this water use permit. A complete list of all standard and special conditions is given in the permit file.

The following are a list of standard condition(s) that the permittee is found to be in non-compliance with:

(10) The applicant shall provide and maintain an approved meter or other appropriate device or means for measuring and reporting total water usage. Water usage shall be measured on a monthly basis and reported to the Commission along with water level and salinity measurements.

Since no salinity records are being submitted for either well, the permittee is found to be in violation of Standard Condition (10).

Field Investigation Information

Due to certain project constraints, no Honolulu Board of Water Supply well sites were visited. However, information collected during the data gathering phase of this project is included in previous sections of this report.

Recommendations

- Update the Commission’s electronic database with the following:
  - Update permittee contact with new BWS director
- Address violation of Standard Condition (10) regarding non-reporting of salinity levels.
Standard Conditions List

1. The water described in this water use permit may only be taken from the location described and used for the reasonable beneficial use described at the location described above. Reasonable beneficial uses means “the use of water in such a quantity as is necessary for economic and efficient utilization, which is both reasonable and consistent with State and County land use plans and the public interest.” (HRS § 174C-3)

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 HRS § 174C-49(a), which means that it:
   a. Can be accommodated with the available water source;
   b. Is a reasonable-beneficial use as defined in HRS § 174C-3;
   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 HRS § 174C-101(a).

4. The ground-water use here must not interfere with surface or other ground-water rights or reservations.

5. The ground-water use here 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 authorized here is subject to the requirements of the Hawaiian Homes Commission Act, as amended, if applicable.

7. The water use permit application and submittal, as amended, approved by the Commission at its <Insert Date> meeting are incorporated into this permit by reference.

8. Any modification of the permit terms, conditions, or uses may only be made with the express written consent of the Commission.

Variations of Standard Condition (8) are as follows:
   i. Modification of any permit condition shall be approved by the Commission. Modification of any permit condition without notification may result in the revocation of the water use permit.
9. This 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 the water sources (quantity or quality);
   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 Home Lands, 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. An approved flowmeter(s) must be installed to measure monthly withdrawals and a monthly record of withdrawals, salinity, temperature, and pumping times must be kept and reported to the Commission on Water Resource Management on forms provided by the Commission on a monthly basis (attached).

Variations of Standard Condition (10) are as follows:
   i. The applicant shall keep monthly pumpage estimates to be submitted annually to the Commission.
   ii. An approved flowmeter(s) need not be installed to measure monthly withdrawals and a monthly record of withdrawals, salinity, temperature, and pumping times must be kept and reported to the Commission on Water Resource Management on forms provided by the Commission on a yearly basis (attached).
   iii. 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 monthly basis in accordance with the Commission's September 16, 1992 action on reporting requirements.
   iv. Approved flowmeters must be installed to measure monthly withdrawals and a monthly record of withdrawals must be kept and reported to the Commission on Water Resource Management on a monthly basis.
   v. An approved flowmeter(s) must be installed to measure monthly withdrawals and a monthly record of withdrawals, salinity, temperature, and pumping times must be kept and reported to the Commission on Water Resource Management on forms provided by the Commission on a quarterly/yearly basis (attached).
   vi. An approved flowmeter shall be installed to measure water withdrawals
   vii. An approved flowmeter(s) must be installed to measure withdrawals; and a record of the withdrawals must be kept and reported to the Department of
Land and Natural Resources, Division of Water and Land Development, P.O. Box 373, Honolulu, HI 96809, on a monthly basis.

viii. Although not stated as a condition of the permit §13-168-7 HAR requires you to keep a record of your monthly total pumpage, water level, salinity, and water temperature. This information must be submitted to the Commission on a regular monthly basis using the enclosed water use report form.

ix. An approved flowmeter shall be installed and the withdrawal from Well 1851-73 shall be recorded and reported to DLNR on a monthly basis by the owner and/or operator of the well.

x. The withdrawals from these wells shall be recorded and reported to the DLNR on a monthly basis by the BWS.

xi. The applicant shall provide and maintain an approved meter or other appropriate device or means for measuring and reporting water usage on a monthly basis.

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

xiii. The applicant shall provide and maintain an approved meter or other appropriate device or means for measuring and reporting total water usage. Water usage shall be measured on a monthly basis and reported to the Commission along with water level and salinity measurements.

11. This permit shall be subject to the Commission’s periodic review of the <Aquifer> Aquifer System’s sustainable yield. The amount of water authorized by this permit may be reduced by the Commission if the sustainable yield of the <Aquifer> Aquifer System, or relevant modified aquifer(s), is reduced.

12. A permit may be transferred, in whole or in part, from the permittee to another, if:
   a. The conditions of use of the permit, including, but not limited to, place, quantity, and purpose of use, remain the same; and
   b. The Commission is informed of the transfer within ninety days.

Failure to inform the department of the transfer invalidates the transfer and constitutes a ground for revocation of the permit. A transfer, which involves a change in any condition of the permit, including a change in use covered in HRS §174C-57, is also invalid and constitutes a ground for revocation.

13. The uses(s) authorized by law and by this permit do not constitute ownership rights.

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

15. The permittee understands that under HRS §174C-58(4), that partial or total nonuse, for reasons other than conservations, of the water allowed by this permit for a period of four (4) continuous years or more may result in a permanent revocation as to the amount of water not in use. The Commission and the permittee may enter
into a written agreement that, for reasons satisfactory to the Commission, any period of nonuse may not apply towards the four-year period. Any period of nonuse which is caused by a declaration of water shortage pursuant to section HRS § 174C-62 shall not apply towards the four-year period or forfeiture.

16. The permittee shall prepare and submit a water shortage plan within 30 days of the issuance of this permit as required by 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 <Aquifer>Ground-Water Management Area.

17. The water use permit shall be subject to the Commission’s establishment of instream standards and policies relating to the Stream Protection and Management (SPAM) program, as well as legislative mandates to protect stream resources.

18. The permittee understands that any willful violation of any of the above conditions or any provisions of HRS § 174C or HAR § 13-171 may result in the suspension or revocation of this permit.

19. Special conditions in the attached cover transmittal letter or attached exhibits are incorporated herein by reference.

20. 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.

Variations of Standard Condition (20) are as follows:
   i. The permit may be revoked if work is not started within six months of the date of issuance or if work is suspended or abandoned for six months. The work proposed in the permit application shall be completed within two years from the date of permit issuance.

21. This permit may not be transferred or the use rights granted by this permit sold or in any other way alienated. Pursuant to HRS § 174C-59 and the requirements of Chapter 174C, the Commission on Water Resource Management has the authority to allow the transfer of the permit and the use rights granted by this permit in a manner consistent with HRS § 174C-59. 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.

22. The water use permit granted shall be an interim water use permit, pursuant to HRS § 174C-50. The final determination of the water use quantity shall be made within five (5) years of the filing of the application to continue the existing use.

23. The water use permit shall be issued only after agricultural review.

24. That scheduled adjustments to Oahu Sugar Co. permitted use shall be initiated upon discontinuance of agricultural uses.
25. The issuance of this permit was approved by the Commission on Water Resource Management at its meeting on <Insert Date>.

26. The permit shall be subject to the review by the Attorney General.

27. The permit holder may be required to relinquish this permit at any time or specified time after issuance to the Board of Land and Natural Resources in accordance with Chapter 166 of Title 13.

28. The applicant shall obtain the necessary land acquisition documents from the Hawaii Housing Authority.
Special Conditions List

1. Should an alternate permanent source of water be found for this use, then the Commission reserves the right to revoke this permit, after a hearing.

2. In the event that the tax map key at the location of the water use is changed, the permittee shall notify the Commission in writing of the tax map key change within thirty (30) days after the permittee receives notice of the tax map key change.

3. The applicant shall contact the Environmental Management Division, State Department of Health, at 586-4304, concerning “GUIDELINES APPLICABLE TO GOLF COURSES IN HAWAII” date <Insert Date & Version #>.

4. Standard Condition 10 is emphasized, to report consumption on a regular basis.

5. The applicant may continue this existing use of ground water within the limits approved by the Commission, and the actual issuance of the interim permit shall not be a reason to interrupt this existing use.

6. This interim water use permit shall cease to become interim and shall be subject to HRS § 174C-55 upon administrative review of the quantity within five (5) years, provided that all conditions of the use (including the review of the quantity which shall not be greater than the amount initially granted) remain the same. Enforcement of the allocation limit shall be stayed pending staff’s review and issuance of a permanent water use permit.

7. As-built drawings of the well and pump, and a complete pumping test record shall be submitted within sixty (60) days.

8. In the event the pump tests show that aquifer boundary conditions do not support the requested withdrawals, the Commission reserves the right to amend this permit, after a hearing, to a level that is supported by the pump tests.

9. The existing use may be continued within the levels approved by the Commission, and the actual issuance of the permit document shall not be a reason to interrupt the approved level of use.

10. The filing of an application by Kukui, Inc. for a new or modified water use permit for the Kualapuu Aquifer in excess of 2.0 mgd (total system withdrawal) shall be just cause for re-consideration of this interim permit by the Commission.

11. Upon completion of a new transmission line for the transport of water use by Well #17, the permit shall be modified to reduce the allocation amount by the additional 79,220 gallons per day allocated for use of the Molokai Irrigation System.

12. Within six (6) months from the date of approval of a water use permit for the well, the applicant shall conduct a feasibility study and submit a report describing
alternative sources of nonpotable water for irrigation uses at the resort area. It is suggested that the developer consider use of dual lines in the subdivisions so that effluent may be used in the existing reuse system. Another consideration is the development of brackish water wells in the Kaluakoi Aquifer system for mixing with the effluent generated at the resort.

13. Within six (6) months from the date of approval of a water use permit for the well, the application shall evaluate the filter back discharges into Kakaako Gulch to determine if excessive preventable waste is occurring and identify possible measures to eliminate or reduce such waste. The evaluation shall be conducted in cooperation with the Commission staff and staff of the Department of Health's Safe Drinking Water Branch, which regulates the drinking water system.

14. Within six (6) months from the date of approval of a water use permit for the well, the applicant shall 1) implement a leakage control and detection system and compete repairs to prevent such leakage and 2) implement use of xeriscaping and low-flow fixtures.

15. Action on the future use portion of the water use permit application for Well #17 (Well No. 0901-01) is deferred pending the establishment of existing uses in the aquifer. Kukui Inc.'s application for uses in excess of those uses existing on July 15, 1992 will be considered “new” uses and will be taken up by the Commission as soon as other existing use applications have been decided. In the interim,
   a. The Commission shall recognize that there is disagreement between the applicant's staff calculations of reasonable-beneficial existing use
   b. The Applicant will have the burden of proof to show within six (6) months reasonable-beneficial existing use calculations that support the applicant's request as opposed to staff's calculations.
   c. The Commission's enforcement of the approved existing use allocation will be suspended for six (6) months.

16. The permittee shall submit a notice of intent and written request to continue the use at least ninety (90) days prior to the expiration of the interim five-year permit.

17. The Commission shall delegate to Maui Department of Water Supply the authority to allocate the use of water for municipal purposes, as provided in §174C-48(b).

18. Maui Department of Water Supply shall be exempt from the requirements for permit modifications, as provided in §174C-57(c).

19. The permittee must meter water use and monitor chloride concentrations on a monthly basis and submit monthly reports of water use and chloride concentrations to the Commission.

20. Standard Condition 16 is waived for saltwater wells.

21. The permit will be revoked if (1) stream monitoring shows that pumping the well reduces stream flow, or (2) the electromagnetic resistivity survey indicates that the
well was drilled into a dike compartment, unless the applicant submits a petition for an amendment to the interim instream flow standard with the well completion report. However, no use of the water may be made without a Pump Installation Permit, which cannot be issued during consideration of the amendment of the interim instream flow standard.

22. The applicant shall present the results of the electromagnetic resistivity survey, pump tests, and stream monitoring to a community meeting as well as to the Commission.

23. A final determination of water use quantity shall be made within five (5) years of the filing date of the application (<Insert Date>) to continue existing use.

24. The applicant shall implement, by December 31, 1995, a biological and hydraulic monitoring program for a minimum 2-year period that: 1) documents the existing operating procedure, 2) seeks to identify the impacts of all operating alternatives on Waikolu Stream, and 3) seeks to identify the effectiveness of weir modifications (Dam No. 1). This program shall incorporate the three new wells, Wells #4-6 (Well Nos. 0855-06, -05, & -04, respectively), which may be pumped within the approved limits, for monitoring and testing purposes only. Further, semi-annual reports summarizing data and preliminary findings shall be submitted to the Commission. It is suggested that the Department of Agriculture work with the State Division of Aquatic Resources and other affected agencies to prepare the monitoring program in light of the difficult technical questions raised by this application. A particular concern is the coordination of this monitoring program with the ongoing National Park Service study by Anne Brasher. A draft of this plan shall be submitted to the Commission staff within ninety (90) days for technical review and comment. Results of the monitoring program shall be used to make recommendations to the Commission on any additional use of the wells, and shall be made readily available to all interested parties.

25. That the Commission approves the well construction permit for the Kamiloloa-Waiola Well (Well No. 0759-01), subject to the standard well construction conditions and the special conditions for the pumping well for the aquifer tests.

26. That the Commission authorizes the Chairperson to approve and issue a pump installation permit upon acceptance of adequate pump test result, subject to the standard pump installation conditions.

27. Should the well be used for back-up domestic supply, applicant is advised to contact DOH or otherwise ensure safe drinking water quality is maintained.

28. The applicant shall follow the agreed monitoring plan.

29. If pesticides used by the applicant are found in ground or surface water and can be traced to the applicant's use, the CWRM may revoke the permit immediately upon such finding.
30. Issuance of the interim permit shall be withheld until the reservation of water for DHHL is set by rule. Applicant may continue this existing use within the approved limits.

31. The applicant shall submit well modification and pump installation permit applications for administrative approval by chairperson prior to beginning any work required to complete well.

32. Should any stream flow impacts result from use, petition to amend interim instream flow standards shall be submitted.

33. Should any dewatering result from use, pumping shall cease immediately.

34. Shall submit accurate schematic diagram of distribution system for the battery of 5 wells.

35. Shall be subject to a 6-month independent audit & monitoring.

36. Final pump capacity shall be determined from pump test results & approved administratively by signature of chair.

37. The permittee shall seek and submit to the Commission within ninety (90) days written confirmation from the Department of Land Utilization of the non-conforming use.

38. Pumping shall cease immediately if the chloride reports show that the brackish water developed in the well exceeds 1,000 mg/l of chloride, unless a variance from the chloride limit has been granted. The authority to approve future variance requests is delegated to the chairperson.

39. The duration of the interim permit shall be:
   a. To July 1, 2006, or
   b. Until treated wastewater is available and acceptable for use, or
   c. Until such time that a significant change in permitted, actual, or projected uses or water supply occurs.

40. Action on any interim permit may be initiated by the Commission or any permittee upon letter request or pursuant to §174C-57 Haw. Rev. Stat. (Modification of permit terms).

41. This permit is approved under the assumption that wastewater will become available for reuse as an alternative supply source.

42. Require adherence to the chloride sampling protocol and the submittal of weekly chloride data. The authority to approve variances from the weekly reporting requirement is delegated to the Chairperson.

43. Require adherence to the Conservation Conditions.
44. In the event a water shortage is declared by the Commission, permittees in the <Insert Aquifer System> shall comply with the <Insert Aquifer System> water shortage plan adopted by the Commission.

45. The permittee shall contact the Department of Health, Clean Water Branch and obtain the necessary discharge permit(s).

46. Permit shall be interim and replaces existing WUP for 2051-07 & 11.

47. Applicant shall submit an acceptable archaeological inventory survey report to DHP. If historic sites affected, a plan to mitigate these affects must be accepted by DHP and completed by applicant.

48. Should the well be used for back-up domestic supply, applicant is advised to contact DOH or otherwise ensure safe drinking water quality is maintained.

49. (The permittee) may report monthly pumpage on yearly basis.

50. Prior to issuance of any permits, must submit filing fee for after-the-fact pump installation permit.

51. The term of this permit shall be twenty years from the date of issuance of the permit with a five-year Board review to determine compliance with the provisions of the permit.

52. The amount of water to be withdrawn under this permit shall be 0.19 mgd, averaged annually, for irrigation use. This permitted use of 0.19 mgd when added to a preserved use of 0.27 mgd amounts to a total of 0.46 mgd, averaged annually, which may be withdrawn from well 1646-01.

53. The use authorized by the permit must not interfered substantially and materially with existing individual household uses and existing uses.

54. The use of this well shall be subject to the shortage and emergency powers of the Board of Land and Natural Resources (BLNR).

55. This permit may be suspended or revoked, in accordance with Chapter 166.

56. The permit holder may be required to relinquish this permit to BLNR, in accordance with Chapter 166.

57. The withdrawal from Well 1646-10 shall be recorded and reported to DLNR on a monthly basis by the permittee.

58. In the event that emergency water use occurs, the permittee shall notify the Commission in writing within one (1) day of pumping, to in form the Commission as to the nature of the emergency and the expected duration of the emergency. A water
use report shall also be filed pursuant to Standard Condition 10 and Administrative Rule 13-168-7.

59. Note DOH’s requirements related to non-potable water systems (attached to original permit).

60. Standard Condition 16 requiring the submittal of a water shortage plan is waived.

61. All non-potable spigots and piping shall be clearly labeled as “DO NOT DRINK, NON-POTABLE” to prevent direct human consumption.

62. Standard Condition 10 is modified. Due to the inability to take water level measurements, the requirement to measure monthly water levels is waived. In addition, as long as the U.S. Geological Survey is collecting and analyzing the chloride content of the well water, the requirement for the permittee to measure and report chlorides is also waived.

63. Well elevation components must be surveyed by a licensed surveyor and this information must be submitted to commission prior to issuance of permanent permit.

64. The permittee shall obtain approvals from the Department of Health and the U.S. Environmental Protection Agency prior to use of the water.

65. This water use permit, WUP No. <Insert #>, shall supersede WUP No. <Insert #>.

66. WUP No. <Insert #> is revoked.

67. Standard Condition 17 is waived.

68. Standard Condition 22 for interim water use permits shall not apply.

69. To supplement our records, we request that you provide a map of the Galbraith Est. lands west of Wahiawa (2100 ac+) and the associated TMK’s for use area.

70. Deferred action on portion requested for golf course irrigation pending further refinement of irrigation requirement and a feasibility study for utilization of surface water sources, including Wahiawa Reservoir.

71. Written justification be provided for any 'cushion' of 0.5 mgd.

72. The water use permit shall be an interim permit. The duration of the interim permit shall be until treated wastewater is available and acceptable for use. The permittee shall continue discussions with Honolulu Board of Water Supply regarding the use of reclaimed water.

73. The permittee is put on notice that this is a qualified approval in that this permit may be modified or revoked prior to the expiration of the interim permit if the
Commission decides that the use of additional basal ground water for dust control and landscape irrigation is not reasonable-beneficial use.

74. The permittee encouraged to use drought-tolerant landscaping to conserve water.

75. Should the applicant provide written evidence that the county DHCD approves a 201E exemption for the elderly affordable housing project then the applicant may modify a corresponding portion of their existing aquacultural use to be used by the exemption approved project within the Commission approved water use permit limits under recommendation 5.

76. The applicant shall obtain a water lease/permit from Land Division prior to actual use of the well water.

77. Require the permittee to sign a contract by May 14, 1998 with the City Department of Wastewater Management to buy and use 0.400 mgd of R-1 water for a corresponding reduction in allocation for Well Nos. 1900-02, 17 to 20, and 1901-03.

78. Standard Condition 9 is waived.

79. Standard Condition 10 is modified to exempt the permittee from monthly measurements of salinity and temperature.

80. Standard Condition 10 is waived.

81. Applicant must seek a determination from BLNR and Land Mgt Div as to whether water license required. If required, license must be obtained prior to issuance of permit. If not, permit will be issued w/out further action.

82. Commission defers action on use in excess of 452,000 gpd pending additional info from BWS and further staff analysis.

83. The permit shall be subject to the Commission's sustainable yield review by December 1990.

84. The Commission shall delegate to the Honolulu Board of Water Supply the authority to allocate the use of water for municipal purposes, in accordance with §174C-48(b) HRS.

85. Honolulu Board of Water Supply shall be exempt from the requirements of permit modifications as provided in §174C-57.

86. BWS must participate in discussions, to be coordinated by Commission Staff, regarding a monitoring program to address impacts to Kaneohe Bay water quality, prior to any action on applications for future municipal uses.

87. A pump installation permit application must be made and approved prior to the installation of a permanent pump.
88. The water withdrawn shall be 0.7 mgd for municipal use.

89. The installed pump capacity of the well shall not be more than 700 gpm or 1.01 mgd.

90. The term of permit shall automatically expire twelve months from the date of issuance.

91. The Honolulu Board of Water Supply may continue to submit monthly water data on their own form, provided that the data are submitted in a format that is acceptable to the Commission staff.

92. Standard Condition 7 shall not apply.

93. Standard Condition 22 shall not apply.

94. Standard Condition 10 is modified to exempt the permittee from monthly measurements of salinity and temperature.

95. This permit shall be subject to conditions providing for stream restoration if the Commission determines that additional water should be returned to the streams.

96. HECO 1 mgd for industrial use

97. Campbell Estate 1 mgd for municipal use through BWS, by separate agreement with HECO

98. BWS 1 mgd for municipal use.

99. The permit shall be subject to the Commission’s sustainable yield review by <Insert Date>.

100. The applicant shall obtain the current version of the Department of Health’s Guidelines Applicable to Golf Courses in Hawaii. Where relevant and viable, items of the guidelines should be implemented and sustained appropriately. To obtain the current version, contact the Safe Drinking Water Branch, Environmental Management Division at 808-586-4258 (Honolulu).

101. The future use portion of the application shall be deferred until existing uses in the Koolauloa area are established.

102. The water to be withdrawn under this permit shall be a total of 0.03 mgd (0.02 mgd preserved plus an additional 0.01 mgd permitted use), averaged annually, for domestic and irrigation use

103. Existing well 1851-09 shall be properly sealed by a licensed drilling contractor. A well modification permit application, enclosed, shall be submitted to the Department for approval of the well sealing. A filing fee for sealing the well will not be required.
104. The permittee is required to test the source using a certified private laboratory and submit the test results to the Commission within three (3) months. The Commission will then forward the results to the Department of Health for their review. The Department of Health recommends that the well be routinely tested for microbiological and chemical parameters thereafter.

105. The permittee is required to submit a completed Registration of Well and Declaration of Water use by <Insert Date>.

106. The permittee shall contact the Department of Health for a written determination on the status of their water system and comply with any Department of Health requirements for monitoring and testing.

107. In the event that the original spring source decontaminates, the new well authorized will be shut down.

108. That within each aquifer the total permitted use shall not exceed the sustainable yield.

109. That any water available for allocation shall be for in-district use.

110. That scheduled reductions to Oahu Sugar Co. permitted use shall be initiated upon final termination of an Osco lease or sub-lease, whichever occurs later.

111. That permits for water use issued in accordance with the proposed schedule shall be interim permits subject to review and adjustment by 1995.

112. That the permit shall be an interim permit for a new use which is afforded to existing users as specified in §13-171-20.

113. That the original allocation of 0.200 mgd shall be taken to hearing for possible revocation at a later date to complete the transfer of the water use permit entirely to Well No. 3407-02. This revocation would reduce the current allocation afforded to the Kunihiro Well (Well No. 3406-06) to zero.

114. This allocation incorporates the unspecified domestic needs of the applicant and therefore necessitates a single meter be installed at the well.

115. Should any impacts to nearby wells or streams be established by the use of this well, the applicant shall address these issues to the satisfaction of the Commission.

116. If an economically feasible nonpotable source is identified, the applicant shall convert to the alternative nonpotable source.

117. The permit shall be subject to the Chairperson's approval of a water use plan recommending possible measures to prevent or minimize saltwater contamination and establish courses of action to follow should the aquifer become to saline to use.
118. Permittee shall provide the necessary end-use information on the 10th residence to allow regulation of the use under Chapter 174C.

119. Standard Conditions 10 & 18 shall not apply.

120. Standard Condition 10 is modified to exempt the permittee from the requirement to install a flowmeter. Salt water withdrawals may instead be estimated based on pumping capacity and run time.

121. The applicant shall review the existing year long period of pumpage and streamflow data and provide analysis on ground and surface water interaction. Deadline is January 25, 1994.

122. The water use permit for Well Nos. 2301-27 to -32 for 0.75 mgd (WUP No. 419) shall be revoked upon issuance of a pump installation permit for the well.

123. The permittee shall use mulching to decrease evaporative losses and manage irrigation scheduling to minimize water demand.

124. The permittee shall submit a detailed agricultural plan to support any future water use permit application for increased agricultural use at this parcel.

125. If not already obtained, the permittee shall seek and obtain any necessary permits from the Department of Health for the proposed discharge to Malaeakahana Stream.

126. Standard Condition 10 is modified to waive the requirement for installing a water meter on Well Nos. 2358-21, 22, and 29. The permittee shall install a water meter on Well No. 2358-26 to measure total monthly flow through the discharge line. This quantity should then be assumed to be the rate of natural flow from the other three wells for monthly reporting purposes.

127. The permit shall be effective upon submittal of documentation by Navy that it has met the DOH requirements for a public system.

128. This WUP shall be subject to Army's application for a WUP to reduce the permitted use of the Army's Schofield Shaft (2901-02 to 04, 10) by 0.208 mgd to a new total of 5.648 mgd. The Army's application shall be submitted within 60 days after the approval of this WUP or this WUP shall be void. Approval of the modification request shall be obtained from the CWRM prior to use of Well No. 3100-02 and issuance of this WUP.

129. Navy shall submit an after-the-fact PIPA, and approval of the permit shall be obtained prior to use of the well.

130. The well shall not be used for drinking water purposes unless it is properly tested and treated.
131. This permit is approved subject to reclaimed water becoming a practical alternative and provided that the Department of Health approves the reuse application.

132. Should any opae ula be recovered in the well water, the permittee shall notify the Division of Aquatic Resources and provide specimens to the Division of Aquatic Resources for analysis.

133. If a single meter at the well is used, the Commission shall allow an additional 1,000 gallons per day to the water use permit amount for the domestic needs of two residences, although a permit for individual domestic consumption is not required. Otherwise, the applicant must provide a meter to separately measure the irrigation consumption.

134. This permit is approved under the requirement that conversion to either: 1) treated wastewater becoming available for reuse as an alternative supply source, provided that Department of Health concerns over the use of treated effluent over the potable water aquifer have been addressed; and/or 2) other nonpotable source becoming available will occur in a timely manner.

135. These permits shall be subject to a review of actual use within four years for possible modification of the permitted amount.

136. The permit shall be reviewed in two (2) years for possible additional revocation due to nonuse.

137. The allocation is based on the projects listed in Exhibit 5 (of Item 10 of the May 20, 1998 Staff Submittal), except for the Queen’s Beach GC (TMK 139-11-2,3), Lot 9 (TMK 139-17-51), and Varsity Place (TMK 128-24-35).

138. Kamehameha Schools Bishop Estate/Honolulu Board of Water Supply shall transfer the water use permit within ninety (90) days of the effective date of the transfer of the pump station to the Honolulu Board of Water Supply, pursuant to §174C-59 Hawaii Revised Statutes.

139. The permittee shall ensure that the water is recycled by either directing it into the Waiahole Ditch for use by downstream farmers (subject to the approval of the Agribusiness Development Corporation’s Board) or into Waikele Farm’s existing irrigation system.

140. The permittee shall file a completed application to modify WUP No. 758 to reduce the allocation by 0.100 mgd within 60 days. If a completed water use permit modification application is not received within 60 days from this submittal’s date, then the subject water use permit application (WUPA No. 767) shall be deemed denied without prejudice without the need for another hearing.

141. The water withdrawn shall be for municipal use. No improvements to the existing sources are required as the existing source capacities are greater than the increase.
142. Water license must be determined through LM.

143. Proposed other uses will be considered at a later date.
State of Hawaii
COMMISSION ON WATER RESOURCE MANAGEMENT
Department of Land and Natural Resources
Honolulu, Hawaii

December 16, 1992

Chairperson and Members
Commission on Water Resource Management
State of Hawaii
Honolulu, Hawaii

Gentlemen:

REVISION - Honolulu Board of Water Supply
Application for a Water Use Permit
Hawaiian Electric Company Waiau Tunnel, Waiau, Oahu

Applicant: Honolulu Board of Water Supply
630 South Beretania Street
Honolulu, HI 96843

Landowner: Hawaiian Electric Company, Inc.
820 Ward Avenue
Honolulu, HI 96814

Background: The Hawaiian Electric Company Waiau Tunnel was constructed between May 1938 and January 1939, to develop water for cooling generators. The tunnel alone developed only 1.5 mgd. To increase production, three wells were drilled near the tunnel and connected to it by laterals. In 1940 the combined yield of the tunnel and wells was 15 mgd. Because it is free flowing and because flows from the tunnel have historically been included in the Pearl Harbor spring flow measurements, the tunnel was not included in the schedule of allocations for the Pearl Harbor Ground Water Management Area. Present flow from the tunnel ranges from about 7 to 12 mgd. Total output consists of artesian flow from G-11 (Well No. 2357-11), artesian flow as leakage around the annulus and fittings of G-12 (Well No. 2357-12), and artesian leakage from the floor and walls of the tunnel. Well G-10 (Well No. 2357-10) has been recased and no longer contributes to the tunnel. The free flow from G-11 and G-12, under normal summertime heads will total about 5 mgd. Higher wintertime heads may yield 6 to 7 mgd. Hawaiian Electric Company and the Honolulu Board of Water Supply, jointly want to develop the free flow from the tunnel. On August 19, 1992, the Commission approved a well modification permit to recase G-11 and G-12 to stop the leakage around the casing, and to build a sump structure to contain the free flow from the wells. Pumps will be designed to withdraw from the sumps at rates equivalent only to the free flow from the wells. An additional condition was that the applicant obtain a water use permit from the Commission.

Action Requested: The Commission approved the water use permit at its November meeting with modifications to some of the permit conditions. Staff was asked to look into the question raised by David Penn regarding ceded lands in the Pearl Harbor area and asked that the BWS be asked how the water allocated by this permit will fit in with the projected needs in the Pearl Harbor area. Ceded lands in the Pearl Harbor area remain under Federal control and not under State jurisdiction. The BWS has indicated that water use from the source will be distributed as follows:

- Hawaiian Electric Company 1 mgd for industrial use through BWS
- The Estate of James Campbell 1 mgd for municipal use through BWS
- Honolulu Board of Water Supply 1-5 mgd for municipal use

Source Location/Tax Map Key: The tunnel is located at the Hawaiian Electric Company Waiau Power Plant at Tax Map Key: 9-8-03:10 (see attached map).

Impact on Surrounding Wells: Water use from the tunnel will reduce the flow of water to Hawaiian Electric Company's pond located at the tunnel exit. Water from the pond is used for emergency cooling water for the plant.

ITEM 7
Chairperson and Members  
Commission on Water Resource Management  
December 16, 1992

Water Availability: The tunnel has historically been counted as part of spring flow in the Pearl Harbor Ground Water Management Area and has not been included in the allocations from the basal aquifer.

Public Notice: In accordance with DLNR Administrative Rules, a public notice was published in the Star Bulletin on September 21 & 28, 1992. In addition, copies of the public notice were sent to the Mayor's office, the County Council, the Department of Health, the Department of Hawaiian Home Lands, the Office of Hawaiian Affairs, the State Historic Preservation Division, and to other interested parties. Written comments to the proposed permit were to be submitted to the Commission by October 12, 1992. The Native Hawaiian Advisory Council submitted comments objecting to the wording of the legal notices and stating their overall objection to current Commission procedures and policies regarding water use permit processing. There were no other objections to the application.

RECOMMENDATION:

That the Commission approve the issuance of a water use permit to use five to seven mgd from the tunnel, subject to the following conditions:

1. The water use authorized by the permit must be for the reasonable-beneficial use and from the source described in the permit. Allocation over 3 mgd shall be committed to the water for approval.

2. The water use and withdrawal shall not adversely affect existing or future legal uses of water in the area, including any surface water or established instream flow standards.

3. The water use will not interfere with the rights of the Department of Hawaiian Home Lands as provided in section 221 of the Hawaiian Homes Commission Act.

4. Modification of any permit condition shall be approved by the Commission. Modification of any permit condition without notification may result in the revocation of the water use permit.

5. The applicant shall update and modify the permit when necessary to comply with all applicable laws, rules, and ordinances.

6. The applicant shall provide and maintain an approved meter or other appropriate device or means for measuring and reporting total water usage. Water usage shall be measured on a monthly basis and reported to the Commission along with water level and salinity measurements.

7. The final permit shall be issued only after review by the Attorney General.

Respectfully submitted,

[Signature]
Deputy Director

Attach.

APPROVED FOR SUBMITTAL:

[Signature]
WILLIAM W. PATY, Chairperson
HECO Waiau Tunnel
(Well Nos. 2357-11,12)
Toni--
We had to piece together the permit history for this well, it's fairly confusing. However, given the level of documentation we have, we have concluded that a pump with up to 1500 gpm capacity could be installed without a permit (for pump replacement work). Also, reviewing the initial pump installation permit application, the proposed pump capacity was 2100 gpm in two wells, with only one operating at a time.

You should be fine if you propose to put in a 1400 gpm pump.

Sorry for the delay in getting back to you. I needed to consult with a very busy Roy on this one because he worked on it in the early 1990s and has some institutional knowledge that was necessary here.

--Denise
"Toni Gonsalves" <gonsalves@beylik.com>

Aloha Denise,

Can you please forward a copy of the WCR Part I & Part II for HECO Waiau Wells No. 1A - Well No. 2357-12? We're bidding this project and want to be sure we have all the pertinent information and ensure the well is permitted for 1400 GPM.

Thanks for your assistance.

Toni Gonsalves
Estimator/Project Manager
Beylik Drilling & Pump Service, Inc.
91-259A Olai Street
Kapolei, HI 96707
Ph: 808-682-5554
Fax: 808-682-5866
Email: gonsalves@beylik.com
Department of Land and Natural Resources
Commission on Water Resource Management
P.O. Box 621
Honolulu, HI 96809

Attention: Ms. R. Loui

Gentlemen:

Subject: Well Modification Permit for HECO Waiau Wells G-11 and G-12

Enclosed are the following:

<table>
<thead>
<tr>
<th>Copies</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Well Modification Permit Well Nox. 2357-11 and 12</td>
</tr>
</tbody>
</table>

(Signed)

These are transmitted as checked below:

- [x] As requested
- _____ For your information/files
- _____ For your review and comments
- _____ Please provide comments by __________________________
- _____ Other

REMARKS: If you have any questions, please call me at 543-7746.

K. Fong
Project Engineer

cc (w/ encl.): Board of Water Supply (F. Fung)
Park Engineering (R. Suzuka)
R. Sakuda
K. Fong

An HEI Company
TO: Hawaiian Electric Company, Inc.
820 Ward Avenue
Honolulu, HI 96814

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 recase Wells G-11 and G-12 (Well Nos. 2357-11 and 12), for municipal use, 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 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 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.

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

4. The following shall be submitted to the Commission within 30 days after completion of the work:
   a. Well Completion Reports.
   b. As-built sectional drawing of the modified wells.
5. The applicant shall comply with all applicable laws, rules, and ordinances.

6. This permit may be revoked if work is not started within six months of the date of issuance or if work is suspended or abandoned for six months. The work proposed in the permit application shall be completed within two years from the date of permit issuance.

7. The applicant shall obtain a water use permit from the Commission. The allocation for the Hawaiian Electric Company Waiau Tunnel Wells G-11 and G-12 shall be counted as part of the Pearl Harbor spring flow, not the basal aquifer.

---

WILLIAM W. PATY, Chairperson
Commission on Water Resource Management
SEP - 8 1992
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: R. B. Munger Date: 9/22/92

Printed Name: R. B. Munger

Firm or Title: Manager, Engineering Dept.

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

Enc. (Well Completion Report form)

USGS
Department of Health
Safe Drinking Water Branch
Ground Water Protection Program
Honolulu Board of Water Supply
The Commission on Water Resource Management, at its meeting on August 19, 1992, approved your request to recase Hawaiian Electric Company Waiau Tunnel Wells G-11 and G-12. The permit to do the work is enclosed.

Please note Condition 7 of the permit requires you to obtain a water use permit from the Commission. We have received your application for a water use permit and are processing it. We will let you know when the water use permit is scheduled to go before the Commission.

Sincerely,

RAE M. LOUI
Deputy Director

ES:ko
Enc.
TO: Hawaiian Electric Company, Inc.
820 Ward Avenue
Honolulu, HI 96814

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 recase Wells G-11 and G-12 (Well Nos. 2357-11 and 12), for municipal use, is approved subject to the following conditions:

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William W. Paty, Chairperson
Commission on Water Resource Management

SEP 8 1992
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.

Enc. (Well Completion Report form)
c: USGS
   Department of Health
      Safe Drinking Water Branch
         Ground Water Protection Program
   Honolulu Board of Water Supply
Ms. Rae Loui, Deputy Director
Commission on Water Resource Management
Department of Land and Natural Resources
State of Hawaii
P.O. Box 621
Honolulu, Hawaii 96809

Dear Ms. Loui:

SUBJECT: WELL MODIFICATION PERMIT APPLICATION
HECO WAI'IAU POWER PLANT WELLS G-11 AND G-12
STATE WELL NOS. 2357-11 AND -12
PEARL CITY, OAHU

Thank you for the opportunity to review and comment on the subject document. We have examined the applications and have the following comments to offer:

1. The applications indicate that the subject wells will be for municipal use. Since these wells will serve 25 or more individuals at least 60 days per year or will have a minimum of 15 service connections, the owner and operator of the wells will be required to comply with Hawaii Administrative Rules, Title 11, Chapter 20, Rules Relating to Potable Water Systems.

2. Section 11-20-29 of Chapter 20 requires that a new source of potable water serving a public water system be approved by the Director of Health prior to its use. Such an approval is based primarily upon the submission of a satisfactory engineering report which addresses the requirements set in Section 11-20-29. The engineering report has been submitted and is in the process of being reviewed for comments.

3. The wells are situated above the Underground Injection Control (UIC) line. Land areas above the UIC line are considered to contain underground sources of drinking water. Thus, it is essential that the well be designed and constructed to prevent the possibility of groundwater contamination. For example, each well should have a concrete well pad and full grouting to prevent seepage or floodwaters from migrating down the well shaft. Similarly, the sump structure and related appurtenances must be watertight to prevent contaminants from seeping into the system.
4. The applicant must be cautioned that these sources are considered to be shallow wells and would be subject to the Environmental Protection Agency's Surface Water Treatment Rule (SWTR). All shallow groundwater sources will be required to demonstrate whether or not they are under the direct influence of surface waters. It will be the responsibility of the well owner and/or operator to provide the required information to the Department. Any source found to be under the influence will be required to immediately install treatment facilities (filtration and disinfection).

If you should have any questions, please contact the Stuart Yamada of the Safe Drinking Water Branch at 586-4258.

Sincerely,

[Signature]

THOMAS E. ARIZUMI, P.E., Chief
Environmental Management Division

SY:chl
c: Ken Fong
Hawaiian Electric Company, Inc.
820 Ward Avenue
Honolulu, HI 96814
Ms. Rae M. Loui
Deputy Director
Department of Land and Natural Resources
Commission on Water Resource Management
P. O. Box 621
Honolulu, Hawaii 96809

Dear Ms. Loui:

Subject: Your Letter of July 10, 1992 on the Permit Application to Modify HECO-Waiau Wells 2357-11 and 12 and Install Pumps

We request approval of the permit application to modify the two wells at Waiau and to install pumps.

The projects is to be constructed jointly with the Hawaiian Electric Company, owners of the artesian wells.

If you have any questions, please call Herbert H. Minakami at 527-6183.

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer
MEMORANDUM

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

FROM: Don Hibbard, Administrator
   State Historic Preservation Division

SUBJECT: Application for Well Construction Permits, HECO Waiau
   Power Plant Wells G-11 and G-12
   Waiau, 'Ewa, O'ahu
   TMK: 9-8-3: 10

These applications propose to redrill and install new pumps at two existing wells. Since this work will take place at existing facilities we believe that there will be "no effect" on historic sites.

TD: amk
Mr. Kazu Hayashida  
Manager and Chief Engineer  
Board of Water Supply  
City and County of Honolulu  
630 South Beretania Street  
Honolulu, Hawaii 96843  

Dear Mr. Hayashida:

Well Construction and Pump Installation Permit Application

Transmitted for your review and comment is a copy of the following permit application:

<table>
<thead>
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<td>Well Modification</td>
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Please review the application pursuant to your area of concern and submit your comments to us, orally or in writing, ten (10) working days from date of this letter.

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

Sincerely,

RAE M. LOUI  
Deputy Director

NF:ky  
Enc.
Mr. Thomas Arizumi, Chief  
Environmental Management Division  
State Department of Health  
Five Waterfront Plaza  
500 Ala Moana Blvd., Suite 250  
Honolulu, Hawaii 96813

Attn: Mr. William Wong

Dear Mr. Arizumi:

Well Construction and Pump Installation Permit Applications

Transmitted for your review and comment are copies of the following permit applications:

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Please review the applications pursuant to your area of concern and submit your comments to us, orally or in writing, ten (10) working days from date of this letter.

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

Sincerely,

RAE M. LOUI  
Deputy Director

NF:ky  
Enc.
MEMORANDUM

TO: Don Hibbard, Director
    Historic Preservation Program

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

SUBJECT: Well Construction and Pump Installation Permit Applications

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Please review the applications pursuant to your area of concern and submit your comments to us, orally or in writing, ten (10) working days from date of this memo.

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

Enc.
Ms. Marjorie Ziegler  
Sierra Club Legal Defense Fund, Inc.  
212 Merchant Street, Room 202  
Honolulu, Hawaii 96813  

Dear Ms. Ziegler:  

Well Construction and Pump Installation Permit Applications  

Transmitted for your information are copies of recent well permit applications:  

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

Sincerely,

RAE M. LOUI  
Deputy Director

NF:ky  
Enc.
Honorable Hoaliku L. Drake
Director
Department of Hawaiian Home Lands
State of Hawaii
P.O. Box 1879
Honolulu, Hawaii 96805

Dear Mrs. Drake:

Well Construction and Pump Installation Permit Applications

Transmitted for your review and comment are copies of the following permit applications:

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<td>HECO-Waiau Wells</td>
<td>2357-11,12</td>
<td>Well Modification</td>
</tr>
<tr>
<td>Maui</td>
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<td>5419-01</td>
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<td>3155-02</td>
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<td>3586-01</td>
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<td>4462-02 to 04</td>
<td>Well and Pump</td>
</tr>
</tbody>
</table>

Please review the applications pursuant to your area of concern and submit your comments to us, orally or in writing, ten (10) working days from date of this letter.

Should you have any questions, please contact Rae M. Loui, Deputy Director at 587-0214.

Very truly yours,

WILLIAM W. PATY

Enc.
Mr. Clayton H. W. Hee  
Chairman & Trustee At Large  
Office of Hawaiian Affairs  
711 Kapiolani Blvd., Suite 500  
Honolulu, Hawaii 96813-5249  

Attn: Ms. Linda Delaney, Land & Natural Resources Division  

Dear Mr. Hee:  

Well Construction and Pump Installation Permit Applications  

Transmitted for your review and comment are copies of the following permit applications:  

<table>
<thead>
<tr>
<th>Island</th>
<th>Well Name</th>
<th>Well No.</th>
<th>Application Type</th>
</tr>
</thead>
<tbody>
<tr>
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Please review the applications pursuant to your area of concern and submit your comments to us, orally or in writing, ten (10) working days from date of this letter.  

Should you have any questions, please contact Rae M. Loui, Deputy Director at 587-0214.  

Very truly yours,  

WILLIAM W. PATY  

Enc.
Mr. Ken Fong
Hawaiian Electric Co., Inc.
820 Ward Avenue
Honolulu, Hawaii 96814

Dear Mr. Fong:

We have received your applications for permits to modify two existing wells (Well Nos. 2357-11,12) at Waiau, Oahu, (TMK 9-8-03:10). We are reviewing the applications for completeness.

Should you have questions, please call the Commission staff at 587-0225.

Sincerely,

[Signature]

RAE M. LOUI
Deputy Director

NF:ky
CHECKLIST

✓ WELL CONSTRUCTION PERMIT

PUMP INSTALLATION PERMIT

WELL NAME or LOCATION: HECO WAIAU WELLS

ISLAND: OAHU

WELL NUMBER: 2357-11,12

Tax Map Key: 9-8-3:10

OWNER/OPERATOR:

Firm Name: Hawaiian Electric Co., Inc.
Contact Person: Ken. Fong
Address: 820 Ward Avenue
Phone: 543-7746

LANDOWNER:

Firm Name: Same
Contact Person
Address
Phone

Date application received.......................... 5-5-92

Date acknowledged receipt/request more info.:

Date application accepted:

Suspense date (90 days):

Date filing fee deposited:

Application sent to following:

Dept. of Hawn Home Lands
Dept. of Health
Office of Hawn. Affairs
State Hist Pres Div
Dept/Bd of Water Supply
Sierra Club L. D. F.
Koolaulea NB #20 (Oahu)
Dept.Pub. Wrks (Hawaii)
Additional List (Molokai)

Date agenda due................................. July 1, 1992

Date submittal due............................... July 1, 1992

Date submittal sent to applicant:

Date application approved or disapproved:

Date applicant notified of decision:

REMARKS:

____________________________

____________________________

____________________________

____________________________

____________________________

____________________________
HELLO  

6-3-98

1. Will process for July Mfg. (15)
2. New WUP appl. soon - fill out
3. Talk to Cushman - recommend WUP not needed some part of "icebag" - Hist. background, etc.
FOR YOUR:

M. TAGOMORI

---

L. Nanbu

---

G. Matsumoto

---

E. Sakoda

---

Y. Shiroma

---

E. Hirano

---

S. Samuels

---

G. Bauer

---

R. Rozeboom

---

R. Hardy

---

TO: INIT: PLEASE:

---

REMARKS:

See Me

Call

Review & Comment

Take Action

Investigate & Report

Draft Reply

Acknowledge Receipt

Type Draft

Type Final

Xerox ___ copies

2 Well Construction (ML/First) permit applies.

2 Well Construction (ML/First) permit applies.

Got water use permit first?

yes, and I think we should require them to list their proposed contractor before we accept. Also, we should return with request & new application forms.
May 4, 1992

Mr. William Paty
Chairperson
Commission on Water Resource Management
Department of Land and Natural Resources
Kalanimoku Building
1151 Punchbowl Street
Honolulu, HI 96813

Dear Mr. Paty:

Attention: Mr. Ed Sakoda

Subject: Heco Waiau Tunnel Source
Permit Applications to Rehabilitation
Wells G-11 and G-12

Request is hereby made for permission to rehabilitate the existing
Wells G-11 (2357-11) and G-12 (2357-12) located on the grounds of
the Hawaiian Electric Company Waiau Power plant. Enclosed are the
applications for this work and a Location Map marked Enclosure A.

Your earliest review and approval of this request will be
appreciated.

Sincerely yours:

Paren, Inc.,
dba PARK ENGINEERING

Reginald Suzuki
Project Manager

TC #178/FOLDER #259

cc: Board of Water Supply, Attention: Francis Fung
Hawaiian Electric Company, Attention Mr. Ross Sakuda
APPLICATION FOR: ☑ Well Construction or ☐ Pump Installation PERMIT

Instructions: Please print or type and send completed application with attachments to the Div. of Water Resource Management, P.O. Box 373, Honolulu, Hawaii 96809. Application must be accompanied by a non-refundable filing fee of $25.00 payable to the Dept. of Land and Natural Resources. (Filing fee waived for government agencies.) If necessary, phone 548-7643, Hydrology/Geology Section for assistance.

1. WELL LOCATION/NAME: HECO-WAIAU POWER PLANT WELLS #1 Island OAHU
   Address 475 KAMEHAMEHA HWY, PEARL CITY, 96782 Tax Map Key 9-8-8110
   (Attach a USGS map, scale 1"=2000', and a property tax map showing well location referenced to established property boundaries.)

2. (a) WELL OWNER:
   Firm Name HAWAIIAN ELECTRIC CO, INC
   Contact Person KEN FONG
   Address 620 WARD AVE
   HONOLULU, HI 96814 Ph: 543-7748

(b) LANDOWNER:
   Firm Name SAME AS WELL OWNER
   Contact Person
   Address
   Ph:

3. PROPOSED CONTRACTOR:
   Name TO BE SELECTED
   Contractor's License No.
   Ph:

4. PROPOSED WORK:
   ☑ Drill New Well ☐ Deepen ☐ Rudrill
   ☐ Alter ☐ Seal ☐ Abandon
   ☑ Install New Pump ☐ Replace Pump ☐ Modify Pump
   (Briefly describe the proposed work and fill in the diagram on the back of this form.)

5. PROPOSED USE:
   ☑ Municipal (including hotels, stores, etc.) ☐ Military
   ☐ Domestic (individual, noncommercial water sys.) ☐ Industrial
   ☐ Irrigation (specify) ☐ Other (specify)

6. PROPOSED AMOUNT OF WITHDRAWAL: 3.0 TO 3.5 MILLION gallons per day

7. PROPOSED PUMP INFORMATION:
   Pump Type:
   ☑ Vertical Turbine ☐ Submersible ☐ Centrifugal
   Motor:
   ☐ Diesel ☐ Gas ☐ Electric, at a rated horsepower of 100
   Rated Pump Capacity: Gallons per minute 2100

Well Owner (print) HAWAIIAN ELECTRIC CO, INC
Signature Bhuma Munga
Date 4/30/92

Landowner (print) HAWAIIAN ELECTRIC CO, INC
Signature Bhuma Munga
Date 4/30/92

For Official Use Only:
Field Checked By ________________
Latitude ________________
State Well No. 2357-11

Field Checked Date ________________
Longitude ________________
Hydrologic Unit ________________
Briefly describe the proposed work:

**INSTALL NEW 16" CASING W/I EXISTING 20" CASING AND GROUT SPACE BETWEEN THEM. CONSTRUCT SUMP STRUCTURE AND INSTALL TWO VERTICAL TURBINE PUMPS.**

---

**PROPOSED SECTION OF WELL**

Elevation at top of casing: 34 ft., msl.

**EXIST: 20" CASING TO BE REMOVED**

**TUNNEL FLOOR +20(CF)**

Total Depth: 102 ft.

Rock Packing: 0 ft.

Cement Grout: 12 ft.

**EXIST: 20" CASING TO REMAIN**

Ground Elevation: 335 ft., msl*

**Solid Casing:**
- Material: **STEEL**
- Length: 47 ft.
- Diameter: 16 in.
- Wall thickness: 0.375 in.

**Casing:**
- □ Perforated
- □ Screen

**Material**
- Length
- Diameter
- Wall thickness
- Openings sq. in./L.F.

**Open HOLE**
- Length 0.2
- Diameter ± 2.2 in.

---

*Approximate elevation at time of filing application. Final elevation (msl) by a surveyor licensed by the State must be submitted at start of construction.
APPLICATION FOR: ☑ Well Construction or ☐ Pump Installation PERMIT

Instructions: Please print or type and send completed application with attachments to the Div. of Water Resource Management, P.O. Box 373, Honolulu, Hawai‘i 96809. Application must be accompanied by a non-refundable filing fee of $25.00 payable to the Dept. of Land and Natural Resources. (Filing fee waived for government agencies.) If necessary, phone 548-7643, Hydrology/Geology Section for assistance.

1. WELL LOCATION/NAME: HECO WAIANA POWER PLANT WELL #12 Island CAHU
   Address 415 KAMEHAMEHA HWY PEARL CITY 96782 Tax Map Key 9-8-2-10
   (Attach a USGS map, scale 1"=2000", and a property tax map showing well location referenced to established property boundaries.)

2. (a) WELL OWNER:
   Firm Name HAWAIIAN ELECTRIC CO., INC.
   Contact Person KEN FONG
   Address 820 WARD AVENUE
   HONOLULU, HI 96814 Ph: 548-7746

(b) LANDOWNER:
   Firm Name SAME AS WELL OWNER
   Contact Person
   Address
   Ph:

3. PROPOSED CONTRACTOR:
   Name TO BE SELECTED
   Contractor's License No.
   Address
   Ph:

4. PROPOSED WORK:
   ☑ Drill New Well ☑ Deepen ☑ Redrill
   ☑ Alter ☑ Seal ☑ Abandon
   ☑ Install New Pump ☑ Replace Pump ☑ Modify Pump
   (Briefly describe the proposed work and fill in the diagram on the back of this form.)

5. PROPOSED USE:
   ☑ Municipal (including hotels, stores, etc.) ☐ Military
   ☐ Domestic (individual, noncommercial water sys.) ☐ Industrial
   ☐ Irrigation (specify) ☐ Other (specify)

6. PROPOSED AMOUNT OF WITHDRAWAL: 20 to 50 MILLION gallons per day

7. PROPOSED PUMP INFORMATION:
   Pump Type:
   ☑ Vertical Turbine ☐ Diesel
   ☐ Submersible ☐ Gas
   ☐ Centrifugal ☑ Electric, at a rated horsepower of 150 HP
   Motor:
   Rated Pump Capacity: Gallons per minute 1500

Well Owner (print) HAWAIIAN ELECTRIC CO., INC.
Landowner (print) HAWAIIAN ELECTRIC CO., INC.

Signature ___________________________ Signature ___________________________
Date 4/30/92 Date 4/30/92

For Official Use Only:
Field Checked By ___________________________ Latitude ___________________________
Date ___________________________ Longitude ___________________________
Hydrologic Unit State Well No. 2357-12
Briefly describe the proposed work:

INSTALL NEW 16' CASING W/ EXISTING 20' CASING AND GROUT SPACE BETWEEN THEM. CONSTRUCT SUMP STRUCTURE AND INSTALL TWO VERTICAL TURBINE PUMPS.

PROPOSED SECTION OF WELL

Elevation at top of casing: 36 ft., msl.

Ground Elevation: 35 ft., msl

Solid Casing:
- Material: STEEL
- Length: 45 ft.
- Diameter: 16 in.
- Wall thickness: 0.375 in.

Casing: □ Perforated □ Screen □ NONE
- Material: 
- Length: 
- Diameter: 
- Wall thickness: 
- Openings: sq. in./L.F.

Rock Packing: 0 ft.

EXIST. 20' CASING TO REMAIN

Cement Grout: 9 ft.

EXIST. 20' CASING TO BE REMOVED

Total Depth: 82 ft.

TUNNEL FLOOR +20(\#)

Open Hole:
- Length: 36 ft.
- Diameter: ± 22 in.

*Approximate elevation at time of filing application. Final elevation (msl) by a surveyor licensed by the State must be submitted at start of construction.
COMMISSION ON RESOURCE MANAGEMENT

FROM: [Signature]

DATE: 3/17

TO: G. Matsumoto

INIT: [Signature]

PLEASE:

- See Me
- Call
- Review & Comment
- Take Action
- Investigate & Report
- Draft Reply
- Acknowledge Receipt
- Type Draft
- Type Final
- Xerox [Number] copies

FOR YOUR:

- R. LOUI
- S. Kokubun

REMARKS:

- Approval
- Signature
- Information
Mr. Manabu Tagomori  
Deputy Director  
Commission on Water Resource Management  
State of Hawaii  
P.O. Box 373  
Honolulu, Hawaii 96809  

Attention: Mr. Ed Sakoda  

Dear Mr. Tagomori:  

Subject: HECO Waiau Tunnel Source, Design of Phase 2 Improvements,  
Aiea, Oahu, Hawaii - TMK:9-8-03:10  

We forward a copy of the letter dated February 7, 1992 from George A. L. Yuen and Associates on the Conceptual Design Report for developing the HECO Waiau Wells G-11 and G-12. This letter and the attached report, dated November 22, 1991, address the concerns raised at a meeting with members of our staff and consultant on April 15, 1991. Attached also is the March 11, 1991 report for your information.  

If you have any questions, please contact James Yamauchi at 527-5203.  

Very truly yours,  

KAZU HAYASHIDA  
Manager and Chief Engineer  

Attachments  

Pure Water ... man's greatest need - use it wisely
February 11, 1992

Mr. Herb Minakami, Chief
Planning and Engineering Division
Board of Water Supply
City and County of Honolulu
630 South Beretania Street
Honolulu, HI 96813

Dear Mr. Minakami

Attention: Francis Fung

Subject: Heco Waiau Tunnel Source
Design of Phase 2 Improvements

We are transmitting herewith a copy of the letter dated February 7, 1992 from George A.L. Yuen and Associates on the Conceptual Design Report for developing the Heco Waiau Wells G-11 and G-12. This letter and the attached report dated March 11, 1991 address the concerns raised by Mr. Manabu Tagomori of the Department of Land and Natural Resources at our meeting on April 15, 1991.

Please submit copies of this letter and report to Mr. Tagomori at your earliest convenience.

Incidentally, we have learned that HECO has rehabilitated Well G-10 and is now using the flows from this well for their plant needs. The discussion in the report on the flows for Well G-11, G-12 and the tunnel with Well G-10 sealed should therefore be ignored.

Sincerely yours:

Paren, Inc.,
dba PARK ENGINEERING

Reginald Suzuka
Project Manager

TC #178/FOLDER #259

cc: George A.L. Yuen and Associates
February 7, 1992

Mr. Reggie Suzuka
Park Engineering Co.
567 South King Street #300
Honolulu, Hawaii 96813

Re: Conceptual Report - Development of Waiau Wells G-11 & G-12

Numerous reports about the capacity and reliability of flow from wells in the HECO Waiau Tunnel have been submitted by either George A. L. Yuen and Associates or Mink and Yuen, Inc. at intervals since 1989. The most comprehensive, submitted to Park Engineering in October 1990, describes the condition of the wells, assesses the likelihood of contamination of the groundwater, and discusses artesian flow principals of which the development program relies.

A report dated March 11, 1991, discussed in detail the concepts underlying the final engineering development plan. The report fully explains the hydraulic behavior of groundwater in the tunnel-well complex and how this behavior can be exploited to yield a reliable water supply. The alternative employs a separate sump at Wells G-11 and G-12 is the chosen means of development.

A copy of the November 22, 1991 report is submitted to satisfy Task IV-1 requirement, "Conceptual Report of Revised Plan." This report in combination with the report of October, 1990 comprises our arguments for the development of the HECO-Waiau water resource by means of wells rather than by collecting the tunnel water.

Copies of both of the above reports were sent to you some time ago. We are transmitting a copy of the November 22, 1991 report which is the "Conceptual Report." It is an update of the March 11, 1991 report.

Very Truly yours,

George A. L. Yuen,
President

GY:sa
cc: Francis Fung
   Board of Water Supply
   630 S. Beretania Street
   Honolulu, Hawaii 96813
Groundwater flow from Waiau Tunnel is considered spring flow and therefore is not included in the schedule of allocation required for the designated Pearl Harbor regional aquifer. Median outflow from the tunnel now is 8.5 mgd, and the range of flows falls between about 7 and 12 mgd. These flows are for the current configuration of the tunnel complex.

Total output consists of three flow components, which are:
1) artesian flow from a pipe connected at right angles to the casing of well G-11.
2) artesian flow as leakage around the annulus and fittings of well G-12.
3) artesian leakage from the floor and walls of the tunnel.

Well G-10, which at one time yielded the largest flow, is sealed and contributes no more than a trickle to tunnel output.

In 1937-1938 when the tunnel was excavated and the wells drilled, total outflow of the combination of G-10, G-11, G-12 and tunnel seepage was 17.3 mgd. The pre-flow groundwater head at Waiau was 22 to 23 feet, but at full free flow it dropped to 15.5 feet, a local drawdown of 7 feet. The contribution from each source at that time was:

\[
\begin{align*}
G-10 & = 5.5 \text{ mgd} \\
G-11 & = 5.0 \\
G-12 & = 3.0 \\
\text{Tunnel leakage} & = 3.0 \\
\text{TOTAL} & = 17.3 \text{ mgd}
\end{align*}
\]
At the current regional head of approximately 11 feet, equivalent flows would be about as follows:

- G-10 - 2.8 mgd (sealed; no flow)
- G-11 - 2.5
- G-12 - 1.5
- Tunnel leakage - 1.9
- TOTAL - 8.7 mgd

Excluding G-10, which is sealed, the remaining flow adds to 5.9 mgd. However, loss of G-10 means also recovery from drawdown and therefore increase in flow from the other sources. Assignment of an equal increment of G-10 flow to the other sources gives outputs of:

- G-11 - 3.4 mgd
- G-12 - 2.4
- Tunnel leakage - 2.8
- TOTAL - 8.6 mgd

This total is the same as the current median flow.

During the recent investigation a meter was placed on the offtake pipe at G-11 and recorded a high of somewhat more than 3 mgd and an average over several days of 2.6 mgd. The offtake arrangement is inefficient, however, and the measurement does not reflect the full flow potential that would be available if an efficient attachment were in place. The realizable free flow at G-11 for normal summertime heads is probably 3.0 to 3.5 mgd.

At G-12 all present flow results from leakage around the annulus and through openings where the casing is exposed in the tunnel. Less than 1 mgd leaks in this way, but were the well to be opened the normal flow would be about 2 mgd.

The combination of free flow under normal summertime heads from G-11 and G-12 will total about 5 mgd. For winter heads of about 15 feet the combined flow would be 6 to 7 mgd.

The above evaluation assumes that free flow from the wells takes place just above the invert of the tunnel, which is about 2 feet above sea level. An offtake set higher up on the casing would deliver lower flows. This relationship is derived and explained in an earlier memo submitted to Park Engineering and the Board of Water Supply.
To develop each well's free flow at the level of the tunnel, the offtake pipes must lead to a sump which is lower than the level of the pipe elevation. Artesian flow will spill into the sump from where it will be pumped to the BWS transmission line.

The alternative to the original plan of diverting total tunnel flow to a master sump calls for individual sumps at wells G-11 and G-12. Tunnel seepage will not be used because it is subject to local contamination.

Each well sump must have enough volume below the invert of the pipe from the well to allow the pump to operate efficiently. Head build-up in the sump will decrease free flow from the well. On the other hand, excavating below the invert of the tunnel will incite additional artesian flow. The design of the offtake - sump - pump arrangement will have to distinguish between free flow originating from the well and that which rises in the sump excavation. This problem may be avoided by sealing the sump from groundwater seepage.

In addition the design must specify withdrawal from the sump at a rate equivalent only to well free flow. How much sump volume below the tunnel invert is necessary to allow continuous pumping at a steady rate without the danger of cavitation needs to be determined.
Groundwater flow from Waiau Tunnel is considered spring flow and therefore is not included in the schedule of allocation required for the designated Pearl Harbor regional aquifer. Median outflow from the tunnel now is 8.5 mgd, and the range of flows falls between about 7 and 12 mgd. These flows are for the current configuration of the tunnel complex.

Total output consists of three flow components, which are:
1) artesian flow from a pipe connected at right angles to the casing of well G-11.
2) artesian flow as leakage around the annulus and fittings of well G-12.
3) artesian leakage from the floor and walls of the tunnel.

Well G-10, which at one time yielded the largest flow, is sealed and contributes no more than a trickle to tunnel output.

In 1937-1938 when the tunnel was excavated and the wells drilled, total outflow of the combination of G-10, G-11, G-12 and tunnel seepage was 17.3 mgd. The pre-flow groundwater head at Waiau was 22 to 23 feet, but at full free flow it dropped to 15.5 feet, a local drawdown of 7 feet. The contribution from each source at that time was:

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\text{Tunnel leakage} & = 3.8 \\
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\]
At the current regional head of approximately 11 feet, equivalent flows would be about as follows:

- G-10 - 2.8 mgd (sealed; no flow)
- G-11 - 2.5
- G-12 - 1.5
- Tunnel leakage - 1.9
- TOTAL - 8.7 mgd

Excluding G-10, which is sealed, the remaining flow adds to 5.9 mgd. However, loss of G-10 means also recovery from drawdown and therefore increase in flow from the other sources. Assignment of an equal increment of G-10 flow to the other sources gives outputs of:

- G-11 - 3.4 mgd
- G-12 - 2.4
- Tunnel leakage - 2.8
- TOTAL - 8.6 mgd

This total is the same as the current median flow.

During the recent investigation a meter was placed on the offtake pipe at G-11 and recorded a high of somewhat more than 3 mgd and an average over several days of 2.6 mgd. The offtake arrangement is inefficient, however, and the measurement does not reflect the full flow potential that would be available if an efficient attachment were in place. The realizable free flow at G-11 for normal summertime heads is probably 3.0 to 3.5 mgd.

At G-12 all present flow results from leakage around the annulus and through openings where the casing is exposed in the tunnel. Less than 1 mgd leaks in this way, but were the well to be opened the normal flow would be about 2 mgd.

The combination of free flow under normal summertime heads from G-11 and G-12 will total about 5 mgd. For winter heads of about 15 feet the combined flow would be 6 to 7 mgd.

The above evaluation assumes that free flow from the wells takes place just above the invert of the tunnel, which is about 2 feet above sea level. An offtake set higher up on the casing would deliver lower flows. This relationship is derived and explained in an earlier memo submitted to Park Engineering and the Board of Water Supply.
To develop each well's free flow at the level of the tunnel, the offtake pipes must lead to a sump which is lower than the level of the pipe elevation. Artesian flow will spill into the sump from where it will be pumped to the BWS transmission line.

The alternative to the original plan of diverting total tunnel flow to a master sump calls for individual sumps at wells G-11 and G-12. Tunnel seepage will not be used because it is subject to local contamination.

Each well sump must have enough volume below the invert of the pipe from the well to allow the pump to operate efficiently. Head build-up in the sump will decrease free flow from the well. On the other hand, excavating below the invert of the tunnel will incite additional artesian flow. The design of the offtake - sump - pump arrangement will have to distinguish between free flow originating from the well and that which rises in the sump excavation. This problem may be avoided by sealing the sump from groundwater seepage.

In addition the design must specify withdrawal from the sump at a rate equivalent only to well free flow. How much sump volume below the tunnel invert is necessary to allow continuous pumping at a steady rate without the danger of cavitation needs to be determined.

The other new alternative allows for pumping directly from G-11 and G-12 at a rate exactly equivalent to free flow. The flow would be established for different head values. Free flow varies directly with head, and the rate of flow per foot of head - based on the original condition of total tunnel output of 17.3 mgd at a regional head of 22.5 feet - is 0.77 mgd per foot. For G-11 and G-12 the comparable values are 0.22 and 0.13 mgd/foot, respectively. For a seasonal swing in regional head of 4 feet, the difference between maximum free flow and minimum free flow is 0.88 mgd at G-11 and 0.52 mgd at G-12. For these conditions the annual range at G-11 would be 3.0 to 3.8 mgd and at G-12 2.1 to 2.7 mgd. The wells can be expected to yield a total of approximately 6.5 mgd when heads are high and 5.1 mgd when they are low. These values have to be verified and are illustrative rather than accurate for the conditions outlined above.
February 7, 1992

Department of Land and Natural Resources
Division of Water Resource Management
P.O. Box 373
Honolulu, HI 96809

Gentlemen:

Please find enclosed a copy of the well completion report for HECO's Waiau Well No. 1 (State Well No. 2357-10). The well was successfully recased on November 11, 1991 by our contractor Roscoe Moss Hawaii, Inc.

If you have any questions, please call me at 543-7746.

Sincerely,

K. Fong
Project Engineer

kbf
enclosure

cc (w/ enclosure): A. Ho (GV)
INSTRUCTIONS: Please print or type and submit completed report within 30 days of well completion to the Division of Water Resource Management, P.O. Box 233, Honolulu, Hawaii 96809. An as-built drawing of the well and chemical analysis, if available, should also be submitted. If necessary, phone (808) 944-7243. Hilo area, Coolzy Section for assistance.

A. STATE WELl NO. USGS 1991-B  WELl NAME HECO G-10   ISLAND Oahu

B. LOCATION Waian
   TAX MAP KEY

C. WELl OWNER Hawaiian Electric Company

D. DRILLING OR PUMP INSTALLATION CONTRACTOR Roscoe Moss Hawaii, Inc.

E. TYPE OF RIG cable tool
   DRILLER Hal Fenton

F. DATE OF WELL COMPLETION 11/20/91 DATE OF PUMP INSTALLATION n/a

G. GROUND ELEVATION (ac) 16 ft.
   Top of Drilling Platform (in) 16 ft.
   Height of drilling platform above ground surface 0 ft.
   Bench mark and method used to determine ground elevation ft.

H. TOTAL DEPTH OF WELL BELOW GROUND 90 ft.

I. HOLE SIZE: 14 inch dia. from 0 ft. to 40 ft. below ground
   20 inch dia. from 40 ft. to 70 ft. below ground

J. CASING INSTALLED:
   14 in. I.D. x .375 in. wall solid section to 40 ft. below ground
   20 in. I.D. x .500 in. wall perforated section to 70 ft. below ground
   Type of perforation

K. AHULUS:
   Grouted from 10 ft. to 40 ft. below ground
   Gravel packed from 10 ft. to 40 ft. below ground

L. PERMANENT PUMP INSTALLATION:
   Pump type, make, serial No. n/a
   Motor type, H.P., voltage, r.p.m.
   Depth of pump intake setting ft. below ground
   Depth of bottom of airline ft. below ground
   Capacity gpm

M. PROPOSED USE Cooling & Boilers

N. INITIAL WATER LEVEL 2.5 ft. below ground. Date and time of measurement 7:00 am 11/19/91

O. INITIAL CHLORIDE ppm. Date and time of sampling

P. PUMPING TESTS: Reference point (R.P.) used: Ground which elevation is 16 ft.
   Date 11/19/91
   Start water level ft. below R. P.
   End water level ft. below R. P.
   Depth of well ft. below R. P.
   Ellapsed Time (hours) (gpm) Depth Draw Ch. Temp.
   10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10

Q. DRILLER'S LOG:

     Depth, ft. Rock Description & Remarks  Water Level, ft.  Depth, ft. Rock Description & Remarks  Water Level, ft.
     10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10

REMARKS:

Submitted by (print) Tracy Runnells

FOR DRILLER'S USE
Job Name
Job No.

Title Field Superintendent

Date 1/14/92

FOR OFFICIAL USE
Latitude 21° 23' 33"
Longitude 157° 57' 53"
Well No. 2357-10
Briefly describe the proposed work:

Recased well 14" diameter steel to 40' from ground level. Initially filled hole with 1:1 grout from 45'-10' and core barreled hole 19" diameter to 40'. Installed new .375 steel casing and pressure grouted casing from bottom up via a shoe and check valve inside casing, forcing cement up annulas.

**PROPOSED SECTION OF WELL**

<table>
<thead>
<tr>
<th>Elevation at top of casing</th>
<th>approx 18 ft., msl.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ground Elevation</td>
<td>ft., msl</td>
</tr>
<tr>
<td>Cement Grout</td>
<td>30 ft.</td>
</tr>
<tr>
<td>(10'-40')</td>
<td></td>
</tr>
<tr>
<td>Hole Dia.</td>
<td>19 in.</td>
</tr>
<tr>
<td>Total Depth</td>
<td>90 ft.</td>
</tr>
<tr>
<td>Rock Packing</td>
<td>n/a ft.</td>
</tr>
</tbody>
</table>

**Solid Casing:**
- Material: steel
- Length: 42 ft.
- Diameter: 14 in.
- Wall thickness: .375 in.

**Casing:**
- Material: n/a
- Length: __________ ft.
- Diameter: __________ in.
- Wall thickness: __________ in.
- Openings: __________ sq. in./L.F.

**Open Hole:**
- Length: 50'
- Diameter: 20"
**STATE OF HAWAII**
**DEPARTMENT OF LAND AND NATURAL RESOURCES**
**COMMISSION ON WATER RESOURCE MANAGEMENT**
**DIVISION OF WATER RESOURCE MANAGEMENT**

**WELL COMPLETION REPORT**

**INSTRUCTIONS:** Please print or type and submit completed report within 30 days of well completion to the Division of Water Resource Management, P.O. Box 379, Hilo, Hawaii 96720. An as-built drawing of the well and chemical analysis, if available, should also be submitted. If necessary, through 218-2511, Honolulu, Graball Section for assistance.

**A. STAKE WELL NO.** USGS 1991-B  
**WELL NAME:** HECO G-10  
**LAND USE:**

<table>
<thead>
<tr>
<th>Date of Survey</th>
<th>2357-10</th>
</tr>
</thead>
</table>

**B. LOCATION:** Maui

**C. WELL OWNER:** Hawaiian Electric Company

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

**E. TYPE OF MACHINERY:** cable tool

**F. DATE OF WELL COMPLETION:** 11/20/91  
**DATE OF PUMP INSTALLATION:** n/a

**G. GROUND ELEVATION:** 46 ft.  
**Top of Drilling Platform above ground surface:** 16 ft.  
**Height of drilling platform above ground surface:** 16 ft.

**H. TOTAL DEPTH OF WELL BELOW GROUND:** 90 ft.

**I. HOLE SIZE:**

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>14 inch dia. from 0 ft. to 40 ft. below ground</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>20 inch dia. from 40 ft. to 90 ft. below ground</td>
</tr>
</tbody>
</table>

**J. CASING INSTALLED:**

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>13 ft. I.D. x .375 in. well solid section to 40 ft. below ground</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>13 ft. I.D. x 13 ft. well perforated section to 90 ft. below ground</td>
</tr>
</tbody>
</table>

**K. ARNHOLES:**

<table>
<thead>
<tr>
<th>Drilled from 10 ft. to 40 ft. below ground</th>
</tr>
</thead>
</table>

**L. PERMANENT PUMP INSTALLATION:**

<table>
<thead>
<tr>
<th>Pump type, make, serial no.</th>
<th>Capacity (gpm)</th>
<th>700 ft. below ground</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**M. PROPOSED USE:**

<table>
<thead>
<tr>
<th>Cooling &amp; Boilers</th>
</tr>
</thead>
</table>

**N. INITIAL WATER LEVEL:** 2.5 ft. below ground.  
**Date and time of measurement:** 7:00 am, 11/19/91

**O. INITIAL CHLORIDE:**

<table>
<thead>
<tr>
<th>Date</th>
<th>11/12/91</th>
</tr>
</thead>
</table>

**P. PUMPING TESTS:**

<table>
<thead>
<tr>
<th>Reference point (R.P.) used:</th>
<th>ground which elevation is 16 ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start water level...</td>
<td>10.0 ft. below R. P.</td>
</tr>
<tr>
<td>End water level...</td>
<td>10.0 ft. below R. P.</td>
</tr>
<tr>
<td>Depth of well...</td>
<td>10.0 ft. below R. P.</td>
</tr>
</tbody>
</table>

**Q. DRILLER’S LOG:**

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Rock Description &amp; Remarks</th>
</tr>
</thead>
</table>

**REMARKS:**

Submitted by (print): Tracy Runnels  
Signature: Tracy Runnels

Date: 1/14/92

FOR DRILLER’S USE
Job Name:  
Job No.:  

FOR OFFICIAL USE

Title: Field Superintendent  

Long.  

Well No.: 2357-10  

Latitude:  

Well No.: 2357-10
Briefly describe the proposed work:

Recased well 14" diameter steel to 40' from ground level. Initially filled hole with 1:1 grout from 45'-10' and core barreled hole 19" diameter to 40'. Installed new .375 steel casing and pressure grouted casing from bottom up via a shoe and check valve inside casing, forcing cement up annulas.

**PROPOSED SECTION OF WELL (8357-10)**

**Elevation at top of casing**

- approx 18 ft., msl.

**Ground Elev.**

- ft., msl.

**Cement Grout**

- 30 ft.
- (10'-40')

**Hole Dia.**

- 19 in.

**Total Depth**

- 90 ft.

**Rock Packing**

- n/a ft.

**Solid Casing:**

- Material: steel
- Length: 42 ft.
- Diameter: 14 in.
- Wall thickness: .375 in.

**Casing: / Perforated / Screen**

- Material: n/a
- Length: 
- Diameter: 
- Wall thickness: 
- Openings: sq. in./L.F.

**Open Hole:**

- Length: 50'
- Diameter: 20"
Dear Mr. Suzuka:

HECO Waiau Tunnel Source Project

Thank you for providing us the opportunity to review the construction drawings for the Honolulu Board of Water Supply's HECO Waiau Tunnel Source project.

Your project was earlier brought to our attention in connection with your request that we determine whether the permitting requirements of the State Water Code might apply to the project. You will recall that our review of your proposal led to determination that a water use permit would not be required of the project.

We have no specific comments to offer on your present construction plans.

Sincerely,

MANABU TAGOMORI
Deputy Director

cc: Honolulu BWS
Mr. Reginald Suzuka  
Project Manager  
Park Engineering  
Ste. 300, Kawaiahaoo Plaza  
567 South King Street  
Honolulu, Hawaii 96813-3036

Dear Mr. Suzuka:

Preliminary Plans for the HECO Waiau Tunnel Source

Thank you for the opportunity to review and comment regarding your preliminary plans for the HECO Waiau tunnel source.

The plans appear to satisfy our condition that the new facility only captures free-flow from the wells, without inducing stress on the aquifer.

If you have any questions, please contact Ed Sakoda at 587-0225.

Sincerely,

[Signature]

MANABU TAGOMORI  
Deputy Director

GB:ko

c: BWS  
Attn: Francis Fung
October 28, 1991

Mr. Manabu Tagomori  
Deputy Director  
Commission on Water Resource Management  
Department of Land and Natural Resources  
Kalanikolu Building  
1151 Punchbowl Street  
Honolulu, HI 96813

Dear Mr. Tagomori:

Subject: Heco Waiau Tunnel Source  
Preliminary Plans for New Well Water Collection and  
Pumping System.

We are transmitting herewith one set of the following preliminary plans dated October 4, 1991 for the subject project:

1. Preliminary Site Plan  
2. Preliminary plan for Pump Station No. 1  
3. Preliminary plan for Pump Station No. 2

We believe the design depicted on these plans satisfies your requirement that the proposed facility not induce flow from the wells but simply capture the free-flowing water from the existing Well Nos. G-11 and G-12.

We request your review, comments and/or approval of these plans at this time. Your earliest response will be appreciated.

Sincerely yours:

Paren, Inc.,  
dba PARK ENGINEERING

Reginald Suzuka  
Project Manager

TC #178/FOLDER #259

cc: Board of Water Supply  
Attention: Francis Fung
<table>
<thead>
<tr>
<th>TO:</th>
<th>INITIAL:</th>
<th>PLEASE:</th>
<th>REMARKS:</th>
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<tbody>
<tr>
<td>G. AKITA</td>
<td>L. Nanbu</td>
<td>See Me</td>
<td>Pl. update 1st me on my 1st day.</td>
</tr>
<tr>
<td>E. Sakoda</td>
<td>G. Matsumoto</td>
<td>Take Action By</td>
<td>Manabu, Roscoe Moss is now going to be the rehab. work for Well 1 (mos make of the 3 wells). PR Drilling could not complete the job.</td>
</tr>
<tr>
<td>E. Lau</td>
<td>L. Chang</td>
<td>Route to Your Branch</td>
<td>ed</td>
</tr>
<tr>
<td>Y. Shiroma</td>
<td></td>
<td>Review &amp; Comment</td>
<td></td>
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<td></td>
<td></td>
<td>Draft Reply</td>
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<td>Acknowledge Receipt</td>
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<tr>
<td>JCC</td>
<td>6/8/83</td>
<td>3-2357-10</td>
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| INITIAL: | File
<table>
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<tbody>
<tr>
<td>M. TAGOMORI</td>
<td></td>
</tr>
<tr>
<td>S. Kokubun</td>
<td></td>
</tr>
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<td></td>
<td></td>
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</table>
June 10, 1991

State of Hawaii
Department of Land and Natural Resources
Division of Water Resource Management
P.O. Box 373
Honolulu, HI 96809

Attention: Mr. Gordon Akita
Manager-Chief Engineer

Gentlemen:

Subject: Waiau Well No. 1 (State Well No. 2357-10)

As you know, we have been attempting to repair our Waiau Well No. 1 (State Well No. 2357-10) under your well modification permit issued on November 17, 1986. However, our efforts to date have been unsuccessful. Additionally, we have been keeping Mr. Ed Sakoda of your staff informed of the latest developments concerning our contractor's attempt to recase the well.

This letter is to inform you that we have terminated our contract with our current contractor, PR Drilling Inc. We will continue with our repair efforts and are currently arranging for another contractor, Roscoe Moss Company, to continue with the well rehabilitation work.

If you have any questions, please contact Mr. Ken Fong at 543-7746.

Sincerely,

Brenner Munger

KBKF:nh
TO: Hawaiian Electric Company, Inc.
820 Ward Avenue
Honolulu, HI 96814

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 modify HECO Waiau Well G-12 (Well No. 2357-12) at Waiau, Oahu, is
approved subject to the following conditions:

1. The Division of Water Resource Management (DWRM), P.O. Box 373,
Honolulu, Hawaii 96809, shall be notified in writing before any work
covered by this permit commences.

2. The proposed work 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 modify and use 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 well could be reduced by the Commission in the
future.

3. The following shall be submitted to DWRM within 30 days after completion
of the work:

   a. Well Completion Report.

   b. As-built sectional drawing of the well.
c. Complete flow test record, including flow rate, chloride content, and water quality data.

4. The applicant shall provide and maintain an approved meter or other appropriate device or means for measuring and reporting total water usage on a monthly basis.

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

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

JUN 4 1991
Date of Issuance

cc: USGS
    Department of Health
    Safe Drinking Water Branch
    Ground Water Protection Program
    Honolulu BWS
May 7, 1991

Mr. Manabu Tagomori  
Deputy Director  
Commission on Water Resource Management  
Department of Land and Natural Resources  
Kalanikino Building  
1151 Punchbowl Street  
Honolulu, HI 96813

Dear Mr. Tagomori:

Subject: Heco Waiau Tunnel Source  
Application to Rehabilitate Existing Well G-12

On behalf of the Board of Water Supply, we hereby request permission to rehabilitate the existing Well G-12 on the grounds of the Hawaiian Electric Company Waiau Power plant. Enclosed is our application for this work and a location map marked Enclosure A. Your approval of this request will be appreciated.

Sincerely yours:

Paren, Inc.,  
dba PARK ENGINEERING

Reginald Suzuka  
Project Manager

TC #178/FOLDER #259

cc: Board of Water Supply w/ enclosure   
Attention: Francis Fung
APPLICATION FOR: □ Well Construction or □ Pump Installation PERMIT

Instructions: Please print or type and send completed application with attachments to the Div. of Water Resource Management, P.O. Box 373, Honolulu, Hawaii 96809. Application must be accompanied by a non-refundable filing fee of $25.00 payable to the Dept. of Land and Natural Resources. (Filing fee waived for government agencies.) If necessary, phone 348-7643, Hydrology/Geology Section for assistance.

1. WELL LOCATION/NAME: HECOXAIWAU POWER PLANT, WELL #12 Island OAHU
   Address: 475 KAMEHAMEHA HIGHWAY, PAPAO, CITY 96780 Tax Map Key 9-8-310
   (Attach a USGS map, scale 1"=2000', and a property tax map showing well location referenced to established property boundaries.)

2. (a) WELL OWNER:
   Firm Name: HAWAIIAN ELECTRIC CO., INC.
   Contact Person: KEN FONG
   Address: 830 WARD AVE.
   HONOLULU, HI 96814 Ph: 5437746

   (b) LANDOWNER:
   Firm Name: HAWAIIAN ELECTRIC CO., INC.
   Contact Person: KEN FONG
   Address: 830 WARD AVE.
   HONOLULU, HI 96814 Ph: 5437746

3. PROPOSED CONTRACTOR:
   Name: ROSCOE MOSS
   Contractor's License No. C-16437
   Address: 830 AHUA STREET, HONOLULU, HI 96819 Ph: 8596888

4. PROPOSED WORK:
   □ Drill New Well □ Deepen □ Redrill
   □ Alter □ Seal □ Abandon
   □ Install New Pump □ Replace Pump □ Modify Pump
   (Briefly describe the proposed work and fill in the diagram on the back of this form.)

5. PROPOSED USE:
   □ Municipal (including hotels, stores, etc.) □ Military
   □ Domestic (Individual, noncommercial water sys.) □ Industrial
   □ Irrigation (specify) □ Other (specify)

6. PROPOSED AMOUNT OF WITHDRAWAL: 2.0 to 3.0 Million gallons per day

7. PROPOSED PUMP INFORMATION:
   Pump Type:
   □ Vertical Turbine □ Diesel
   □ Submersible □ Gas
   □ Centrifugal □ Electric, at a rated horsepower of _________
   Motor:
   □ Gas □ Electric, at a rated horsepower of _________
   Rated Pump Capacity:
   Gallons per minute _________

Well Owner (print) BRENNER MUNGER
   Signature: ____________________________ Date: 5/13/91

Landowner (print) BRENNER MUNGER
   Signature: ____________________________ Date: 5/12/91

For Official Use Only:
   Field Checked By: ____________________________ Date: ____________
   Latitude: ____________________________ Longitude: ____________________
   Hydrologic Unit: ____________ State Well No: 3-2357-12
Briefly describe the proposed work:

**REMOVED EXISTING CASING IN WELL & REPLACE WITH NEW 20" STEEL COMPLETE WITH VALVE & METER ASSEMBLY. IF POSSIBLE TO STOP FLOW FROM WELL, GROUT 14 FT. OF ANNULUS FROM TUNNEL FLOOR TO BOTTOM OF 20" CASING.**

**PROPOSED SECTION OF WELL**

- Elevation at top of casing: **36** ft., msl.
- Cement Grout: **14** ft.
- Hole Diameter: **22** in. (TUNNEL FLOOR 4 + 2.0)
- Total Depth: **82** ft.
- Rock Packing: **0** ft.

**Ground Elevation:** **35** ft., msl

**Solid Casing:**
- Material: Steel
- Length: **48** ft.
- Diameter: **20** O.D. in.
- Wall thickness: **0.375** in.

**Casing:**
- Perforated: No
- Screen: No

**Open Hole:**
- Length: **35** ft.
- Diameter: **10** in.

*Approximate elevation at time of filing application. Final elevation (msl) by a surveyor licensed by the State must be submitted at start of construction.

** Grouting will depend on whether flow from well can be stopped. If flow cannot be stopped, grouting will not be done.**
FROM: Ed
INITIAL: __

DATE: 3-1-91
FILE IN: HECO Waian Tunnel

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

REMARKS:
Call from Paul Kuchler.
They will begin work Mond 3-4-91, at HECO Tunnel.

FOR YOUR: Apparently, the well was not recased as planned due to various problems.

Although they are going back to try to finish the job of recasing, keep on top of this.

Keep on top of this.
MEMORANDUM FOR THE RECORD

February 27, 1991

From: Glenn Bauer

Subject: BWS HECO Waiau Project Meeting

A meeting to discuss a new proposal regarding the BWS HECO Waiau project was held. Meeting participants are listed on the accompanying sheet.

The proposal put forward would be to pump the free-flow from the flowing wells directly, thereby eliminating the pipeline trench, sump, and all contamination problems inherent to BWS's existing design. Determination of pumpage based on basin head level was discussed. This determination would present BWS and DWRM problems in operation and "selling" the idea to the Commission.

Cliff Jamaile suggested installing single water tight sumps next to each well. Park Engineering and Mink and Yuen will look at the scheme, redesign, and submit an addendum to DOH and DWRM for review.
<table>
<thead>
<tr>
<th>Name</th>
<th>Company</th>
<th>Address</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Myron T. James</td>
<td>PWS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kengo Yuen</td>
<td>PWN, Inc.</td>
<td>100 N Beretania</td>
<td>536-0081</td>
</tr>
<tr>
<td>Reigusa H.</td>
<td>Park Engineering</td>
<td>567 S. King St</td>
<td>531 1676</td>
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<tr>
<td>John Hardie</td>
<td></td>
<td>100 N Beretania</td>
<td>536 0081</td>
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<tr>
<td>Richr. Matsui</td>
<td>BWS</td>
<td>630 S. Beretania</td>
<td>542-3217</td>
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<tr>
<td>Roy Doi</td>
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<td></td>
<td>527-5201</td>
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<tr>
<td>Derrick Enfalan</td>
<td>PKN Engineering</td>
<td>567 S. King St</td>
<td>531 1674</td>
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<td>Floyd Nakamura</td>
<td>BWS</td>
<td>630 S. Beretania</td>
<td>527-5103</td>
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<td>Francis Fung</td>
<td>BWS</td>
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<td>527-5202</td>
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<tr>
<td>Ed Sakada</td>
<td>TWEM</td>
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<td>548-7643</td>
</tr>
</tbody>
</table>
Mr. Manabu Tagomori, Deputy  
Commission on Water Resource Management  
Department of Land and Natural Resources  
State of Hawaii  
P. O. Box 373  
Honolulu, Hawaii 96809

Dear Mr. Tagomori:

Subject: Your Letter of November 6, 1989 on HECO Waiau Tunnel Project

We are completing the Engineering Report for the source and will be submitting the report to Department of Health for their review and approval. If approved, we plan to proceed with construction upon reaching an agreement with HECO to utilize the source.

Our staff has looked at the possibility of relocating the wells to the area mauka of Kamehameha Highway, but their findings have been inconclusive. After our discussion with John Mink who is helping to prepare the Engineering Report, we have decided to use the two upper existing wells and make any necessary repairs in the future, if required.

If you have any questions, please contact Herbert Minakami at 527-6183.

Very truly yours,

Kazu Hayashida  
Manager and Chief Engineer
Mr. Kazu Hayashida  
Manager and Chief Engineer  
Board of Water Supply  
City and County of Honolulu  
630 South Beretania Street  
Honolulu, Hawaii  96843  

Dear Mr. Hayashida:  

This is a follow-up to our meeting held on May 19, 1989, concerning the HECO Waiau Tunnel project.  

We would like to know the status of the project and whether or not your staff was able to conduct any of the investigations that were proposed at the meeting.  

I look forward to hearing from you on this matter.  

Sincerely,  

MANABU TAGOMORI  
Deputy Director  

ES:ko
<table>
<thead>
<tr>
<th>FROM:</th>
<th>E. lum</th>
</tr>
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<tbody>
<tr>
<td>TO:</td>
<td>INITIAL:</td>
</tr>
<tr>
<td>D. LUM</td>
<td>[✓]</td>
</tr>
<tr>
<td>E. Sakoda</td>
<td>[✓]</td>
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<tr>
<td>D. Nakano</td>
<td>[✓]</td>
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<tr>
<td>P. Haraguchi</td>
<td>[✓]</td>
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<tr>
<td>R. Jinnai</td>
<td>[✓]</td>
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<tr>
<td>M. Ohye</td>
<td>[✓]</td>
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<tr>
<td>D. Hamada</td>
<td>[✓]</td>
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<tr>
<td>K. Oshiro</td>
<td>[✓]</td>
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<tr>
<td>M. Tagomori</td>
<td>[✓]</td>
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<tr>
<td>G. Matsumoto</td>
<td>[✓]</td>
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<tr>
<td>G. Akita</td>
<td>[✓]</td>
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<tr>
<td>L. Chang</td>
<td>[✓]</td>
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<td>S. Kokubun</td>
<td>[✓]</td>
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<td>DATE:</td>
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<td>FILE IN:</td>
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<td>PLEASE:</td>
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<td>[✓] See Me Call Review &amp; Comment</td>
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<td>Take Action Investigate &amp; Report Draft Reply</td>
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<td>Acknowledge Receipt Type Draft</td>
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<td>Type Final cc:</td>
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<tr>
<td>Xerox copies</td>
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<td>File Mail</td>
<td></td>
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<tr>
<td>REMARKS:</td>
<td></td>
</tr>
<tr>
<td>Ross Sakoda, Hanmi. Elec., called today. Wanted to know what we should do if we replied to their letter of March 14, 1988 (attached). I've updated a draft I wrote @ 4/25/88. Letter should still be ok.</td>
<td></td>
</tr>
<tr>
<td>FOR YOUR</td>
<td></td>
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<tr>
<td>[✓] Approval [✓] Signature</td>
<td></td>
</tr>
<tr>
<td>Information</td>
<td></td>
</tr>
</tbody>
</table>

Signed: E. lum
June 22, 1989

Mr. Stanley I. Tanno  
Manager, Engineering  
Hawaiian Electric Company, Inc.  
P.O. Box 2750  
Honolulu, HI 96840-0001

Dear Mr. Tanno:

This is regarding your letter concerning repair of Well No. 1 at the Waiau Power Plant.

I appreciate the effort and funds expended in trying to control the well thus far. I am also glad to hear that you are again working with the Board of Water Supply (BWS) to develop the water.

We do not believe there is adequate data to conclude that blocking the tunnel portal will be enough to control the flow from Well No. 1. As stated in one of your previous letters, closing the portal sluice gate "did result in a significant flow reduction but there was sufficient leakage by-passing the deteriorated concrete containment such that adequate throttling may not be achievable."

However, if it can be demonstrated that the BWS project will be able to adequately control the flow from the well and that there will be no waste of water, the intent of the law should be satisfied.

Please keep me informed of the progress at Well No. 1, and of your talks with the BWS concerning the project. Let me know if my staff can assist you in any way.

Sincerely,

[Signature]

MANABU TAGOMORI  
Deputy Director

ES:ko
April 18, 1988

Mr. Stanley I. Tanno
Manager, Engineering
Hawaiian Electric Company, Inc.
P.O. Box 2750
Honolulu, HI 96840-0001

Dear Mr. Tanno:

Thank you for your letter of March 14, 1988, concerning repair of Well No. 1 at the Waiau Power Plant. I appreciate your continuing efforts to control the flow and prevent waste.

My staff is studying the situation and will contact your staff for any questions.

Sincerely,

MANABU TAGOMORI
Deputy for Water Resource Management
Mr. Manabu Tagomori  
Manager-Chief Engineer  
Department of Land and Natural Resources  
Division of Water and Land Development  
P.O. Box 373  
Honolulu, Hawaii  96809

Dear Mr. Tagomori:

Subject: Repair of Well No. 1  
Waiau Power Plant

Our contractor's attempts to recase the subject well have so far been unsuccessful. In lieu of making further attempts and incurring additional costs, we request that we be allowed to meet the intent of well water regulations in a different manner.

In a meeting with you and Dan Lum and Ed Sakoda of your staff on October 3, 1986, it was stated that controlling the flow at the tunnel portal would meet the intent of Section 178-2 of HRS. This paragraph basically says that well water flow must be controllable to prevent waste. We now propose to implement a plan to control the flow at the portal instead of trying to recase the well.

We are again working with the Board of Water Supply to develop the Waiau well water for potable use. In their plans, the tunnel portal will be blocked and a portion of the flow will be diverted through a valve to the power plant. With this arrangement, we will be able to limit the flow to the plant to the amount actually needed, and waste will be effectively prevented.

We have made a good faith effort to comply with the regulations by trying to recase the well and have spent in excess of $40,000 in doing so. So far, unfortunately, nature has prevailed.

March 14, 1988

Stanley L. Tanno  
Manager, Engineering
We request your approval to suspend the well repair work and to proceed with the alternate plan. The BWS projects that the new water facility will be operational by the second quarter of 1990.

We would appreciate receiving your response by March 25, 1988.

Sincerely,

For S. Tanno

RHS:kh

cc: T. Paresa
    K. Kusaka
DIVISION OF WATER RESOURCE MANAGEMENT

FROM: M. Tagomori
TO: INITIAL:

PLEASE:

- See Me
- Take Action By
- Route to Your Branch
- Review & Comment
- Draft Reply
- Acknowledge Receipt
- Xerox copies
- File
- Mail
- For Information

REMARKS:

I talked to

Kaz

Ed file with Heco

Wait

Decision is stick w/H/W tunnel.
**Message:**

**MARS OF HECO WAI'HAU & PROPOSED BWS REPLACEMENT WELLS**

**PHONE NO.**

**TELEPHONED** | **PLEASE CALL**
---|---
**CALLED TO SEE YOU** | **WILL CALL AGAIN**
**WANTS TO SEE YOU** | **RUSH**

**RETURNED YOUR CALL**

**SIGNED**

---

**SIGNED**

Everett Pad & Paper No. 79-115

---

**DRAWING:**

- **HECO WAI'HAU TUNNEL & 3 WELLS**
- **5 MGD PROPOSED WEL SITE**
- **3 WELLS 1.5 MGD**
- **1 STAND BY**

**EAST LOCH**

---

**FACILITY:**

- **AIEA**
- **PEARL CITY**
- **HARBOR**

---

**NOTE:**

- **5 MGD PROPOSED 8-10 MG D FLOW**
February 14, 1980
Memorandum for the Record
From: Ed Sakoda
Subject: Field Inspection - Hawaiian Electric Co. wells at Waian.

On February 14, 1980, I inspected the Hawaiian Electric (HECO) Company wells at Waian accompanied by Tom Tezlycky.

HECO uses four free-flowing artesian wells. Three are interconnected by a tunnel and flow into the manuka fresh water pond. The fourth is connected by an underground pipe and flows into the same pond. USGS data of spring flow discharge from the HECO Waian plant and comments from HECO employees during the field inspection indicate that the flow from the wells vary seasonally.

Noted: Flows from the wells are not measured. There are
old control valves on the 3 wells that feed the tunnel directly but they are unused or may be unusable. There is no visible control valve for the fourth well.

There is what looks like a gate valve across the main tunnel near its opening but no one knew if it was operable.

See the attached report by John Clay for a more detailed description of the HECO wells.

A water sample taken during the field inspection at the mouth of the tunnel had a chloride content of 281 ppm.
**Ground Water Index**

- **WELL NUMBER** - Six-digit well numbers are assigned by the Department of Land and Natural Resources, Division of Water and Land Development and are based on the latitude and longitude position of the well.

<table>
<thead>
<tr>
<th>Minute of Latitude</th>
<th>Minute of Longitude</th>
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<tbody>
<tr>
<td>2456-91</td>
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</tbody>
</table>

- **QUAD MAP NO.** - U.S. Geological Survey 7.5 Minute topographic quadrangle maps, 1" = 2000' scale. Maps have arbitrarily assigned reference numbers.

- **TYPE CONS** - Type of Well Construction

<table>
<thead>
<tr>
<th>Symbols listed:</th>
<th>ROT - Rotary</th>
<th>TUN - Tunnel</th>
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<tbody>
<tr>
<td>CSG DIA IN</td>
<td>DUG - Dug</td>
<td></td>
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</tbody>
</table>

- **CSG ELEV FT** - Ground surface elevation in feet, referenced to mean sea level

- **TOTL DEP FT** - Total depth of well in feet

- **CSG DEP FT** - Casing depth in feet

- **MAJ USE** - Major use of well

<table>
<thead>
<tr>
<th>Symbols listed:</th>
<th>MUN - Municipal</th>
<th>UNU - Unused</th>
<th>LOS - Lost</th>
</tr>
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<tbody>
<tr>
<td>IRR - Irrigation</td>
<td>SLD - Sealed</td>
<td></td>
<td>RCH - Recharge</td>
</tr>
<tr>
<td>IND - Industrial</td>
<td>OBS - Observation</td>
<td></td>
<td>OTH - Other</td>
</tr>
<tr>
<td>DOM - Domestic</td>
<td>DIS - Disposal</td>
<td></td>
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</table>

- **CL** - Chloride content of water

- **WTR LEV** - Water level

- **WTR TEM** - Water temperature

- **CHEM ANAL** - Chemical analysis of water

- **DRFT** - Draft or withdrawal from well

<table>
<thead>
<tr>
<th>Symbols listed:</th>
<th>ANN - Annually</th>
<th>DLY - Daily</th>
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<tbody>
<tr>
<td>(above 5 headings)</td>
<td>MON - Monthly</td>
<td>REC - Recorder</td>
</tr>
<tr>
<td>WKY - Weekly</td>
<td></td>
<td>OCC - Occasional</td>
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</table>

**Ground Water Summary**

- **YEAR DRLD** - Year well was drilled

- **CSG DIA IN** - Casing diameter in inches

- **GRD SURF** - Ground surface

- **BOT OF HOLE** - Bottom of hole, i.e., total depth of well

- **BOT SOL CSG** - Bottom of solid, unperforated section of casing

- **BOT PERF CSG** - Bottom of perforated or screened section of casing

- **STAT HEAD FT** - Static water level elevation in feet

- **CL MG/L** - Chloride content of water in milligrams/liter

- **PUMP RATE GPM** - Maximum test pumping rate in gallons per minute

- **DRAWDOWN FT** - Drawdown of well in feet at stated rate

- **SPEC CAP** - Specific well capacity in gallons per minute per foot of drawdown

- **C MG/L** - Chloride content of water during maximum pumping rate

- **WTR TEMP C** - Field water temperature in degree Celsius

- **PUMP CAP MGD** - Installed pump capacity, million gallons per day

- **DRFT MGD** - Average annual draft from well in million gallons per day

- **BATT** - Battery of wells connected together as one source

- **AQFR** - Aquifer tapped by well. Symbols listed are geologic formation symbols used on published Island geologic maps.
April 18, 1988

Mr. Stanley I. Tanno  
Manager, Engineering  
Hawaiian Electric Company, Inc.  
P.O. Box 2750  
Honolulu, HI 96840-0001

Dear Mr. Tanno:

Thank you for your letter of March 14, 1988, concerning repair of Well No. 1 at the Waiau Power Plant. I appreciate your continuing efforts to control the flow and prevent waste.

My staff is studying the situation and will contact your staff for any questions.

Sincerely,

MANNABU TAGOMORI  
Deputy for Water Resource Management

ES:ko
Mr. Manabu Tagomori
Manager-Chief Engineer
Department of Land and Natural Resources
Division of Water and Land Development
P.O. Box 373
Honolulu, Hawaii 96809

Dear Mr. Tagomori:

Subject: Repair of Well No. 1
Waiau Power Plant

Our contractor's attempts to recase the subject well have so far been unsuccessful. In lieu of making further attempts and incurring additional costs, we request that we be allowed to meet the intent of well water regulations in a different manner.

In a meeting with you and Dan Lum and Ed Sakoda of your staff on October 3, 1986, it was stated that controlling the flow at the tunnel portal would meet the intent of Section 178-2 of HRS. This paragraph basically says that well water flow must be controllable to prevent waste. We now propose to implement a plan to control the flow at the portal instead of trying to recase the well.

We are again working with the Board of Water Supply to develop the Waiau well water for potable use. In their plans, the tunnel portal will be blocked and a portion of the flow will be diverted through a valve to the power plant. With this arrangement, we will be able to limit the flow to the plant to the amount actually needed, and waste will be effectively prevented.

We have made a good faith effort to comply with the regulations by trying to recase the well and have spent in excess of $40,000 in doing so. So far, unfortunately, nature has prevailed.
We request your approval to suspend the well repair work and to proceed with the alternate plan. The BWS projects that the new water facility will be operational by the second quarter of 1990.

We would appreciate receiving your response by March 25, 1988.

Sincerely,

[Signature]

For S. Tanno

RHS:kh

cc: T. Paresa
    K. Kusaka
DIVISION OF WATER AND LAND DEVELOPMENT

FROM: [Signature]
DATE: 9/1
FILE IN: [Blank]

TO: INITIAL:

M. TAGOMORI   G. Matsumoto   L. Chang   G. Akita
D. Lum        S. Miyamoto    S. Samuels   P. Haraguchi
N. Imada      P. Matsuo      N. Kaneshiro  R. Suzuki

PLEASE:

See Me   Take Action By   Route to Your Branch   Review & Comment   Draft Reply By   Acknowledge Receipt   Xerox copies   Return   File   Mail

FOR INFORMATION:

S. Kokubun   D. Hamada   L. Nanbu   F. Ching

REMARKS:

End cement joint may not work. I'd probably
Count on OK
12

Ed's advice as well
Mr. Manabu Tagomori  
Manager-Chief Engineer  
Department of Land and Natural Resources  
Division of Water and Land Development  
P.O. Box 373  
Honolulu, HI  96809

Dear Mr. Tagomori:

Subject: Repair of Waiau Well No. 1  
Waiau Power Plant

As Ross Sakuda of our staff had advised your Mr. Ed Sakoda, PR Drilling has thus far been unsuccessful in their attempts to recase the well. In the latest attempt, the pneumatic packer ruptured before the grout had set and all of the grout was lost. PR Drilling is now proposing an alternate method of sealing off the well flow prior to grouting the casing in place. This is described in Option I of their submittal (copy attached). Option II is to attempt to seal the well with a new packer but we have chosen not to try this again.

Work is expected to resume on October 12. We will have PR Drilling contact Ed Sakoda directly to advise him of the exact date. If you have any questions, please contact Ross Sakuda at 548-4450.

Sincerely,

Stan Tanno

RHS:mac  
Attachment  
cc: K. Kusaka
OPTION I

1. Initially, before starting to place sand, place plywood cover over outlet to valve chamber into main stream (at a height to stop sand from flowing into stream) then place wire mesh screen above plywood to stop any plastic bags from going into main stream.

2. Get PVC pipe, sand, plastic bags & hoist truck to site.

3. It will require 5.104 cu.yd. of sand to backfill hole to 34.2' + 25%.

4. Set the 14"Ø or 16"Ø well casing at proper depth.

5. Insert 8" PVC plastic pipe to bottom of well.

6. Raise PVC 5' off bottom of well & secure in place with clamps on top of 14"Ø pipe.

7. Fill plastic bags with sand, approximately 10 lb each. 240 each required for 1 cu yd of sand.

8. Place 40 bags, sound hole with dummy weight & if it has filled 4' of open hole raise 8"Ø PVC to 90' and add another 40 bags. Hopefully water should stop flowing somewhere in the bottom 10' of hole. Resound hole and keep repeating process until we have water flow stopped. Once the water flow has stopped then we will add loose sand, 450 lbs at a time and keep sounding until we have backfilled the hole to 34' from top of 14"Ø pipe. At this time we will sound between 14"Ø casin and 20"Ø and if sand hasn't come up to 34' we will put in 1.5"Ø tremie pipe, add sand and sound until we have sand at 34'.

9. Set up grout plant and have 40 bags of cement on hand.

10. Start mixing grout. (1 bag cement and 6 gals of water is mix to be used). We will mix 7 bags at a time (this will be called a batch). Start pumping. Pump in 1 batch while watching water flow from around gate valve and valve chamber. Keep mixing and pumping until we show grout or pump 3 batches, or 1 cu yd. Shut down.

11. Let set for 12 hours.

12. Sound hole, find out what elevation grout has reached and repeat steps 9 & 10 until grout flows from valve chamber.

13. Set up drill rig, start bailing sand from hole and bail until we have all of the sand we can bail out, which should give us a clean hole. Open 20" valve slowly to let sand run into valve chamber until valve is clean. Shut valve off. Hand clean valve chamber, then open 20" valve & let water run.

"Every Bit Better"
1. Initially, before starting to place sand, place plywood cover over outlet to valve chamber into main stream (at a height to stop sand from flowing into stream) then place wire mesh screen above plywood to stop and plastic bags from going into main stream.

2. Send Sealco Combination Plug Packer back to manufacture to have new packer rubber installed, approximately 1 week to 10 days airfreight round trip.

3. Re-set 14"Ø or 16"Ø casin at 35' +.

4. Set Sealco Packer at 41' +.

5. Backfill with sand to 1' inside of casin, approximately 0.511 cu yds of sand, + 25%, to fill to 34 Linear feet.

6. Sound between 20" casin and smaller casin and tremie enough sand to fill up 12" between casin.

7. Mix cement grout, start pumping, continue pumping and mixing until cement grout flows out of valve chamber. Stop pumping.

8. Wait 12 hours, sound hole and if not full, finish filling to bottom of 20" valve.

9. Set up drill rig. Bail out hole of all sand.

10. Deflate and remove Sealco Packer, if possible.

11. If we cannot remove Sealco Packer we will reset packer, unscrew drill rods, and remove same. Deflate packer, place 12"Ø rock bit on drill string and try to drill out packer. If we are not able to, we will have Roscoe Moss mobilize with their drill and drill out the packer. Pau well, then open 20" gate valve and let water flow.
WATER RESOURCES & FLOOD CONTROL BRANCH
Division of Water and Land Development

FROM: Ed
DATE: 5/28/87
FILE IN: 

TO: INITIAL:

A. CHING

D. Lum
E. Sakoda
D. Nakano
M. Ohye
S. Miyamoto
S. Samuels
D. Hamada
K. Oshiro
D. Stewart
M. Tagomori
H. Sakai
G. Morimoto
S. Kokubun

PLEASE:

See Me
Call
Review & Comment
Take Action
Investigate & Report
Draft Reply
Acknowledge Receipt
Type Draft
Type Final cc:
Xerox copies
File
Mail

REMARKS:

Paul Kuchler, P.R. Drilling, called.
They are starting work on HECO Waian Well No. 1 releasing job.

FOR YOUR

Approval
Signature
Information

Suspect installation dry cement basket.
EMORANDUM FOR THE RECORD

FROM: Ed Sakoda

SUBJECT: HECO Waiau Tunnel Source

A meeting was held in the DOWALD conference room on March 19, 1987, to discuss use of the HECO Waiau Tunnel source by the Board of Water Supply.

The following attended:

BWS - Herbert Minakami
    Richard Matsui
    Robert Nagato

HECO - Stan Tanno
    Buddy Freitas
    Ross Sakuda

DOWALD - Manabu Tagomori
    Dan Lum
    Ed Sakoda

The BWS and HECO talks for BWS' use of the HECO Waiau Tunnel source have resumed. HECO pointed out that the required modifications of the tunnel source should not be at HECO's expense. Consequently, Wally Hirai, an independent engineering consultant, will be hired by BWS to determine the power plant's water requirements and conversion to salt water cooling, tunnel source modifications, and costs necessary to implement the project. An estimated date of mid-1988 was given for evaluation of the consultant's study and approval of the project.

BWS wants to make sure that recasing of the makai tunnel well (Well No. 1) will not affect the original design for the proposed project. BWS will review HECO's plans to recase Well No. 1. A target date of June 1, 1987 was set for BWS to reply to DOWALD and HECO as to whether or not the recasing of Well No. 1 should be done now or wait for final approval of the project.

ED SAKODA
Dan, Did you draft this memo? You need to be automatic - it's 5AM procedure to write a memo for the memo.
Mr. Stanley I. Tanno  
Manager, Engineering  
Hawaiian Electric Company, Inc.  
P. O. Box 2750  
Honolulu, Hawaii 96840-0001

Dear Mr. Tanno:

Subject: Your Letter of March 20, 1987 on Repair of HECO-Waiau Well No. 1

Thank you for the plan for the repair of the well. The repair of the well should have little effect on the quality of the water and capacity of the well. We, therefore, have no objections if Hawaiian Electric Company proceeded with the work as shown on the plan.

If you have any questions, please call Chester Lao at 527-5276.

Very truly yours,

KAZU HAYASHIDA  
For Manager and Chief Engineer

Cc: Department of Water and Land Development
March 20, 1987

Board of Water Supply  
City and County of Honolulu  
630 South Beretania Street  
Honolulu, Hawaii 96843

Attention: Mr. Herb Minakami

Gentlemen:

Subject: Waiau Well Water Development

As discussed in our meeting of March 19, we are forwarding a copy of our proposed repair plan for Well No. 1 and two prints of our Drawing No. 29188, Rev. 0, which details the present conditions. We understand that you will have your staff determine whether or not the proposed repair will have an adverse effect on the well water's quality or quantity and that you will have a decision by June 1, 1987. In the meantime, we will temporarily suspend work on the well repair project.

If you have any questions, please contact Ross Sakuda at ext. 4450.

Sincerely,

Stanley I. Tanno  
Manager, Engineering

RHS:mac

cc: R. O'Connell  
T. Paresa  
M. Tagomori, DLNR  
P. Kuchler, PR Drilling
Attachment 1
Well Repair Diagram

Hole in new casing, & to coincide with & of existing 18" discharge pipe.
ATTACHMENT 2

Repair of Well No. 1

Proposed Construction Sequence

1. The top of the existing 20" well casing will be cut off so that the new 16" casing can be slipped inside.

2. The new casing will have a "doughnut" welded on the bottom end and have a predrilled hole which will align with the 18" discharge tee in the existing casing. The hole will allow water to flow through the discharge tee. The new casing will extend down about 19 feet past the existing casing to bare rock. The doughnut is a canvas-wrapped spring steel device which will seal the annular space between the new casing and the well bore. Although it is sufficiently flexible to conform to the shape of the bore, it must be set at a location where the bore is smooth and circular.

3. The new casing will be slipped down the existing casing to the level where the doughnut fits snugly against the well bore and the hole aligns with the discharge tee.

4. About a foot of sand will be laid on top of the doughnut.

5. A small diameter pipe will be passed down the annular space between the new and old casings. Grout will be pumped through the pipe onto the sand base up to a height of about four feet before it is left to set.

6. After the initial grout is set, grouting will continue until the cavity below the discharge tee is reached. Water will still be able to flow through the new casing and out the cavity. To prevent water from flushing the grout out from the cavity, a temporary packer will be installed inside the new casing to stop the flow. Once the flow is stopped, grouting will continue until the cavity is completely filled.

7. The tunnel-side passageway to Well No. 1 will be temporarily sandbagged, and the water pumped out, to prevent water from diluting the grout.
Board of Water Supply  
City and County of Honolulu  
630 South Beretania Street  
Honolulu, Hawaii  96843

Attention: Mr. Herb Minakami

Gentlemen:

Subject: Waiau Well Water Development

As discussed in our meeting of March 19, we are forwarding a copy of our proposed repair plan for Well No. 1 and two prints of our Drawing No. 29188, Rev. 0, which details the present conditions. We understand that you will have your staff determine whether or not the proposed repair will have an adverse effect on the well water's quality or quantity and that you will have a decision by June 1, 1987. In the meantime, we will temporarily suspend work on the well repair project.

If you have any questions, please contact Ross Sakuda at ext. 4450.

Sincerely,

[Signature]

RHS:mac

cc: R. O'Connell  
T. Paresa  
M. Tagomori, DLNR  
P. Kuchler, PR Drilling
February 12, 1987

Mr. Stanley I. Tanno
Manager, Engineering
Hawaiian Electric Co., Inc.
P.O. Box 2750
Honolulu, Hawaii 96840

Dear Mr. Tanno:

Repair of Well No. 1, Waian Power Plant:

As a followup to your letter of January 29, 1987, and phone discussion between Ross Sakuda and Dan Lum, we offer the following suggestions:

(1) To successfully recase and grout seal the well, all artesian flow within the well needs to be temporarily stopped.

(2) A pneumatic rubber packer should be installed below the bottom of the new 16-inch casing to stop principal artesian flow from entering the well.

(3) Casing guides welded onto the 16" casing should be required to keep the 16" casing centered inside the 20" casing so that a uniform grout seal can be obtained.

(4) Contract specifications should require that grouting between the casings be continuous and placed in such a manner as to prevent "bridging" or "channeling" to effect proper sealing.

(5) The grouting should extend above the water level and the 18" discharge pipe and a pneumatic rubber packer installed in the mouth of the discharge pipe would be required to grout the annulus.

(6) Neat cement or no more than 1:1 ratio sand/cement slurry should be used to grout the casing.

Thank you for the opportunity to review and comment on the proposed reconditioning of Well No. 1.

Sincerely,

MANABU TAGOMORI
Manager-Chief Engineer
January 29, 1987

Mr. Manabu Tagomori
Manager-Chief Engineer
Department of Land and Natural Resources
Division of Water and Land Development
P. O. Box 373
Honolulu, HI 96809

Dear Mr. Tagomori:

Subject: Repair of Well No. 1
Waiau Power Plant

In preparation for the subject work, we have performed a remote camera survey of the well interior, visually examined the external conditions, and have discussed in detail with PR Drilling the proposed repair method. The attached drawing No. 29188 shows the information revealed by our investigations. The leakage appears to be coming through a rectangular hole in the casing, through the rocky surroundings and through a cavity beneath the existing concrete containment around the valve. The cavity appears to be the result of years of erosion. It is not known why the rectangular hole was cut into the casing.

Attachment 1 shows the repair technique proposed by PR Drilling. Attachment 2 describes the proposed construction sequence.

Ross Sakuda of our staff has already discussed briefly the proposed repair work with Dan Lum of your staff. Based on this discussion, we would appreciate your review of our plans, and would value any recommendations you may have which would help ensure a satisfactory result.

If you have any questions, please contact me at 548-6885 or Ross Sakuda at 548-4450.

Sincerely,

[Signature]

RHS:kh
Enclosure

cc: G. Tucker
K. Kusaka

A Hawaiian Electric Industries Company
ATTACHMENT 1
WELL REPAIR DIAGRAM

HOLE IN NEW CASING, & TO COINCIDE WITH & OF EXISTING 18" DISCHARGE PIPES

NEW CASING 14"

TOP OF EXISTING CASING

7.0" CSS

GROUT

F 28' ±

44'

102' ±

"DOUGHNUT"

SAND

BOTTOM OF NEW CASING

BOTTOM OF EXISTING CASING
The top of the existing 20" well casing will be cut off so that the new 16" casing can be slipped inside.

The new casing will have a "doughnut" welded on the bottom end and have a predrilled hole which will align with the 18" discharge tee in the existing casing. The hole will allow water to flow through the discharge tee. The new casing will extend down about 19 feet past the existing casing to bare rock. The doughnut is a canvas-wrapped spring steel device which will seal the annular space between the new casing and the well bore. Although it is sufficiently flexible to conform to the shape of the bore, it must be set at a location where the bore is smooth and circular.

The new casing will be slipped down the existing casing to the level where the doughnut fits snugly against the well bore and the hole aligns with the discharge tee.

About a foot of sand will be laid on top of the doughnut.

A small diameter pipe will be passed down the annular space between the new and old casings. Grout will be pumped through the pipe onto the sand base up to a height of about four feet before it is left to set.

After the initial grout is set, grouting will continue until the cavity below the discharge tee is reached. Water will still be able to flow through the new casing and out the cavity. To prevent water from flushing the grout out from the cavity, a temporary packer will be installed inside the new casing to stop the flow. Once the flow is stopped, grouting will continue until the cavity is completely filled.

The tunnel-side passageway to Well No. 1 will be temporarily sandbagged, and the water pumped out, to prevent water from diluting the grout.
Mr. Manabu Tagomori  
Manager-Chief Engineer  
Department of Land and Natural Resources  
Division of Water and Land Development  
P. O. Box 373  
Honolulu, Hawaii 96809

Dear Mr. Tagomori:

Subject: Repair of Artesian Well  
Waiau Power Plant

In our meeting of October 3, 1986, we stated that we would try to prevent waste of the artesian water by attempting to control the flow of it out of the tunnel by closing the portal sluice gate. Although we were successful in closing the gate, we were unable to control the flow satisfactorily. Closing the gate did result in a significant flow reduction but there was sufficient leakage bypassing the deteriorated concrete containment such that adequate throttling may not be achievable. Therefore, we will not make any further attempts to control the flow using the sluice gate but will instead concentrate our efforts toward repairing the casing on Well No. 1, which was found to have the worst leakage.

The Well Modification Permit, which DLNR issued to HECO on April 1, 1986, covered work on Well No. 3. At that time, it was believed that this was the only well with a leakage problem. More recent investigations, however, revealed that Well No. 1 was leaking substantially more than Well No. 3.

We request that the Well Modification Permit be revised, or a new one issued, to cover the work on Well No. 1. We would like to receive the permit by November 24, 1986 so that we can allow the contractor to proceed with the repair work. We would still like to complete this work by the end of this year.
If you have any questions, please call me at 548-6885.

Sincerely,

Mr. Manabu Tagomori
November 12, 1986
Page 2

RHS:kh

cc: T. Paresa
    G. Tucker
    P. Kuchler (PR Drilling)
November 13, 1986

Mr. Stanley Tanno  
Hawaiian Electric Co., Inc.  
P.O. Box 2750  
Honolulu, Hawaii 96840  

Dear Mr. Tanno:

Thank you for having Mr. Sakuda of your staff inform us of the latest developments at the Manu tunnel source. We understand that the control gate near the tunnel portal is operable but not successful in controlling flow from the tunnel because water continues to flow around the control gate and from the tunnel walls seaward of the control gate.

We also understand that you plan to recase Well No. 1 (State Well No. 2357-10) instead of Well No. 3 (State Well No. 2357-12), in accordance with our meeting on October 3, 1986 at your office.

Enclosed is a Well Modification Permit for your Well No. 1 (State Well No. 2357-10). It replaces the permit issued by our Department on April 1, 1986 for Well No. 3 (State Well No. 2357-12).

If you have any questions, please contact Mr. Albert Ching at 548-7619.

Sincerely,

[Signature]

MANABU TAGOMORI  
Manager-Chief Engineer

ES:dh
Enc.
TO: Hawaiian Electric Co., Inc.
P.O. Box 2750
Honolulu, Hawaii 96840

In accordance with Chapter 166 of Title 13, "Rules for the Control of Ground Water Use in the State of Hawaii", your application to recase State Well No. 2357-10 is approved subject to the following conditions:

1. All obstructions shall be cleared and removed to a depth of 30 feet from the top of the 20" casing. Clearing of the well shall be judged by the unimpeded passage of a 20-inch diameter drilling bit or equivalent.

2. The new 16-inch casing and pneumatic rubber packer shall be set at 40 feet from the top of the 20" casing. A grout seal consisting of 1+ foot of sand and 5+ feet of neat cement shall be placed above the packer and allowed to set for 24 hours before grouting the remaining annular space.

3. Upon completion of the work, the applicant shall submit an "as-built" drawing of the well.

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

chairperson of the Board

Date of Issuance

cc: USGS
Honolulu BWS
WATER RESOURCES & FLOOD CONTROL BRANCH
Division of Water and Land Development

FROM: Ed Saboda
DATE: 11/07/86
FILE IN: HECO WATER TUNNEL

<table>
<thead>
<tr>
<th>TO:</th>
<th>INITIAL:</th>
<th>PLEASE:</th>
<th>REMARKS:</th>
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<tr>
<td></td>
<td>A. CHING</td>
<td>See Me</td>
<td>Received a call from Ross Saboda yesterday - 11/06. He reported that the portal gate was fixed but that it did not successfully control the flow from the tunnel. HECO plans to rerun Tunnel well #1. He wanted to know if we could transfer the WELL MODIFICATION PERMIT from #3 to #1.</td>
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<td></td>
<td>T. FUJII</td>
<td>Call</td>
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<td></td>
<td>D. LUM</td>
<td>Review &amp; Comment</td>
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<td>E. SAKODA</td>
<td>Take Action</td>
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<td></td>
<td>D. NAKANO</td>
<td>Investigate &amp; Report</td>
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<td></td>
<td>J. MENOR</td>
<td>Draft Reply</td>
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<td>M. OHYE</td>
<td>Acknowledge Receipt</td>
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<td>N. KANESHIRO</td>
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<td></td>
<td>S. MIYAMOTO</td>
<td>Type Final</td>
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<td>W. KOYANAGI</td>
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<td>K. OSHIRO</td>
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<td>M. TAGOMORI</td>
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<td>H. SAKAI</td>
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<td>H. MORIMATSU</td>
<td>Information</td>
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<td></td>
<td>J. SATO</td>
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<td></td>
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</tbody>
</table>
Hold for Permit
Mr. Stanley I. Tanno  
Manager, Engineering  
Hawaiian Electric Company, Inc.  
P.O. Box 2750  
Honolulu, HI 96840-0001  

Dear Mr. Tanno:

This letter concerns the repair of Well No. 4 at the Waiau Power Plant, that was the subject of your letter of July 22, 1986, and our meeting at your office on October 3, 1986 and (concerning all the wells at the power plant).

The results of DOWALD's logging of Well D indicate that the leakage around the six-inch pipe that enters through the 20" tee has been successfully stopped. We also found some leakage near the bottom of the casing. Of greater concern, however, was our finding of large amounts of leakage around the bottom of the casing and at the lateral discharge pipe of Well B (Tunnel Well No. 1). We did not log Well C, I would like to do so in the near future.

From our meeting on October 3, we understand that you will meet with your Waiau Power Plant personnel to discuss the feasibility of (1) closing the tunnel portal gate valve to control the flow, and (2) re-casing Well B (Tunnel Well No. 1). Please let us know if we can be of any help in your discussions. My staff is available to recommend re-casing procedures for Well B.

We would also like to suggest that some long-range budgetary provisions be made to locate and eventually seal the wells at the Waiau Plant other than those supplying the tunnel. My staff would be available to help you locate and log the other wells.

Sincerely,

MANABU TAGOMORI  
Manager-Chief Engineer

ES:ko
WATER RESOURCES & FLOOD CONTROL RANCH
Division of Water and Land Development

FROM: ____________________________ DATE: __________ FILE IN: __________

TO: INITIAL: ______________________

PLEASE:
- See Me
- Call
- Review & Comment
- Take Action
- Investigate & Report
- Draft Reply
- Acknowledge Receipt
- Type Draft
- Type Final cc:
- Xerox ____ copies
- File
- Mail

REMARKS:

Please:

What's the next step
Who's move?

Ed, with ref to Oct 3rd
Draft to His last draft

Wells D (#3) should
some leakage send in this bag
---20th received and
---founded to

Wells A (#1) found to
---leak badly. Must be
---tran sp. or cause
---in bottom of tank.
MEMORANDUM FOR THE RECORD
FROM: Ed Sakoda
SUBJECT: HECO Waiau Tunnel Wells

On October 3, 1986, a meeting was held at Hawaiian Electric to discuss the Waiau Tunnel Wells. The following attended:

Stan Tanno Hawaiian Electric
Ross Sakuda * *
Buddy Freitas * *
Manabu Tagomori DOWALD
Dan Lum * *
Ed Sakoda * *

Manabu presented the background of DOWALD's interest in the tunnel from designation of the Pearl Harbor GWCA to the present. Dan presented the results of the logging done on Wells 1 and 3 on September 30, 1986 (see attached memo).

HECO pumps its water supply from the mauka pond which gets its water from the tunnel source and springs within and around the pond. Water use by the Waiau Plant is as follows:

Waiau Auxiliary Generators #3 & #4: 2.3 mgd needed for cooling. These are normally used during peak demand periods. Presently being used daily.

Waiau Generators #5 to #8: 6 mgd for auxiliary cooling. These units can be converted to use salt water for auxiliary cooling. They would be converted if BWS uses the tunnel water.

Miscellaneous: Approximately 0.7 mgd
Maximum Use: 9 mgd

The following were suggested by DOWALD to prevent wasting of the tunnel water:

1. Fix the inoperative gate valve at the tunnel portal.
2. Re-case well #1.
3. Log Wells #2 and #3.

HECO will get together with their Waiau Plant operations personnel to discuss feasibility of closing the tunnel portal gate valve. There is the possibility that flooding will be a problem if the gate is closed. They will also plan the re-casing of Well No. 1.

Mr. Tanno indicated that BWS may still be interested in using the tunnel water. That possibility will be explored after January 1st.

ED SAKODA

ES:ko
MEMORANDUM FOR THE RECORD

FROM: Ed Sakoda
SUBJECT: Hawaiian Electric Company (HECO) Waiau Tunnel
Logging of Wells B and D

On September 30, 1986, Dan Lum, assisted by Ed Sakoda, logged HECO Waiau Wells B and D (see attached location map). The results, in the order logged, are summarized as follows:

Well D (also referred to as Well No. 3)

Flowmeter: Depth of the hole was 68.5' below the top of the 20" casing. There was no flow indicated at the bottom of the hole. There was flow at 60.0' depth (0.4 division), 55.0' depth (0.5 division), and at 50.0' depth (0.1 division). There was no flow at 45.0', 35.0', 32.0', and 30.0' depths. The above data indicates that with the main valve and 6" valve closed, there is leakage near the bottom of the casing which is at 50'+ depth.

Well B (Well No. 1)

The valve was closed and the flowmeter was run down the hole. Depth to water was 10'. At 12' the flowmeter got stuck in the hole. The flowmeter was removed and just the weight was run to see if it could get by the obstruction. The weight was run to 98.7' depth from the top of the 20" casing.

Caliper Log: The caliper log (attached) was run from 97.0' depth (total depth was 97.5'). The depth of the casing was found at 28' instead of at 39' as the records indicate. The lateral discharge pipe was at 12' depth. There was a constriction in the casing, above the water, that was observed and logged at 6' depth.

Flowmeter Log: The flowmeter (see attached log) was run again. It indicated heavy flow (2.7 divisions) at 17' depth, peak recorded flow (4.2 divisions) from 26' to 29' depth near the bottom of the casing, smaller flows (0.5 to 1.9 divisions) from 30' to 52' depth, increased flow (1.6 to 3.4 divisions) from 52' to 94' depth, and a decrease in flow from 94' to the bottom of the hole.

The flowmeter data indicates large amounts of leakage around the bottom of the casing and at the lateral discharge pipe.

Salinity Log and Sampler: A salinity log (attached) was taken and two samples taken at 93.0' depth (300 ppm) and 20.0' depth (250 ppm). The salinity log indicates that the well gets saltier with depth.

ED SAKODA
SKETCH MAP OF HECO WAIAU PLANT
SHOWING LOCATIONS OF WELLS
Scale: 1" = 100'

GRAPHIC SCALE

100'  0  100'  200'

| Stream | Entrance Box @ Rice Mill |

| Generator Units | 3, 4, 5, 6, 7 & 8 |

| Portal Tower | Tunnel Portal |

| WELL A | WELL B | WELL C | WELL D | WELL E & F | WELL G (Sealed) | WELL H |
HECO WAIAU NO. 1 2357-10

SEPTEMBER 30, 1986

CALIPER LOG

T.O.C. (20")

Observed constriction

20" casing (Driller's Log)

Lateral discharge pipe (20")?

B.O.C. = 28'

Observed constriction
HECO WAIAU NO. 1 2357-10

SEPTEMBER 30, 1986

FLOWMETER
9 FPM DOWNHOLE LOG

T.O.C. (20")

Annular leakage around bottom of casing

T.D. = 97.8'
WATER RESOURCES & FLOOD CONTROL BRANCH
Division of Water and Land Development

FROM: __________________________ DATE: 6-3-86 FILE IN: HECO Waian

TO: INITIAL: __________________________ PLEASE: __________________________ REMARKS: BWS has not done any work with flowmeters at HECO tunnel.

T. FUJII
D. Lum
E. Sakoda
D. Nakano
J. Menor
M. Ohye
N. Kaneshiro
S. Miyamoto
S. Samuels
W. Koyanagi
D. Hamada
K. Oshiro
M. Tagomori
H. Sakai
H. Morimatsu
J. Sato

PLEASE:

See Me
Call
Review & Comment
Take Action
Investigate & Report
Draft Reply
Acknowledge Receipt
Type Draft
Type Final
Xerox copies
File
Mail

FOR YOUR:

Approval
Signature
Information
HECO WAIAXU NO. 1 2357-10

SEPTEMBER 30, 1986

SALINITY LOG

20 FPM DOWNHOLE LOG

300 ppm

250 ppm

5 T.O.C. (20°) 10 OHM-METERS
MEMORANDUM FOR THE RECORD

FROM: Ed Sakoda
SUBJECT: HECO Waiau Tunnel Wells

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Ross Sakuda
Buddy Freitas
Manabu Tagomori DOWALD
Dan Lum
Ed Sakoda

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Maximum Use: 9 mgd

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3. Log Wells #2 and #3.

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Mr. Tanno indicated that BWS may still be interested in using the tunnel water. That possibility will be explored after January 1st.

ED SAKODA
October 3, 1986

MEMORANDUM FOR THE RECORD

FROM: Ed Sakoda
SUBJECT: Hawaiian Electric Company (HECO) Waiau Tunnel
Logging of Wells B and D

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Well B (Well No. 1)

The valve was closed and the flowmeter was run down the hole. Depth to water was 10'+. At 12'+ the flowmeter got stuck in the hole. The flowmeter was removed and just the weight was run to see if it could get by the obstruction. The weight was run to 98.7' depth from the top of the 20" casing.

Caliper Log: The caliper log (attached) was run from 97.0' depth (total depth was 97.5'). The depth of the casing was found at 28' instead of at 39' as the records indicate. The lateral discharge pipe was at 12' depth. There was a constriction in the casing, above the water, that was observed and logged at 6' depth.

Flowmeter Log: The flowmeter (see attached log) was run again. It indicated heavy flow (2.7 divisions) at 17' depth, peak recorded flow (4.2 divisions) from 26' to 29' depth near the bottom of the casing, smaller flows (0.5 to 1.9 divisions) from 30' to 52' depth, increased flow (1.6 to 3.4 divisions) from 52' to 94' depth, and a decrease in flow from 94' to the bottom of the hole.

The flowmeter data indicates large amounts of leakage around the bottom of the casing and at the lateral discharge pipe.

Salinity Log and Sampler: A salinity log (attached) was taken and two samples taken at 93.0' depth (300 ppm) and 20.0' depth (250 ppm). The salinity log indicates that the well gets saltier with depth.

ED SAKODA
SKETCH MAP OF HECO WAI'AU PLANT
SHOWING
LOCATIONS OF WELLS
Scale: 1" = 100'
HECO WAIAU NO. 1 2357-10'

SEPTEMBER 30, 1986

FLOWMETER

9 FPM DOWNHOLE LOG

T.O.C. (20")

Annular leakage around bottom of casing

T.D. = 97.8'

T.O.C. (20")

Annular leakage around bottom of casing

T.D. = 97.8'
October 3, 1986

MEMORANDUM FOR THE RECORD

FROM: Ed Sakoda

SUBJECT: Hawaiian Electric Company (HECO) Waiau Tunnel Logging of Wells B and D

On September 30, 1986, Dan Lum, assisted by Ed Sakoda, logged HECO Waiau Wells B and D (see attached location map). The results, in the order logged, are summarized as follows:

Well D (also referred to as Well No. 3)

Flowmeter: Depth of the hole was 68.5' below the top of the 20" casing. There was no flow indicated at the bottom of the hole. There was flow at 60.0' depth (0.4 division), 55.0' depth (0.5 division), and at 50.0' depth (0.1 division). There was no flow at 45.0', 35.0', 32.0', and 30.0' depths. The above data indicates that with the main valve and 6" valve closed, there is leakage near the bottom of the casing which is at 50' depth.

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Caliper Log: The caliper log (attached) was run from 97.0' depth (total depth was 97.5'). The depth of the casing was found at 28' instead of at 39' as the records indicate. The lateral discharge pipe was at 12' depth. There was a constriction in the casing, above the water, that was observed and logged at 6' depth.

Flowmeter Log: The flowmeter (see attached log) was run again. It indicated heavy flow (2.7 divisions) at 17' depth, peak recorded flow (4.2 divisions) from 26' to 29' depth near the bottom of the casing, smaller flows (0.5 to 1.9 divisions) from 30' to 52' depth, increased flow (1.6 to 3.4 divisions) from 52' to 94' depth, and a decrease in flow from 94' to the bottom of the hole.

The flowmeter data indicates large amounts of leakage around the bottom of the casing and at the lateral discharge pipe.

Salinity Log and Sampler: A salinity log (attached) was taken and two samples taken at 93.0' depth (300 ppm) and 20.0' depth (250 ppm). The salinity log indicates that the well gets saltier with depth.

ED SAKODA
SKETCH MAP OF HECO WAI'AU PLANT
SHOWING
LOCATIONS OF WELLS
Scale: 1" = 100'

GRAPHIC SCALE

100' 200'

Entrance Box @ Rice Mill Stream

Generator Units 3, 4, 5, 6, 7 & 8

To Waipahu

Power House Units 1 & 2

Wells E & F

Wells A, B, C, D, G (Sealed), H

Tunnel Portal

Portion Tower

To Honolulu

Kamehameha Hwy

Makal
HECO WAIAU NO. 1 2357-10

SEPTMBER 30, 1986

FLOWMETER
9 FPM DOWNHOLE LOG

T.O.C. (20°)

Annular leakage around bottom of casing

T.D. = 97.8'
WATER RESOURCES & FLOOD CONTROL RANCH
Division of Water and Land Development

FROM: ED
DATE: 10/2/86
FILE IN: HECO WAIWAU

TO: INITIAL:

T. FUJII
D. Lum
E. Sakoda
D. Nakano
J. Menor
M. Ohye
N. Kaneshiro
S. Miyamoto
S. Samuels
W. Koyanagi
D. Hamada
K. Oshiro
M. Tagomori
H. Sakai
H. Morimatsu
J. Sato

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

REMARKS:
I checked BWS files for records of sealed wells at HECO Waiwai Plant.

Of the 9 wells on the plant site, one well (2357-16 old 199-1G) has been sealed (June 1949). Of the 8 existing wells, 3 are in the tunnel being "used" and the rest are elsewhere on the plant site unused.
SKETCH MAP OF HECO WAI'ANA PLAN
SHOWING
LOCATIONS OF WELLS
Scale: 1" = 100'
October 1986

MEMORANDUM

FROM: Ed Sakoda

SUBJECT: Hawaiian Electric Company (HECO) Waian Tunnel - Logging of Wells B and D.

On September 30, 1985, Dan Grumpy logged HECO Waian Wells B and D (see attached location map). The results, in the order logged, are summarized as follows:

Well D (also referred to as No. 3) Flowmeter: LFP-200.4.8

Flowmeter: was the the

Depth of hole: 68.5' below top of 20" casing. There was no flow indicated at the bottom of the hole. There was flow at 60.0' depth (0.4 division), 55.0' depth (0.5 division), 50.0' depth (0.1 division). The flow at 45.0', 35.0', 32.0', and 30.0' depth. The above data indicates that there is leakage near the bottom of the casing. 50' depth. (Data from remote camera inspection). The flowmeter was stuck at the bottom of the hole. Depth to water was 10'. At 12' the flowmeter got stuck in the.
hole. The flowmeter was removed and just the weight was run to see if it could get by the obstruction. The weight was run to 98.7' depth from the top of the 20" casing.

Caliper Log: The caliper log was run from 97.0' depth (tied depth was 97.5'). The depth of the casing was found at 26' instead of at 39' as the records indicate.

The lateral discharge pipe was at 12' depth. There was a constriction in the casing above the water that cold flow was observed and recorded at 6' depth.

Flowmeter Log: The flowmeter was run again. It indicated heavy flow (2.7 divisions) at 17' depth, peak recorded flow (4.2 divisions) from 26' to 29' near the bottom of the casing, flow (0.5 to 1.9 divisions) from 29' to 30', to 32', increased flow (1.6 to
3.4 divisions) from 52' to 94' depth, and a decrease in flow from 94' to the bottom of the hole. Aborted the pump.

The data indicates large amounts of leakage around the bottom of the casing and at the lateral discharge pipe.

Sampler: The sampler was run and samples taken at 93.0' depth and 20.0' depth.

Salinity log ad Sampler: A salinity log was taken at

(attach)
HECO WAIAU NO. 1 2357-10'

SEPTEMBER 30, 1986

FLOWMETER

9 FPM DOWNHOLE LOG

T.O.C. (20")

Annular leakage around bottom of casing

T.D. = 97.8'

T.O.C. (20")
HECO WAIAU NO.1 2357-10

SEPTEMBER 30, 1986

SALINITY LOG

20 FPM DOWNHOLE LOG

300 ppm

250 ppm

T.O.C. (20")

10 OHM-METERS
9-30-86  HEED - WAIAU WELL #3  

11:30A  RUN FLOWMETER, RMM: 50 cpg, TC=3
Bottom of Hole at 68.5' below top of 20' casing.
- No flow indicated at bottom of hole.
- Flow (0.4 div.) at 60.0' depth.
- Flow (0.5 div.) at 55.0'.
- Flow (0.1 div.) at 50.0'.
- No Flow at 45.0'.
- No Flow at 30.0', 35', 32'.

HEED - WAIAU WELL #1

12:20P  RUN FLOWMETER, Ref. = TOC, 20' casing.
RMM: 50 cpg, TC=3
Depth to water = 10'.
Flowmeter stuck in hole at 12'.
Run weight to 88.7' = T.D.

NIP  RUN CALIPER
T.D. = 97.5'
Start at 97.0' depth.

1:50P  RUN FLOW LOG
RMM: Suppr. full 10, R.O. = 700
TC = 3, 50 cpg.
HECO - unit 1 (cont'd)
Running down-hole flow log.
Running up-hole flow log - RMBI malfunction
2:30p Run salinity log
A-OK
2:50p Run sampler at 93.0' depth
3:04p Run sampler at 200' depth
<table>
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<td>Investigate &amp; Report</td>
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FOR YOUR: | | Signature | |
DIVISION OF WATER AND LAND DEVELOPMENT

FROM: [Signature]
DATE: 11/18
FILE IN: 

TO: INITIAL:

PLEASE:

- See Me
- Take Action By
- Route to Your Branch
- Review & Comment
- Draft Reply By
- Acknowledge Receipt
- Xerox copies
- Return
- File
- Mail
- For Information

REMARKS:


Ed. 11/19/86
Tanno

September 3, 1986

Mr. Stanley I. Tanno
Manager, Engineering
Hawaiian Electric Company, Inc.
P.O. Box 2750
Honolulu, Hawaii 96840-0001

Dear Mr. Tanno:

Thank you for your letter of July 22, 1986 regarding the repair of well No. 3 at the Waiau Power Plant.

My staff agrees with yours that HECO personnel [appeared] successful in stopping the leak in the casing where the six-inch pipe penetrates the twenty-inch casing. Recasing is not required since that leak has been stopped.

We appreciate your plant personnel's efforts to repair the control valves for wells 1, 2 and 3. We would like to continue our investigations, however, since there appears to be a problem at well No. 1 where there is a flow even with the valve shut.

Thank you for the fine cooperation you have shown my staff.

Sincerely,

MANABU TAGOMORI
Manager-Chief Engineer

ES:ko
March 6th, 1969.

With love closed, share your from west.

To seek show in old recorse.

Name: John A. (wrtt: written) - see alphabetical.

Wht: 4 - seek red clear to red.

In the west, from some shares. However.

Wht # 2 (wrtt: written) above some west.

Gramp to arrange, and so.

Nudge like us, as usual, were were.

He call from you, very soon (after you go).

Ed: very here (saw: seen) no accident.

W. Wilson
Well *(J)* — There is another well with a piped flow into the tunnel. This well was not surveyed.

Preliminary Recommendations —

- Best (ground water) decision is to re-cable the well.
- Next best is to re-case well #3 and the well *(?)*.
- Next best is to re-case well #3 only.
- Next best is close gate to the total: tunnel flow + well flow. (But closing gate may not be a satisfactory solution i.e., rise in water level in tunnel may cause springs or seepages in the area.) However, this action is least expensive.

- Suggest that HECO budget for re-case wells.
8/19/86

Called Ross Sakuda to let him know of our flowmeter problems with USGS meter. We will try to trouble shoot the recorder & contact USGS when/if we fix the flowmeter.

Ed
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YOSHIMOTO, James

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**WATER RESOURCES & FLOOD CONTROL BRANCH**  
Division of Water and Land Development

**FROM:** [Name]  
**DATE:** 8/14/86  
**FILE IN:** HECO WAHAU

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<td>Checked with Richard Nakahara - USGS</td>
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<td>D. Lum</td>
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<td>Investigate &amp; Report</td>
<td>k. Y. Chang. Checked the Keiki Lagoon store room &amp; basement stores of USGS</td>
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<td>of Randall &amp; Frank but no success.</td>
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<td>Richard N. says he will contact Kanei USGS and have them send whatever they have of the equipment.</td>
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<td>They might have discarded all but the meter</td>
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<td>J. Sato</td>
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<td></td>
<td>8/14/86 Richard called today. Kanei USGS has meter only</td>
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**FOR YOUR:** They might have discarded all but the meter.
Flow Measurements at Waiau Tunnel  

July 10, 1972

Location

Measuring Pt. 1

Well No. 199-1C (Heco #2)  
3.508 mgd

Measuring Pt. 2

Well No. 199-1D (Heco #3)

Leakage by fitting + portions of tunnel  
0.855 mgd

Measuring Pt. 3

USGS Parshall flume 24" throat with 5% reduction factor for algae growth
Wells No. 199-1C and 199-1D off (represents leakage from all wells plus tunnel)  
6.38 mgd

Well No. 199-1C off
(represents leakage from wells 199-1C and Well 199-1D plus tunnel)  
6.88 mgd

All wells on = total flow  
8.65 mgd

Total flow - #2 = (wells #1 + #3 + tunnel)
8.65 - 3.51 = 5.14 mgd

Total flow - (#3 + #1) = Well #1 + tunnel
8.65 - (3.51 + 0.86) = 4.28 mgd
net 3.28 mgd (approx.)

T. F. - Flow w/#2 off = leakage from #2
8.65 - 6.88 = 1.77 mgd

T. F. - (leakage from #2 + Well #1 + tunnel + #3) = leakage from #1
8.65 - (1.57 + 4.28 + 0.86) = 1.94 mgd

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**FROM:** Ed  **DATE:** 8/11/86  **FILE IN:**

**PLEASE:**
- See Me
- Call
- Review & Comment
- Take Action
- Investigate & Report
- Draft Reply
- Acknowledge Receipt
- Type Draft
- Type Final cc: __________
- Xerox __________ copies
- File
- Mail

**REMARKS:**
- Raw flowmeter test on 7/21/86 for 3 HECO Waian Wells.
- The flowmeter was not working properly so no results.

**FOR YOUR:**
- Approval
- Signature
- Information

**PRESENT:** Ed Sabate  J. Jawko
Mitch Ohye  A. Morisho - BWS
<table>
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Ed, What's Your Recommendation now? D.

Dowaro's flowmeter did not work properly or we were doing something wrong. Do you want to go out with us again to check the wells? 68 7/28/86.
Mr. Manabu Tagomori
Department of Land and Natural Resources
Division of Water and Land Development
P.O. Box 373
Honolulu, Hawaii 96809

Dear Mr. Tagomori:

Subject: Repair of Well No. 3
Waiau Power Plant

During the past several months, we have been taking action to repair the subject well in accordance with DLNR's directive. Based on our investigations, it appears that the leakage from the casing can be stopped from the exterior and that recasing is not necessary.

In February of this year, during DLNR's logging of the well, an obstruction was found within the casing. After receipt of the Well Modification Permit in April, HECO had a subcontractor perform a remote camera survey to determine the nature of the obstruction. The survey, which was done in early May, and subsequent visual inspections of the exterior of the casing, revealed the information shown on Attachments 1 and 2. A six-inch pipe penetrates the casing through the 20" tee. The annular space around the pipe is sealed with a pliable sealing material and a washer held in place by bolts. It appears that water is leaking past the seal.

In mid-May, HECO personnel appeared successful in stopping the leakage by forcing new pliable material into the space. We later contacted Ed Sakoda of your staff to determine whether or not DLNR would allow HECO to forgo the recasing since the leakage appeared to have been effectively stopped. Mr. Sakoda advised us that DLNR wanted to obtain conclusive data that showed that there was no leakage through the casing.

In late May, head level measurements were taken in HECO's wells with all valves closed, DLNR's monitoring well (Suetani well) and Board of Water Supply's monitoring well near Pearl City Tavern. If the head levels for all of the wells were essentially equal, it could be concluded that there was no leakage in HECO's well. HECO's well head level was below that of the monitoring well head levels but a review of historical data showed that this has been a consistent occurrence since the wells were drilled. Therefore, the test was inconclusive.
As a final test, Mr. Sakoda advised us that flow meter readings would be taken inside of the well casing. If no flow was evident, it could be concluded that there was no leakage. At this time, DLNR is making arrangements with the USGS to perform this test.

To help us plan our budget expenditures, please advise us of your schedule for the testing and of whether or not you would waive recasing the well if the data indicates that we have effectively stopped the leak.

If you have any questions, please do not hesitate to call me at 548-6885.

Very Truly Yours,

[Signature]

RHS:dk

Attachment
NOTE:
1. INFORMATION OBTAINED FROM REMOTE CAMERA INSPECTION TUNNEL ON 5-5-86 BY PR DRILLING. SEE ALSO ENG. NO. 1G15 & 4300.

SELECTION A-A
NO SCALE

WAIAU WELL NO. 3 REPAIR
USGS NO. 199-1D
DETAIL AT PENETRATION THROUGH CASING
WAIAU WELL NO. 3
03 June 1986

MEMORANDUM

FROM: ED SAKODA

SUBJECT: PHGNCA - HECO WAI'ANA WELLS NO. 3 (2357-12)

I spoke with Guy Tucker, HECO, by telephone. The casing of Well No. 3 seems ok except for the leak at the point where the 6” pipe enters the main casing. HECO maintenance crews have temporarily plugged the leak with oakum. They plan to replace the temporary plug with a permanent one. They will not be able to install the permanent plug until after June due to scheduled maintenance in another part of the plant.

I told Mr. Tucker that DOWALD’s next step will be to send a flowmeter down the 3 wells to try to determine if there are leaks and to pinpoint the location of the leaks.

SUMMARY

1. HECO will not recase Well No. 3 at this time. They will be putting a permanent plug on the present leak at the point where the 6” pipe enters the main casing. Work to be done after June 1986.

2. DOWALD is to check for leaks in all 3 wells — no time table set.

ED SAKODA
# Memorandum

**From:** Ed Sakoda  
**Subject:** HECO Waimalu Wells - Head Levels  
**Date:** 02 June 1986

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**Note:** 5/22/86 Sulphur Well 11.85'
WELL MODIFICATION PERMIT
for
Hawaiian Electric Co. Waiau Well No. 3
State Well No. 2357-12
Waiau, Oahu

TO: Hawaiian Electric Co., Inc.
P.O. Box 2750
Honolulu, Hawaii 96840

In accordance with Chapter 166 of Title 13, "Rules for the Control of Ground Water Use in the State of Hawaii", your application to recase State Well No. 2357-12 is approved subject to the following conditions:

1. All obstructions shall be cleared and removed to a depth of 55 feet from the top of the 6" coupling. Clearing of the well shall be judged by the unimpeded passage of a 20-inch diameter drilling bit or equivalent.

2. DOWALD shall be permitted to log the well after it is cleared to determine depths for setting the new 16-inch casing and packer. Two days advance notice of readiness to log shall be given to DOWALD.

3. Upon completion of the work, the applicant shall submit an "as-built" drawing of the well.

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

SUSUMU ONO
Chairperson of the Board

APR 1 1986
Date of Issuance

cc: USGS
Honolulu BWS
**WATER RESOURCES & FLOOD CONTROL BRANCH**
Division of Water and Land Development

**FROM:**

**TO:**

**DATE:** 3/21/86

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**FOR YOUR:**

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</tr>
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</table>

**Verification:**

[Signature]

**Date:** 3/25/86
February 6, 1986

Mr. Stanley Tanno

Dear Mr. Tanno:

Thank you for your letter of January 22, 1986, regarding the status of Artesian Well No. 3 at the Waiau Power Plant. We understand that the valve on Well No. 3 will be repaired but that you have no plans to install permanent flow meters on Well Numbers 1, 2, and 3.

Our main concern regarding the Waiau Tunnel is that the water not be wasted, that is, to flow directly into Pearl Harbor without being used for any beneficial purpose. We understand that the tunnel flow is being used intermittently for cooling purposes. If so, we would like to know how much is used for cooling, and how much flows into Pearl Harbor unused. The U.S. Geological Survey presently measures tunnel flow about twice a year. To determine the total flow from the tunnel, we recommend that a continuous gage height recorder be installed, according to U.S. Geological Survey standards, at the tunnel portal. We also recommend that the control valves on Wells 1 and 2 be inspected and repaired.

When the tunnel flow and actual amount used for cooling are determined, and the three artesian wells controllable, the best scheme for efficient and beneficial use of the water can be determined.

We look forward to working with you to try to make the best possible use of our precious ground water resources. If you have any questions, please call me at 548-7533.

Sincerely,

MANABU TAGOMORI
Manager-Chief Engineer

ES:ey
March 6, 1986

Mr. Guy Nakamoto  
Life of the Land  
250 S. Hotel Street  
Honolulu, Hawaii 96813

Dear Mr. Nakamoto:

The Hawaiian Electric Company Waiau Tunnel source was not considered for control under the State's Ground Water Use Law (Chapter 177, HRS) because of its free flowing conditions. The attached letters document the Department's position.

Also enclosed, as you requested, is a copy of the Certification of Water Withdrawals and Uses. Copies of the Permits to Withdraw and Use Ground Water issued to date are available at the Division office and you are welcome to review them. Please contact Mr. Takeo Fujii at 548-7619 if you have further questions.

Sincerely,

MANABU TAGOMORI  
Manager-Chief Engineer

MT:ES:dh  
Enc. letters & Bd. Sub.
Mr. Guy Nakamoto
Life of the Land
250 S. Hotel Street
Honolulu, Hawaii 96813

Dear Mr. Nakamoto:

The Hawaiian Electric Company Waiau Tunnel source was not considered for control under the State's Ground Water Use Law (Chapter 177, HRS) because of its free flowing conditions. The attached letters document the Department's position.

Also enclosed, as you requested, is a copy of the Certification of Water Withdrawals and Uses, and copies of the Permits to Withdraw and Use Ground Water issued to date. It is available at the Division. If you or your clients have further questions, please contact Mr. Tagomori at 581-2677.

Sincerely,

MANABU TAGOMORI
Manager-Chief Engineer

MT:ES:dh
Enc.
September 9, 1981

Department of Land and Natural Resources
Division of Water and Land Development
P. O. Box 373
Honolulu, Hawaii 96809

Gentlemen:

Subject: HECO Waiau Tunnel Source

Our firm has been requested by the Honolulu Board of Water Supply to investigate the possibility of utilizing an existing fresh water source for the municipal water supply. The source is within the Hawaiian Electric Company's (HECo) Waiau generator plant site. Presently, about 10 million gallons per day of fresh and slightly brackish water empties into East Loch, Pearl Harbor. This water is used by HECo periodically for maintenance purposes. When not used, it flows freely into East Loch.

The project would involve connecting to the existing artesian wells and tunnel complex and installing pumping equipment, necessary piping and appurtenances. A transmission pipeline would carry this water from the site to an existing BWS transmission main in Moanalua Road. All work would be within the HECo plant site and existing State and County roadways. Enclosed is a sketch showing the approximate project location.

At this time, we are gathering data to determine the nature and scope of any impacts that this project may have on the physical, social and economic environment. We would appreciate your comments on necessary permits to be filed, areas or concerns to be aware of, or any other information which would assist us in properly assessing the impacts of this project. Also, please inform us of any special conditions, e.g., other wells or springs, in the project area or which may be affected by the project.

We would appreciate it if your response would be sent directly to Park Engineering, Inc.

Thank you for your assistance in this matter.

Sincerely yours,

PARK ENGINEERING, INC.

Alan B. Sugihara
Engineer

Enclosure
October 5, 1981

Park Engineering, Inc.
Suite 2085, Pacific Trade Center
190 S. King Street
Honolulu, Hawaii 96813

Attention: Mr. Alan B. Sugihara, Engineer

Gentlemen:

HECo Waiau Tunnel Source

The HECo Waiau Tunnel is located in the Pearl Harbor Ground Water Control Area administered by the Department of Land and Natural Resources. Because of its free flowing conditions, the Waiau Tunnel was not considered for control under the provisions of the State's Ground Water Use Law (Chapter 171, HRS).

The Department, however, will be monitoring the proposed conversion of the Waiau source to a municipal water source. In this connection, your design proposal should not in any way alter the present free flowing conditions which are subjected to seasonal flow variations. We would appreciate reviewing the plans when they become available.

The Division of Water and Land Development has information on wells and springs for your use. Additional information are also available at the U.S. Geological Survey whose offices are located in the Federal Building.

If you have any questions, please contact Manabu Tagomori at 548-7619.

Very truly yours,

ROBERT T. CHUCK
Manager-Chief Engineer

MT: dh
cc: BWS
USGS
February 24, 1986

Mr. Manabu Tagamori
Dept. of Land & Natural Resources
Division of Water
P. O. Box 373
Honolulu, Hawaii  96809

Dear Mr. Tagamori,

We want to know if any or all of the tunnel waters, spring/tunnel waters and spring waters that are in the Hawaiian Electric Company Waiau Electric Plant property was excluded from the control of the ground water use when the Pearl Harbor aquifer was designated as Ground Water Control Area in 1979.

If it was excluded, we want a copy of your records.

Also, we want copies of "Certified Declaration" of all existing users (S13-166-17) and copies of all the "Permits to use water in designated area" that was issued for the Pearl Harbor Ground Water Control Area.


Sincerely,

Guy Nakamoto
Life of the Land
FEB. 20. 1986

WELD WELD #3 (2997-12)

REF TOP OF 6' COUPLING. BLUE TPE (TOP) REF.

0910 RUN TOTAL DEPTH

UNIT MOW 68.5 (BOTTOM OF HOLE) STOP 04

DHW = 497 FT. (DEPTH TO WATER)

1000 RUN CALIPER (#1 & 2)

LOG UPHOLE FROM 605 FT

END LOGGING 1030 HRS

LEHUA - REAL CITY (2958-02)

REF TOP OF FLANGE TOP OF SPRING REF.

1700 RUN CALIPER LOG:

LOG UPHOLE FROM 580' 80'

OBSTRUCTION AT 98 FT.
HELCO-WAIAU 2357-12
CALIPER LOG
FEBRUARY 20, 1986

REF. TOP OF 6" COUPLING
0

RUN NO. 1
LINE SPEED 15 FPM

LOG UPHOLE FROM 65 FT.
HECO-WAIAU 2357-12
CALIPER LOG
FEBRUARY 20, 1986

REF. TOP OF 6" COUPLING

15 FPM
RUN NO. 2

LOG UPHOLE FROM 65 FT.

CALIBRATION 1" / DIV.
**WATER RESOURCES & FLOOD CONTROL BRANCH**
Division of Water and Land Development

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FOR YOUR:

Philip Kuchler - PR Drilling - would like to be there when the well is logged.
February 4, 1986

Mr. Guy Nakamoto
P.O. Box 723
Kaneohe, Hawaii 96744

Dear Mr. Nakamoto:

As requested, transmitted is information on the HECo Waiau Water Tunnel. Should you have any question, please call Takeo Fujii at 548-7619.

Sincerely,

MANABU TAGOMORI
Manager-Chief Engineer

TF:ko
Enc.
February 9, 1983

MEMORANDUM FOR THE RECORD

FROM: Ed Sakoda

SUBJECT: HECO Waiau Tunnel Field Trip

On January 12, 1983, we took an orientation field trip to HECO's Waiau Tunnel. The following were present:

Manabu Tagomori DOWALD
Ed Sakoda"
Neal Imada"
Reginald Suzuka Park Engineering
Guy Tucker HECO

We took a brief tour of the ponds into which the tunnel flows, the two outlets from the ponds into Pearl Harbor (photos 1-3), and some of the springs feeding into the ponds from the Waianae end of HECO's property.

We then entered the tunnel thru the existing tower structure (photos 4 & 5) and followed the tunnel to its mauka end. Pictures were taken and four water samples were collected for chloride analysis at the locations shown on the accompanying map. The chloride content of the samples are as follows:

Sample 1. 144.75 mg/l. Water flowing from the well casing (2357-12) at the head of the tunnel (photos 6-8). Weak to moderate flow.

Sample 2. 148.50 mg/l. Taken a few feet downstream from sample 1.

Sample 3. 256.50 mg/l. Taken at the intersection of the main tunnel with a secondary tunnel (photos 9 & 10) leading to another flowing well (2357-11). Fairly strong flows.

Sample 4. 625 mg/l. Taken near the tower structure where a third well (2357-10) flows into the main tunnel (photo 11). Strong flow.

Sample 5. 425 mg/l. Taken near the mouth of the tunnel when it enters the small pond (photo 12).

Pertinent well data:

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<th>BOT. OF</th>
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<td></td>
<td>DRILLED</td>
<td>DIA (IN)</td>
<td>SURF. (FT)</td>
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<td>15</td>
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<td>20</td>
<td>32</td>
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<td>1938</td>
<td>20</td>
<td>36</td>
<td>-47</td>
<td>-12</td>
<td>144 mg/l</td>
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Flow from tunnel is approximately 10 mgd dependent upon the head in the area.
By

John Y. C. Chang

Resources and Research Section
Planning, Resources and Research Division
Board of Water Supply
April 1972
I. General Description of Hawaiian Electric Company

The Hawaiian Electric Company (HECo) Waiau plant is one of three power generating plants on Oahu. It is located makai of Kamehameha Highway which forms the mauka boundary. Pearl Harbor forms the makai boundary. A 40 ft. OR&L right-of-way cuts the site in two parts. All of the generating units are located in the mauka portion between Kamehameha Highway and the right-of-way.

There are presently eight fossil-fueled boiler-turbine-generator sets installed at this site. The units are numbered 1 through 8 in chronological order of installation. Of the eight units, only Units 1 and 2, installed in the late 1930s require fresh water for condensing. The remaining six units, Nos. 3 through 8, can use either fresh or salt water for condensing.

Units 1 and 2 are the smallest and least efficient of the eight. They are used to meet peaking requirements and are run for a few hours daily for this purpose.

Under normal operating conditions, with Units 1 and 2 idle, the plant presently requires about 11 mgd of fresh water. This is used for screen washing, plant service, boiler wash and other miscellaneous uses. With Units 1 and 2 operating, the fresh water requirement jumps to a 40 mgd rate because of the high condensing requirements of these two generating units. By substituting salt water for certain plant uses, the minimum quantity of fresh water required for plant operations can be reduced to some 3 or 4 mgd when Units 1 and 2 are idle. With this substitution
and Units 1 and 2 operating, the plant requires fresh water at the rate of about 33 mgd.

II. The Water Resources of the Area

The presence of fresh water spring and a means for disposal of same via cane irrigation were probably factors in choosing the Waiau location. The close proximity of Pearl Harbor also made an alternate source of cooling water available.

In May 1938, a tunnel was started to develop condensing water for the plant. Starting at elevation +2 ft., a tunnel was driven 363 ft. on a bearing of N 70° E. The tunnel encountered dense basalt the crevices of which were filled with soft decomposed basalt and laterite. Although the tunnel was some 20 ft. below the water table prevalent at that time, it developed only 1.5 mgd, an amount that was inadequate for condensing and other plants needs. On the advice of Dr. H. T. Stearns, tunneling was stopped and three wells were drilled (199-1B, 199-1C, 199-1D). The combined yield of the three wells and the tunnel is between 10 and 15 mgd and varies directly with the area head. Five other wells were drilled on the plant site between 1938 and 1940.

Figure I shows the location of the wells and the development tunnel. Wells 199-1B, 199-1C, and 199-1D are under positive heads and flow directly into the development tunnel. These wells have motorized values that have been
disconnected from the power source. Combined flows from the tunnel emerge through a sluice gate into a flume leading to a pond. Condensing water and some of the plant service water requirements are taken from the pond. The pond also collects water from springs around the power plant.

Plant service needs are supplied from two wells, 199-1D and 199-1J. Well 199-1D is at the mauka end of the development tunnel. A pipeline connects this well directly to two pump houses which supply plant service water. Although the top of this well is capped the well casing is ruptured so that the resulting leakage flows into the tunnel. Well 199-1J does not contribute to tunnel flow but is directly connected to plant service pumps. Plant service pumps are housed in two pumphouses each sheltering two pumps. One pumphouse contains two pumps of 200 gpm each while the second pumphouse houses two pumps of 400 gpm each. Normally, one of the 400 gpm pumps is run constantly for plant service needs.

Wells 199-1B, 199-1C, 199-1D, and 199-1J are the only ones contributing to the present plant requirements for fresh water. All other wells shown on the sketch are either sealed or not in use. Well 199-1A, located immediately mauka of Units 1 and 2 is not in use. It formerly supplied some plant service requirements. When opened up on July 23, 1971, the water level was below the top of the well head so free flow was not possible. Well 199-1H is presently
buried and is not used. Sampling was possible only via a 12 inch pipe of unknown length accessible through a manhole between generating Units 6 and 8. Well 199-10 is sealed.

"Well No. 5" is in reality two wells. These are shallow dug wells that were located at a spring orifice when the plant was built.

Near the mauka boundary of the OR&L right-of-way, a 48 inch reinforced concrete pipe has been installed to carry fresh water. The pipe is laid horizontal and can carry water either away from the power plant pond or toward the same pond from the east end. This pipe replaces a ditch which formerly served the same purpose. The water originating at the east boundary is from the "Rice Mill Stream" whose flow is collected in a pond mauka of Kamehameha Highway and carried into Pearl Harbor in a ditch. A diversion structure permits water to be diverted either toward the power plant pond or away from it into Pearl Harbor. In addition to the "Rice Mill Stream" flow, a subsurface drainage system also contributes flow into this 48 inch reinforced concrete pipe.

III. Water Quality Data

Figure I also shows chloride data derived from samples taken on July 23, 1971.

The tunnel portal composite sample is representative of water from the development tunnel and the three flowing
wells. Samples were also taken directly from each well in the tunnel.

Well 199-1A was sampled under two conditions. The "stagnant" sample was taken after it was found that the well would not flow. A siphon hose was then lowered into the well casing and a sample was siphoned from the well bore. Another sample was taken later when a small air operated pump was available.

Well 199-1H was sampled by bleeding water from a 12-inch valve. As the well itself was not directly accessible nor was it located, it was not possible to calculate how much water had to be displaced before water from the well bore could be sampled. Due to drainage restrictions, only a limited amount could be bled before sampling. It must therefore be assumed that this well was sampled under essentially static conditions.

Samples from Well No. 5 were taken after the pit in which the two well heads were located was bailed out. The well heads are capped. Small valves tapped into the cap were bled then the samples taken.

The samples from the entrance box of the Rice Mill Stream was taken where the 48-inch reinforced concrete pipe ends at the east boundary of the power plant. The composite flume sample was taken from the box that collects water from the pond, the Rice Mill Stream and a small amount from subdrains under Units 1 and 2.

The water samples taken July 23, 1971 show that water
quality deteriorates from mauka to makai. Well 191-1D is the furthest mauka and yields water of the lowest chloride (152 ppm). Well 191-1C is just slightly seaward of 199-1D and has slightly higher chloride (164 ppm). Well 199-1J, slightly makai of 191-1C, is slightly higher in chloride (170 ppm). Wells 191-1A and 191-1B are about equidistant from the sea but differ widely in chloride content. This can be explained by the fact that 199-1B flows continuously while 199-1A is presently unused. Well 199-1H is some distance inland of 199-1J but shows higher chloride. However, this well has been unused for some years and the water drawn from it cannot be considered to be representative of the well.

The sample drawn at the tunnel portal represents flow from the three wells in the tunnel plus any water developed in the shaft. This is one of the points from which we take monthly samples. Our records show that chloride at this point varies directly with the head at the Waiawa Observation Well (T-27). The relation can be expressed approximately by the equation:

\[ C = 10h + 50 \]

where \( C \) = chloride in ppm at the tunnel portal
\( h \) = head in feet at T-27

Over the period between 1962 to 1970, mean head at T-27 was about 17.4 ft. The corresponding chloride was 224 ppm. The head at T-27 undergoes a yearly cycle, reaching highs in the period from January to March and lows in the
period August to October. Chlorides follow the pattern, the yearly range being about 25 to 40 ppm. Figure 2 shows a time plot of head at T-27, chloride and flow at the Waiau Shaft portal. Figure 3 is a plot of chloride at the Waiau Shaft portal versus head at T-27.

IV. Flow Data

The HECO power plant is located in an area of spring outflows. Watercress is presently grown on both the Ewa side and the Honolulu side of the plant. A measurement taken by the USGS and the BWS in July 1971 showed that when the power plant was operating at full capacity, the tunnel flow was 9 mgd while surrounding springs contributed another 9 mgd for a total of 18 mgd.

Flow from Waiau Shaft is independent of plant operations. Due to its configuration flow from it is dependent on the area head. A plotting of head at T-27 and tunnel flow (Figure 4) shows that 1 ft. change in head is equivalent to about 2.4 mgd at the tunnel. At the mean head of 17.4 ft., the flow from the Waiau tunnel is close to 11 mgd.

The flow from the tunnel can be expressed in the following relation:

\[ Q = 0.42h + 3.57 \]

where \( Q \) = flow in mgd

\( h \) = head in ft. @ T-27

The flow from the tunnel represents the largest concentration of flow in the area. The other 9 mgd come
from springs, watercress wells and the "Rice Mill Ditch" around the plant. These sources flow toward the plant when the water from the pond is drawn upon for cooling power generating Units 1 and 2.

When there is no need for condensing water for Units 1 and 2, flow from the tunnel and other sources is allowed to go to waste except for plant service needs. As previously mentioned, about 3 to 4 mgd will suffice for this. Wells 199-1D and 199-1J can supply this requirement.

V. Utilization of Waiau Shaft Flow

It is evident that the present utilization of fresh water from the Waiau Shaft is very inefficient. The entire flow is required for just a few hours daily when it is used for condensing during peak hours. During the remaining time, most of the flow goes to waste.

This was not always the case. During the time when sugar cane was grown in the area mauka of the plant, the once-used condensing water was pumped up to an irrigation reservoir and used for sugar cane irrigation. With the westward movement of cane lands and urbanization of the area mauka of the HECo Waiau plant, dual use is not possible anymore.

However, the present increasing demand for fresh water in leeward Oahu and metropolitan Honolulu focuses attention on efficient utilization of water resources. While the dual use of the Waiau water resources is not possible anymore due
SKETCH MAP OF HECO WAI'AU PLANT
SHOWING
LOCATIONS OF WELLS & CHLORIDE

Scale: 1"=100'

Date: 29 Mar 1971

NOTE: Chloride data from samples taken on July 23, 1971.
DIVISION OF WATER AND LAND DEVELOPMENT

FROM: [Signature]
DATE: 1/23
FILE IN: 

TO: INITIAL: 

PLEASE:

M. TAGOMORI
T. Fujii
H. Sakai
H. Morimatsu
A. Ching
G. Morimoto
G. Matsumoto
P. Matsuo
L. Asari
D. Lum
S. Samuels

SEE ME
TAKE ACTION BY
ROUTE TO YOUR BRANCH
REVIEW & COMMENT
DRAFT REPLY BY
ACKNOWLEDGE RECEIPT
XEROX COPIES
FILE

REMARKS:

CHECK ON STATUS
Well modified

[Signature]

[Handwritten notes]

Ed to prepare reply on request for water developments
January 22, 1986

Department of Land & Natural Resources
Division of Water & Land Development
P. O. Box 373
Honolulu, HI 96809

Attention: Mr. Manabu Tagomori
Manager-Chief Engineer

Gentlemen:

Subject: Artesian Well No. 3
Waiau Power Plant

This is to inform you of the status of our work on the subject well.

The well casing will be repaired as soon as possible. A permit to proceed with the work has already been filed with DNLR. The valve will also be repaired in accordance with DLNR's request. An inspection of the valve was done by PR Drilling and our personnel on December 18, 1985 to determine the extent of work required.

We understand that the Board of Water Supply and/or the U.S. Geological Survey now take periodic measurements of the total flow emanating from the tunnel portal. We, therefore, have no plans to install permanent flow meters to measure the flows from Wells Nos. 1, 2 and 3. In addition, because the total flow out of the tunnel consists of more than that which discharges from the well, (some flow emanates from the unlined portion of the tunnel floor), we believe that installing flow monitors on the individual wells would be of limited practical use.
Please contact me at 548-6885 if you need more information. We are hoping for an expeditious processing of our Well Modification Permit.

Sincerely,

[Signature]

RHS:mac

cc: W. Lee
    G. Tucker
    R. O'Connell
December 26, 1985

Mr. Stanley Tanno  
Hawaiian Electric Company  
Engineering Department  
820 Ward Avenue  
Honolulu, Hawaii 96814

Dear Mr. Tanno:

With reference to Hawaiian Electric Company's (HECO) application for a well modification permit to recase Well No. 3 (State Well No. 2357-12) in HECO's Waiau Tunnel, our review of the plans submitted indicates that there is presently no provision to install a flowmeter to determine the amount of water used.

This letter is to inform you that a flowmeter must be incorporated in the proposed plans for Well No. 3. Our Department's Administrative Rules, Chapter 166 of Title 13, entitled "Rules for the Control of Ground Water Use in the State of Hawaii", states, "the owner of any producing ground water well shall be responsible for determining and recording water withdrawals on a monthly basis, using a measuring device or method of determining the amount of withdrawal deemed appropriate by the chairperson." Unless the well is to be capped, a flowmeter shall be required to measure any water use withdrawals.

This matter has been discussed with Mr. Phillip Kuchler of PR Drilling Company, Inc. and Mr. Ross Sakuda of your Engineering Department.

We are also concerned about Well Numbers 1 and 2 (State Well Numbers 2357-10 and 11) also located in the tunnel. An inspection in January 1983, found Well Numbers 1 to 3 to be flowing uncontrolled and unused beneficially, except intermittently for cooling purposes. The existing condition of Wells 1 and 2 are in violation of Chapter 173, Wells Generally, HRS, and they must also be rehabilitated to prevent uncontrolled flow and wasting of ground water. Also, use of the three wells shall require a water use permit from our Department as well as installed flowmeters, in accordance with the Department's Administrative Rules, Chapter 166 of Title 13.

If you have any questions, please call me at 548-7533.

Sincerely,

MANABU TAGOMORI  
Manager-Chief Engineer

ES:ko
cc: Mr. Phillip G. Kuchler;  
PR Drilling Co., Inc.
December 26, 1985

Mr. Stanley Tanno
Hawaiian Electric Company
Engineering Department
820 Ward Avenue
Honolulu, Hawaii 96814

Dear Mr. Tanno:

With reference to Hawaiian Electric Company's (HECO) application for a well modification permit to recase Well No. 3 (State Well No. 2357-12) in HECO's Waiau Tunnel, our review of the plans submitted indicates that there is presently no provision to install a flowmeter to determine the amount of water used.

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We are also concerned about Well Numbers 1 and 2 (State Well Numbers 2357-10 and 11) also located in the tunnel. An inspection in January 1983, found Well Numbers 1 to 3 to be flowing uncontrolled and unused beneficially, except intermittently for cooling purposes. The existing condition of Wells 1 and 2 are in violation of Chapter 176, Wells Generally, HRS, and they must also be rehabilitated to prevent uncontrolled flow and wasting of ground water. Also, use of the three wells shall require a water use permit from our Department as well as installed flowmeters, in accordance with the Department's Administrative Rules, Chapter 166 of Title 13.

If you have any questions, please call me at 548-7533.

Sincerely,

MANABU TAGOMORI
Manager-Chief Engineer

ES:ko
cc: Mr. Phillip G. Kuchler,
     PR Drilling Co., Inc.
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Ed: floor meters

Not read? Should be i this
November 6, 1985

State of Hawaii  
Department of Land & Natural Resources  
Division of Water & Land Development  
P.O. Box 373  
Honolulu, Hawaii 96809  

ATTENTION: MANABU TAGOMORI, Manager-Chief Engineer

Gentlemen:

Subject: Repair of Well No. 3 Casing  
Waiau Power Plant

In response to DLNR's request, we are submitting the following information to you to supplement the well modification permit application:

1. HECO Drawing No.1850, Rev. 0, shows the layout of the tunnel and wells.

2. HECO Drawing No. 1846, Rev. 1, shows the location of the control valves in relation to the wells.

3. There are no flow meters or other appurtenances.

4. Removable fittings located at the top of each well allow measurement of the shut-in artesian head or measurement of the well depth. The repair work shall not interfere with the ability to take these measurements.

5. Check in the amount of $100.00 for filing fee.

A plot plan and sectional drawings of the existing wells were submitted to you earlier.

If you require additional information, please contact Phillip G. Kuchler at 487-9969.

Sincerely,

Phillip G. Kuchler  
President

cc: Ross Sakuda, HECO

"Every Bit Better"
December 26, 1985

Mr. Stanley Tanno
Hawaiian Electric Company
Engineering Department
820 Ward Avenue
Honolulu, Hawaii 96814

Dear Mr. Tanno:

With reference to Hawaiian Electric Company's (HECO) application for a well modification permit to recuse Well No. 3 (State Well No. 2357-12) in HECO's Waiau Tunnel, our review of the plans submitted indicates that there is presently no provision to install a flowmeter to determine the amount of water used.

This letter is to inform you that a flowmeter must be incorporated in the proposed plans for Well No. 3. Our Department's Administrative Rules, Chapter 166 of Title 13, entitled "Rules for the Control of Ground Water Use in the State of Hawaii", states, "the owner of any producing ground water well shall be responsible for determining and recording water withdrawals on a monthly basis, using a measuring device or method of determining the amount of withdrawal deemed appropriate by the chairperson." Unless the well is to be capped, a flowmeter shall be required to measure any water use withdrawals.

This matter has been discussed with Mr. Phillip Kuchler of PR Drilling Company, Inc. and Mr. Ross Sakuda of your Engineering Department.

We are also concerned about Well Numbers 1 and 2 (State Well Numbers 2357-10 and 11) also located in the tunnel. An inspection in January 1983, found Well Numbers 1 to 3 to be flowing uncontrolled and unused beneficially, except intermittently for cooling purposes. The existing condition of Wells 1 and 2 are in violation of Chapter 173, Wells Generally, HRS, and they must also be rehabilitated to prevent uncontrolled flow and wasting of ground water. Also, use of the three wells shall require a water use permit from our Department as well as installed flowmeters, in accordance with the Department's Administrative Rules, Chapter 166 of Title 13.

If you have any questions, please call me at 548-7533.

Sincerely,

MANABU TAGOMORI
Manager-Chief Engineer

ES:ko

cc: Mr. Phillip G. Kuchler;
PR Drilling Co., Inc.
WATER RESOURCES & FLOOD CONTROL BRANCH
Division of Water and Land Development

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REMINDERS:
- 8/02/85
- File
- Meeting
- Call
- Review & Comment
- Take Action
- Investigate & Report
- Draft Reply
- Acknowledge Receipt
- Type Draft
- Type Final
- Xerox copies
- File
- Mail

FOR YOUR:
- Approval
- Signature
- Information
- Vlog
- PM
- Water license
- Land license
- File
- Review
- Action
- Investigate
- Report
- Acknowledge
- Draft
- Type
Mr. Stanley Tanno  
Hawaiian Electric Company  
Engineering Department  
820 Ward Avenue  
Honolulu, Hawaii 96814

Dear Mr. Tanno:

My staff is presently reviewing Hawaiian Electric Company's (HECO) application for a well modification permit to recase Well No. 3 (State Well No. 2357-12) in HECO's Waiau Tunnel.

Our review indicates that there is presently no provision to install a flowmeter to determine the amount of water used. Our Department's Administrative Rules, Chapter 166 of Title 13, entitled "Rules for the Control of Ground Water Use in the State of Hawaii", states, "the owner of any producing ground water well shall be responsible for determining and recording water withdrawals on a monthly basis, using a measuring device or method of determining the amount of withdrawal deemed appropriate by the chairperson." We feel that a flowmeter is appropriate in this instance.

My staff has spoken with Mr. Phillip Kuchler of PR Drilling Company, Inc. and Mr. Ross Sakuda of your Engineering Department concerning this matter. This letter is to inform you of the situation so a flowmeter can be incorporated into HECO's proposed plans for Well No. 3 as soon as practical.

If you have any questions, please call Ed Sakuda at 548-7543.

Sincerely,

MANABU TAGOMORI  
Manager-Chief Engineer

ES:ko  
cc: Mr. Phillip G. Kuchler,  
PR Drilling Co., Inc.
We are also concerned about Well Numbers 1 and 2 (State Well Numbers 2357-10 and 11) located in the tunnel. We request that along with the recasing steps be taken to place of well No. 3, if well Number 1 and 2 under control, and any unusual flow be discontinued.

Upon completion of the above work, the amount of flow contributed by both spring flow and well flow may be determined and a waste water permit can be assigned to the well flow portion of the Waian Tunnel source.
**WATER RESOURCES & FLOOD CONTROL BRANCH**  
Division of Water and Land Development

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- 1. Proposed section of the well showing location of the control valves, flow meter(s), and other appurts.
- 2. Who to contact (write) at HECO re: flowmeter: R.O. Sakuda - S48 - 4460
- 3. Recasting Details - maybe
- 4. Other 2 wells - what values + comments?

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October 18, 1985

Mr. Phillip G. Kuchler  
President  
PR Drilling Company, Inc.  
98-710 A Kuahao Place  
Pearl City, Hawaii 96782

Dear Mr. Kuchler:

This is to acknowledge receipt of your application on behalf of Hawaiian Electric Co., Inc. (HECO) for a Well Modification Permit for Well 2357-12 located at the HECO Waiau Power Plant. Since the well is located in the Pearl Harbor Ground Water Control Area, a filing fee of $100 is required, payable to the Department of Land and Natural Resources. To complete Hawaiian Electric Co.'s application, we also require a plot plan and sectional drawings of the existing well and of the proposed modification of the well, showing the location of the control valves, flow meter and other appurtenances. Provisions must be made to allow for measurement of shut-in artesian pressure or head and for probing the depth of the well.

Please send the above items as soon as possible to expedite review of your application. If you have any questions, please call Ed Sakoda at 548-7543.

Sincerely,

[Signature]

MANABU TAGOMORI  
Manager-Chief Engineer

ES:ko  
cc: Mr. V.E. Cronkhite, HECO
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| D. Lum | | | ED
|
| S. Samuels | | | Is this OK? Do we need to make a redline?
|
| | | | Test it to be certain. This proposal is O.K. to proceed with? yes.

PR Dela will use a "homemade" pneumatic "Donut" which will go "up the #6" cage to the open hole. Shall we call cement basket/bermage test?
APPLICATION FOR (check one)

☐ WELL DRILLING PERMIT  ☒ WELL MODIFICATION PERMIT

Instructions: Send completed application and attachments to Department of Land and Natural Resources, P.O. Box 373, Honolulu, Hawaii 96809.
Reference: Regulation 9, Dept. of Land & Natural Resources.

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

1. WELL LOCATION: Island Oahu _____ Tax Map Key 9-8-03:10 __. Attach a plot plan showing well location referenced to established property boundaries.

2. WATER USER Hawaiian Electric Co., Inc. Telephone 548-7771

3. PROPOSED DRILLING COMPANY: PR Drilling Co., Inc.

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

Fill in the diagram and briefly describe the proposed work (use back of form if necessary):
Clean out casing interior; set 50' feet of 16" steel pipe with Donut in existing 20" casing and grout in place; remove any debris.

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

6. PROPOSED AMOUNT OF WITHDRAWAL: Check most appropriate box and fill in amount.
☒ Daily 900,000 gallons  ☐ Monthly gallons  ☐ Yearly gallons

7. PROPOSED PUMP OR FLOW CAPACITY:

Signature: /\[signature\] Water User Date: 10/4/89

Signature: /\[signature\] Landowner of Well Site Date: 10/4/89

For Official Use:
State Well No. 2357-12
DLNR Permit No.
DLNR Application No.
APPLICATION FOR (check one)

☐ WELL DRILLING PERMIT  ☑ WELL MODIFICATION PERMIT

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

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

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WELL LOCATION: Island  Oahu Tax Map Key  9-8-03:10  Attach a plot plan showing well location referenced to established property boundaries.

WATER USER Hawaiian Electric Co., Inc. Telephone  548-7771
Address  P. O. Box 2750 Zip Code  96840

PROPOSED DRILLING COMPANY:  PR Drilling Co., Inc.

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

Fill in the diagram and briefly describe the proposed work (use back of form if necessary):
Clean out casing interior; set 48 feet of 16" steel pipe with tee in existing 20" casing and grout in place; remove any debris.

PROPOSED SECTION OF WELL

Elevation at top of casing ______________ ft., msl.

Cement Grout __________________ ft.

Hole Dia. 24 in.

Total Depth 48 ft.

Rock Packing __________________ ft.

Existing Casing Dia. = 20"

Ground Elev. 35.0 ft. (ft., msl)*

Solid casing:
Material Sch. 20 black pipe
Length 48 ft.
Diameter 16 in.
Wall thickness 0.312 in.

Casing: ☑ Perforated ☑ Screen
Material
Length __________________ ft.
Diameter __________________ in.
Wall thickness __________________ in.
Openings sq. in./L.F.

Open Hole:
Length 83 ft.
Diameter 20 in.

Approximate elev. at filing. Final elev. (msl) by a surveyor licensed by the State must be submitted at start of construction.

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

6. PROPOSED AMOUNT OF WITHDRAWAL:  Check most appropriate box and fill in amount.
☐ Daily 900,000 gallons  ☑ Monthly __________________ gallons  ☐ Yearly __________________ gallons

7. PROPOSED PUMP OR FLOW CAPACITY:  __________________ gallons per minute

Signature:  /s/ [Signature]

Date:  10/4/85

Water User

Signature:  /s/ [Signature]

Date:  10/4/85

Landowner of Well Site

For Official Use:

State Well No. 2357-12

DLNR Permit No. __________________

DLNR Application No. __________________
Notes to Well Modification Permit Application

Item 1
-----
The attached HECO Drawing No. 27805 Rev. 1 shows the location of HECO's Well No. 3 (USGS No. 199-1D).

Item 4
-----
The alteration will be done to stop the leakage from the casing of Well No. 3. The attached HECO Drawing No. W-4300 shows details of the Well No. 3 construction.

Item 7
-----
The amount of water emanating by natural flow from Well No. 3 is presently estimated at 900,000 gal./day. This amount plus the amount flowing from Well Nos. 1 & 2 will continue to be used for plant equipment cooling purposes.

Note: HECO references MLLW as elevation 100.0 feet.
October 8, 1985

Department of Land & Natural Resources
P.O. Box 373
Honolulu, Hawaii 96809

Gentlemen: RE: WAIAU POWER PLANT

Enclosed you will find two copies each of the following:
Well Modification Permit for Hawaiian Electric
W-4300 Log of Drilling for above referenced.
Drawing No. 27805 Fresh Water Sources for above referenced.

Please review and issue the Well Modification Permit as soon as possible.

Sincerely

Phillip G. Kuchler
President

"Every Bit Better"
State of Hawaii
DEPARTMENT OF LAND AND NATURAL RESOURCES

APPLICATION FOR (check one)
☐ WELL DRILLING PERMIT  ☑ WELL MODIFICATION PERMIT

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

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

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

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

1. WELL LOCATION: Island Oahu  Tax Map Key 9-8-03:10. Attach a plot plan showing well location referenced to established property boundaries.

2. WATER USER Hawaiian Electric Co., Inc.  Telephone 548-7771  Address P. O. Box 2750  Zip Code 96840

3. PROPOSED DRILLING COMPANY: PR Drilling Co., Inc.

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

Fill in the diagram and briefly describe the proposed work (use back of form if necessary):

Clean out casing interior; set 48 feet of 16" steel pipe with tee in existing 20" casing and grout in place; remove any debris.

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

6. PROPOSED AMOUNT OF WITHDRAWAL: Check most appropriate box and fill in amount. ☐ Daily 900,000 gallons  ☐ Monthly ___________ gallons  ☐ Yearly ___________ gallons

7. PROPOSED PUMP OR FLOW CAPACITY: ________________________ gallons per minute

Signature: /\ Vileankedhu \ Date: 10/6/8-
Water User

Signature: /\ Vileankindhu \ Date: 10/4/8-
Landowner of Well Site

For Official Use:
State Well No. 2357-12
DLNR Permit No.
DLNR Application No.

Filing Fee Deposited 11/29/85
Notes to Well Modification Permit Application

Item 1
------
The attached HECO Drawing No. 27805 Rev. 1 shows the location of HECO's Well No. 3 (USGS No. 199-1D).

Item 4
------
The alteration will be done to stop the leakage from the casing of Well No. 3. The attached HECO Drawing No. W-4300 shows details of the Well No. 3 construction.

Item 7
------
The amount of water emanating by natural flow from Well No. 3 is presently estimated at 900,000 gal./day. This amount plus the amount flowing from Well Nos. 1 & 2 will continue to be used for plant equipment cooling purposes.

Note: HECO references MLLW as elevation 100.0 feet.
I talked to Edna Tanno. Ed is the Eng. Dept. @ DECO. regarding the
retaining wall. We are about to sign.

He says that negotiations for
buying to purchase water from 1,500 is
not near agreement and most likely will
not materialize. DECO plans to
six wells in question.
Gentlemen:

Notification of Leaking Artesian Wells, Waiau Tunnel Source, Oahu

According to our records, the Waiau tunnel source was inspected in January 1983, and water was found to be flowing uncontrolled and unused from three artesian wells located within the tunnel.

The three wells, identified as State Well Nos. 2357-10, 2357-11, and 2357-12, were equipped with control valves that appeared to have been left open and inoperative. Also, Well No. 2357-12 was leaking through an opening in the casing. Except for a small quantity used for cooling purposes, the artesian ground water was flowing unused into Pearl Harbor.

The Department wishes to notify you that the conditions described above are in violation of Chapter 178, "Wells Generally" of the Hawaii Revised Statutes and that you are subject to penalties if the conditions are allowed to continue. We request that you take immediate steps to repair the leaking wells, place each of the three artesian wells under immediate control, and discontinue any unused flow from the wells.

The responsibility of placing and maintaining these wells under control must be borne by the owner. However, as provided in Section 178-7 of Chapter 178, HRS, a well owner may relieve himself of such responsibility by transferring them to the Honolulu Board of Water Supply, along with the exclusive right to develop water from them.

An early response on this matter, including an outline of your action plans to correct the leakage and unused flow or offer them to the Honolulu Board of Water Supply would be appreciated.

Very truly yours,

SUSUMU ONO
Chairperson of the Board
WELLS, GENERALLY

Sec. 178-11

written notice shall constitute a separate offense; provided, that when the continuance of the waste is not under immediate control, as where recasing or sealing is necessary, each day's continuance of the same shall constitute a separate offense after sixty days have elapsed from the time of receiving written notice to prevent waste. For violations under sections 178-5 and 178-6, each day's continuance of the same shall constitute a separate offense after 30 days have elapsed from the time of written notice of violations. [L 1963, c 39, pt of §1; Supp, §101-7; HRS §178-7; am L 1970, c 123, §1(h)]

§178-8 Person may relieve himself of liability. Any person owning a well, drilled for water development purposes, through which water flows to the surface of the ground or to any porous substratum by natural pressure or is raised by artificial means, may relieve himself of further responsibility therefor by transferring it to the county in which it is situated and the exclusive right to develop water on or under any property owned by him in the district in which the well is situated and the right to enter the property for the purpose of capping or plugging the well. The county may, for conservation purposes, accept the well and the right and cap or properly plug the well as soon as practicable. The county shall have the right to use the well and to lay and maintain pipes to draw water therefrom; provided that the use and the laying and maintenance of the pipes be made in such manner as to cause minimum inconvenience to the person owning the well before its transfer as provided herein. [L 1963, c 39, pt of §1; Supp, §101-8; HRS §178-8; am L 1970, c 123, §1(i)]

§178-9 Inspection by board. For the more effectual carrying out of this chapter, the board of land and natural resources or its designated agent may at all times enter without warrant the premises where a well is situated or wherein a well is used in order to procure such information or for such other purpose as may be necessary. [L 1963, c 39, pt of §1; Supp, §101-9; HRS §178-9; am L 1970, c 123, §1(j)]

§178-10 Appeals from decisions of the board. Any person, firm, copartnership, or corporation adversely affected thereby may appeal to the circuit court from any ruling of the board of land and natural resources regulating the flow, manner of sealing, or manner of repairing of any well by filing, in writing, a notice of appeal within ten days after the date of the ruling with the clerk of the court and serving a copy thereof upon the board, stating the grounds therefor. The court shall have power to review and to affirm, modify, or reverse any decision or order of the board so appealed from, in any matter of law or fact. [L 1963, c 39, pt of §1; Supp, §101-10; HRS §178-10; am L 1970, c 123, §1(k)]

Case Notes

Territory cannot prohibit an individual owner of land in Honolulu from boring an artesian well while at the same time permitting unrestrained operation and use of all existing artesian wells. Reasonable regulations may be applied. 30 H. 912.

§178-11 County charters not impaired. The provisions of this chapter shall not be construed as amending or impairing the provisions of any county charter relating to boards or departments of water supply. [L 1970, c 123, §1(l)]
For well diameters greater than 20", casing thickness shall be as specified by the Manager.

The well owner shall insure that proper precautions are taken during installation to prevent collapse.

3. In all new and/or modified wells wherein casing is required, the annular space shall be grouted in a manner approved by the Manager from a depth set by the Manager to the ground surface.

4. Joints in the steel casing may be either welded or of the screwed type with external sleeves. Welded joints are to be made by a State certified welder. External sleeve joints shall be screwed to refusal before being lowered into the ground. The threads of the pipe casing and the sleeves shall be cleaned of any rust, dirt or grease and given a coating of approved metal preservative. After the joint has been made up, all exposed surface of the joints, sleeves and uncovered threads are to be given a final coating of the same preservative.

5. The lower end of the casing shall be set at such depth and by such method, chosen by the contractor and approved by the Manager, as will minimize the possibility of leakage and insure that any loose material will not enter or ravel into the well. Tests for leakage in and around the casing shall be conducted under the direction of the Manager after drilling or recasing is completed. For the purposes of such tests a suitable standpipe shall be temporarily installed by the Owner at his own expense when so requested by the Manager.

6. Should a well casing be found to be leaking and causing wastage of water or contamination of water resources, the Owner must either stop the leak or seal the well at his own expense, and in a manner satisfactory to the Manager.

Sec. 3-309 Other Requirements for Wells

1. For all new wells constructed after March 1972 from which water is to be drawn, the Owner shall provide and maintain the following at his own expense:
   a. Devices satisfactory to the Manager for measuring and recording total draft. Where the well is one of a battery of interconnected wells, a centralized measuring and recording facility may be installed.
   b. Means to determine water level satisfactory to the Manager.
   c. Adequate access and clearance for well drilling equipment.

2. For all new artesian wells constructed after March 1972, wherein the static water level can rise to the well head, the Owner shall provide and maintain the following equipment at his own expense in addition to that required in paragraph 1 above:
   a. A valve of the same diameter as the well casing, so arranged as to facilitate the introduction of instruments for inspection and test purposes, the valve shall be capable of stopping the flow from the well and shall be installed directly at the top of the well casing.
   b. A valve or petcock 1/4" or larger shall be installed below the valve required in paragraph (2a) above, for periodic testing of the well or sampling of the water under static conditions.
   c. Clearance at the well to permit the well casing to be extended above the altitude of the static artesian head.

3. The replacement of pumps or other equipment at a well for its control and operation that will materially increase the output from the well shall be subject to the approval of the Manager, measured by the criteria set forth in Section 3-306(4). The Manager's decision whether or not to approve shall be made within two weeks after receipt of the notification.

4. The Manager shall be notified at least 48 hours before the Owner removes pumps or other devices installed in the well bore. When such devices are removed, the Manager shall be allowed access to the cleared well for inspection and measurements. In emergencies, the Manager shall be notified as soon as practicable after the devices are removed.

5. The Owner of any well subject to these Rules and Regulations shall be responsible for providing adequate safeguards at the well at his own expense, so that any person permitted to be on such property where the well is located shall not be exposed to any danger, hazard or nuisance.

6. For all wells constructed prior to March 1972, wherein the static water level can rise to the well head, the Owner shall provide and maintain an operable control valve to prevent unnecessary wastage.

Sec. 3-310 Log of Well, Length of Casing and Depth of Well

1. The Owner shall require that the well driller maintain a continuous log of the drilling of the well, including a description and samples of the materials encountered, together with the depths to the top and bottom of each change in geologic characteristics. The log shall include a record of water levels encountered, any changes thereof, and the rate of flow at the surface, if any, for different depths of drilling.

2. Within ninety (90) calendar days after construction of each well, the Owner shall submit a Driller's Report to the Manager on forms approved by the Manager.

Sec. 3-311 Qualifications of Well Drillers

The drilling, modifying, recasing, reusing, or sealing of any well shall be done only under the direct supervision of personnel properly certified by the Department of Regulatory Agencies, State of Hawaii.

Sec. 3-312 Inspection of Work

The Manager may supply an inspector, whose duties shall be to obtain and report the progress of the work of drilling, modifying, recasing, reusing or sealing of wells. The Manager and his assistants or inspectors shall have free access to all parts of the work at all times, and shall be given an assistance required and every facility, information and means of thorough inspecting the work and the materials used or to be used.

Sec. 3-313 Utilization of Well Water

1. All water wells shall be operated in a manner that will readily and effectively prevent wastage and pollution of water. The Manager may exclude high-level tunnels from the provisions of this section if it is specifically determined in each case that wastage of water therefrom cannot be reasonably corrected.

2. The Manager may limit the amount of water drawn from any well covered under these Rules and Regulations if there is a reasonable basis for expect that the overdraft will:
   a. Cause or bring about overdraft conditions, or
Mr. Kazu Hayashida  
Manager and Chief Engineer  
Board of Water Supply  
City and County of Honolulu  
630 South King Street  
Honolulu, Hawaii 96843  

Dear Mr. Hayashida:

Thank you for notifying us that the Honolulu Board of Water Supply has deferred development of the HECO/Waiau tunnel source for municipal use.

Our assessment of Oahu's available water supply and projected demand through the Year 2000 continues to indicate a need for accelerated new water source developments. As a result, the State has embarked on an alternate water source development program on Oahu to demonstrate the feasibility of such source to meet Oahu's future water needs.

The Board of Water Supply's decision not to pursue development of the HECO/Waiau source hopefully is a temporary one. We feel that the development of the source would help relieve the stress on the Pearl Harbor Ground Water Control Area and help meet the water needs of Oahu. We urge the Board of Water Supply and HECO to continue discussions to develop the source in the future.

Verry truly yours,

SUSUMU ONO  
Chairperson of the Board

NT: ko
Mr. Susumu Ono, Chairperson
Board of Land and Natural Resources
State of Hawaii
P. O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Ono:

Subject: HECO/Waiau Tunnel Source

We have deferred the development of the HECO/Waiau tunnel source for municipal use.

The availability of additional water in the Pearl Harbor basin has removed the urgency of developing this source at this time. This will give us the opportunity of monitoring the chloride of the water which has been increasing during the past two years.

If you have any questions, please contact Herbert H. Minakami at 527-6183.

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer
Mr. Susumu Ono, Chairperson  
Board of Land and Natural Resources  
State of Hawaii  
P. O. Box 621  
Honolulu, Hawaii 96809

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Very truly yours,

KAZU HAYASHIDA  
Manager and Chief Engineer

— Water... man's greatest need — use it wisely
Mr. Kazu Hayashida  
Manager and Chief Engineer  
Board of Water Supply  
City and County of Honolulu  
630 South King Street  
Honolulu, Hawaii 96843

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Very truly yours,

SUSUMU ONO  
Chairperson of the Board
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Ok < I talked to Chuck last night. Better to go with old staff.

Plans to niche services for self-serve.
May 17, 1983

Mr. Robert T. Chuck
Manager - Chief Engineer
Division of Land and Water Development
Department of Land and Natural Resources
P.O. Box 373
Honolulu, Hawaii 96809

Attention: Mr. Manabu Tagomori

Dear Mr. Chuck:

Subject: HECo Waiau Tunnel Source

This concerns my telephone conversation this afternoon with Mr. Tagomori on the installation of the staff gage.

Because of the close proximity of your gage site to the existing pond, there is a possibility of backwater effects at the staff gage during high water levels in the pond. Since such backwater would distort the gage readings, your Division is agreeable to locating the staff gage at the old USGS gaging station (refer to Park Engineering's letter of January 29, 1983). We shall proceed to finalize our designs accordingly.

Sincerely yours,

Reginald M. Suzuka
Associate

cc: Mr. Herbert Minakami
Mr. Rueben Lee
March 14, 1983

Mr. Edward Y. Hirata
Vice President, Engineering
Hawaiian Electric Company, Inc.
Box 2750
Honolulu, HI 96840

Dear Ed:

Waiau Water Tunnel Facility

In response to your letter of March 9, 1983, we have no objections to your proceeding with the development plans for the Waiau Tunnel in conjunction with the Honolulu Board of Water Supply.

As stated in our letter of February 14, 1983, artesian wells 2357-10, 2357-11 and 2357-12 that feed the Waiau Tunnel require rehabilitation work as required by Chapter 178, HRS. We suggest that the necessary work on the existing artesian wells be incorporated into the development plans and the work be completed together with the overall improvements to the Waiau Tunnel.

If you have any questions please contact Manabu Tagomori at 548-7619.

Very truly yours,

ROBERT T. CHUCK
Manager-Chief Engineer

MT:js
cc: Board of Water Supply
Department of Land & Natural Resources  
Div. of Water & Land Management  
P. O. Box 373  
Honolulu, HI  96809

Attention:  Mr. Robert T. Chuck  
Manager-Chief Engineer

Gentlemen:

Subject: Waiau Water Tunnel Facility

This is in response to your letter of February 14, 1983 commenting on our fresh water tunnel facilities at Waiau.

For sometime now, we have been working on a plan with the Board of Water Supply wherein facilities will be built to divert the tunnel water not needed for plant operation into a collection basin and subsequently pump this water into the public water system. At present, this new facility is in the design stage and construction is scheduled for completion in 1985.

The proposed design of the new facility requires no modifications to the existing tunnel system except for interconnections. The development of this water source makes any changes now premature and would tend to increase project costs.

Based on the foregoing, we ask that you allow us to proceed with our development plan with the Board of Water Supply. If you have any questions, do not hesitate to call me.

Sincerely,

Edward Y. Hirata  
Vice President, Engineering

RBF:fy

cc:  V. E. Cronkhite
February 14, 1983

Hawaiian Electric Co., Inc.
P.O. Box 3978
Honolulu, Hawaii 96813

Gentlemen:

On a recent visit to your Waiau water tunnel facilities by our staff, it was observed that the water flowing out the tunnel is fed by three artesian wells located within the tunnel. The wells are identified as State No. 2357-10, 2357-11, and 2357-12. The locations of the wells are shown on the attached sketch.

It was noted during the visit that the three wells are equipped with valves but none seemed to be in working order and they all seemed to be fully in open positions, permitting the full flow of the artesian water into the tunnel and into Pearl Harbor unused except for a small quantity used for cooling purposes. Additionally, one of the artesian wells (State No. 2357-12) was discharging water through a break in the casing.

Conditions described above are in violation of Chapter 178, HRS relating to Wells, Generally. Section 178-2 states:

"A well through which water flows to the surface of the ground or to any porous substratum by natural pressure and is not capped, cased, equipped, or furnished with such control facilities as will readily and effectively arrest and prevent waste or unnecessary flow of any water from the well is declared to be a common nuisance. The owner, tenant, or occupant of the land upon which such a well is situated, or any person in charge of such a well, who causes, suffers, or permits such common nuisance, or suffers or permits it to remain or continue, is guilty of a misdemeanor."

Based upon our observations, we request that (1) any leakage in well casing, piping, or appurtenance be repaired and (2) all valves and control facilities be in operational condition and
(3) the flow of water discharging from the tunnel be limited only to the quantity needed for cooling purposes.

We would be pleased to discuss this matter with you further. If you have any questions, please contact Manabu Tagomori of my staff at 548-7619.

Very truly yours,

ROBERT T. CHUCK
Manager-Chief Engineer

MT:ko
Attach.
cc: Honolulu BWS
February 9, 1983

MEMORANDUM FOR THE RECORD

FROM: Ed Sakoda
SUBJECT: HECo Waiau Tunnel Field Trip

On January 12, 1983, we took an orientation field trip to HECo's Waiau Tunnel. The following were present:

Manabu Tagomori
Ed Sakoda
Neal Imada
Reginald Susuka
Guy Tucker

DOWALD

We took a brief tour of the ponds into which the tunnel flows, the two outlets from the ponds into Pearl Harbor (photos 1-3), and some of the springs feeding into the ponds from the Waianae end of HECo's property.

We then entered the tunnel thru the existing tower structure (photos 4 & 5) and followed the tunnel to its mauka end. Pictures were taken and four water samples were collected for chloride analysis at the locations shown on the accompanying map. The chloride content of the samples are as follows:

Sample 1. 144.75 mg/l. Water flowing from the well casing (2357-12) at the head of the tunnel (photos 6-8). Weak to moderate flow.

Sample 2. 148.50 mg/l. Taken a few feet downstream from sample 1.

Sample 3. 256.50 mg/l. Taken at the intersection of the main tunnel with a secondary tunnel (photos 9 & 10) leading to another flowing well (2357-11). Fairly strong flows.

Sample 4. 625 mg/l. Taken near the tower structure where a third well (2357-10) flows into the main tunnel (photo 11). Strong flow.

Sample 5. 425 mg/l. Taken near the mouth of the tunnel when it enters the small pond (photo 12).

Pertinent well data:

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<th>WELL NO. (OLD NO.)</th>
<th>YR. DRILLED</th>
<th>CSG (IN)</th>
<th>GROUND (FT)</th>
<th>BOT. OF HOLE (MSL)</th>
<th>BOT. OF SOLID CSG(MSL)</th>
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<td>32</td>
<td>-75</td>
<td>-16</td>
<td>256 mg/l</td>
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<tr>
<td>2357-12 (199-1D)</td>
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<td>20</td>
<td>36</td>
<td>-47</td>
<td>-12</td>
<td>144 mg/l</td>
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</table>

Flow from tunnel is approximately 10 mgd dependent upon the head in the area.
February 2, 1983

Mr. Rueben Lee  
U.S. Geological Survey  
300 Ala Moana Boulevard  
Room 6110, Prince Kuhio Federal Bldg.  
Honolulu, Hawaii 96850

Dear Mr. Lee:

Subject: HECo Waiau Tunnel Source

The Department of Land and Natural Resources (DLNR) has informed us that they prefer the gage location shown on their map of January 19, 1983. The reason is that an existing ground water flow enters the ditch downstream of the abandoned gaging station and DLNR wish to include this flow in their flow measurements.

As we are unfamiliar with staff gage and the details/procedures/methods of installation, we ask that you provide us with these informations. Your cooperation and assistance will be deeply appreciated.

Sincerely yours,

PARK ENGINEERING, INC.

Reginald Suzuka  
Associate

cc: Mr. Herb Minakami

Mr. Manabu Tagomori
February 1, 1983

Mr. Reginald Suzuka, Associate
Park Engineering, Inc.
Pacific Trade Center
190 S. King Street
Honolulu, Hawaii 96813

Dear Mr. Suzuka:

Thank you for your letter concerning the installation of the staff gage at the HECO Waiau Tunnel.

The reason for locating the gage as originally shown in our January 19, 1983 letter was to include the flow from a pipeline entering the main tunnel a few yards upstream of the proposed gage location. Though identification of the origin of the pipeline was not made during our January 12, 1983 trip to the site, our records indicate that the pipeline may originate from Well 2357-18 (Old Well No. 199-1J) which was formerly connected to plant service pumps housed in two pumphouses.

As an alternate solution, we would have no objection to using the existing U.S.G.S. gaging station if the source of the pipeline can be located and steps taken to shut off the flow.

If you have any questions, please contact Manabu Tagomori of my staff at 548-7619.

Very truly yours,

ROBERT T. CHUCK
Manager-Chief Engineer

ES:ko
January 24, 1983

Mr. Robert T. Chuck  
Manager - Chief Engineer  
Division of Water and Land Development  
Department of Land and Natural Resources  
P. O. Box 373  
Honolulu, Hawaii 96809

Dear Mr. Chuck:

Subject: HECO Waiau Tunnel Source

Thank you for your letter of January 19, 1983.

I contacted Mr. Rueben Lee of the U.S. Geological Survey (U.S.G.S.) to inquire about the staff gage. He informed me that his office has an existing gaging station just upstream from the gage location shown on your map (see enclosed map for the relative locations). Unfortunately, the U.S.G.S. no longer maintain flow records at this station. According to Mr. Lee, it would be a fairly simple matter to replace the existing staff gage and to re-rate (e.g. develop a new flow curve) a new staff gage. If you are agreeable to using the old gaging station, the U.S.G.S. will install and rate the new gage at no cost.

We hereby request that you consider and agree to using the old gaging station. Your earliest response on this matter will be appreciated.

Sincerely yours,

PARK ENGINEERING, INC.

Reginald Suzuka  
Associate

Enclosure

cc: Mr. Herb Minakami  
Mr. Rueben Lee
January 19, 1983

Mr. Reginald Suzuka, Associate
Park Engineering, Inc.
Pacific Trade Center, Suite 2085
190 S. King Street
Honolulu, Hawaii 96813

Dear Mr. Suzuka:

Thank you for sending a set of construction plans for the proposed pumping and collection system for the HECo. Waiau Tunnel Source for our review and comments.

We have no objections with the plans as drawn. We are pleased that a flowmeter is provided to measure the total pumpage into the BWS system. In this connection, we would like to see that a staff gage be installed downstream of the lower diversion (see attached map) on the existing open ditch to measure by-pass flows and other flows before it enters the lower receiving pond. The installation of this staff gage will enable our Department to obtain periodic total flows discharging from the HECo. Waiau Tunnel. Information on the staff gage may be obtained from the U.S. Geological Survey office in Honolulu.

If you have any questions, please contact Manabu Tagomori of my staff at 548-7619.

Very truly yours,

ROBERT T. CHUCK
Manager-Chief Engineer

MT:ko
cc: Honolulu BWS
    HECo.
    USGS
December 28, 1982

Mr. Robert T. Chuck
Manager and Chief Engineer
Division of Water and Land Development
Department of Land and Natural Resources
Kalanikuu Building
1151 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Chuck:

Subject: HECO Waiau Tunnel Source

We are hereby acknowledging your letter of October 5, 1981 requesting plans for the subject project.

Please find attached herewith a set of our construction plans for the pumping and collection system.

Your review and comments are requested.

Sincerely yours,

PARK ENGINEERING, INC.

Reginald Suzuki
Associate

Attachment
January 24, 1983

Mr. Robert T. Chuck  
Manager - Chief Engineer  
Division of Water and Land Development  
Department of Land and Natural Resources  
P. O. Box 373  
Honolulu, Hawaii 96809

Dear Mr. Chuck:

Subject: HECo Waiau Tunnel Source

Thank you for your letter of January 19, 1983.

I contacted Mr. Rueben Lee of the U.S. Geological Survey (U.S.G.S.) to inquire about the staff gage. He informed me that his office has an existing gaging station just upstream from the gage location shown on your map (see enclosed map for the relative locations). Unfortunately, the U.S.G.S. no longer maintain flow records at this station. According to Mr. Lee, it would be a fairly simple matter to replace the existing staff gage and to re-rate (e.g. develop a new flow curve) a new staff gage. If you are agreeable to using the old gaging station, the U.S.G.S. will install and rate the new gage at no cost.

We hereby request that you consider and agree to using the old gaging station. Your earliest response on this matter will be appreciated.

Sincerely yours,

PARK ENGINEERING, INC.

Reginald Suzuka  
Associate

Enclosure

cc: Mr. Herb Minakami  
    Mr. Rueben Lee
January 20, 1983

Mr. Reginald Suzuka
Park Engineering, Inc.
190 S. King St., Suite 2085
Honolulu, Hawaii 96813

Dear Mr. Suzuka:

Thank you for arranging and personally accompanying my staff in a visit to the HECO Waiau water facilities on January 12, 1983.

I learned that the visit, particularly into the tunnel to see the flow from artesian wells, was very interesting. Seeing the facilities first-hand will help us better understand the water development proposal by the Honolulu Board of Water supply.

Your courtesies extended my staff is sincerely appreciated.

Very truly yours,

ROBERT T. CHUCK
Manager-Chief Engineer

MT:ko
cc: Mr. Larry Matsuo
December 28, 1982

Mr. Robert T. Chuck
Manager and Chief Engineer
Division of Water and Land Development
Department of Land and Natural Resources
Kalanikuku Building
1151 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Chuck:

Subject: HECo Waiau Tunnel Source

We are hereby acknowledging your letter of October 5, 1981 requesting plans for the subject project.

Please find attached herewith a set of our construction plans for the pumping and collection system.

Your review and comments are requested.

Sincerely yours,

PARK ENGINEERING, INC.

[Signature]

Reginald Suzuki
Associate

Attachment
MEETING AT USGS

1/13/82

Ben Selvin
Wilson L.R.
Canada

Water level - 1973 data (old)
- Unnamed spring in pond

Near Jacobs.
Tidal effect
Channel ringing.

USGS

Manpower
Dry run (old pumps should be running)
Prepare outlet site
Code

Best time: Feb 18, 19

USGS has no mechanism for
control or put. org.

3WS = 2,000

HEC's running same pumps: 1/13/82

2US = 4, W? Rec. it? pend
Route Slip
WATER RESOURCES & FLOOD CONTROL ANCH

From: Ed Date: 11/23/81 File in: 11/23/81

To Initial

Manabu Tagomori
Albert Ching
Daniel Lum
George Matsumoto
Nobu Kaneshiro
Tom Nakama
Paul Matsuo
Edwin Sakoda
Mitchel Ohye
Milton Yamasaki
Joe Menor
Doris Hamada

Please

See me
Call
Take action by
Review & comment
Draft reply by
Type draft
Type final
Xerox copies
Mail

For Approval
Signature
Information

Robert Chuck Jane Sakai Bill Koyanagi
Takeo Fujii Elsie Yonamine Richard Jinnai
James Yoshimoto

Met with Warren Lee, Ross Sakuda, and Steve Yoshida of HeCo on Fri., Nov. 20. They had questions re. the HeCo Tunnel. Gave them copy of Chapter 166, and some other info. Told them Water Use Supply Permit not necessary unless they "enhance" the present source. Ed
November 3, 1981

Mr. Kazu Hayashida  
Manager & Chief Engineer  
Board of Water Supply  
City & County of Honolulu  
630 South Beretania Street  
Honolulu, Hawaii 96843  

Dear Mr. Hayashida:

Conversion of Hawaiian Electric Company's Waiau Tunnel Flow for Municipal Use

Thank you for keeping us informed on the progress of your negotiations with HECO concerning the Waiau Tunnel.

We have no objections to the proposed diversion. However, we would like to review the detailed development plans as they become available and would like to review your agreement with HECO before it is finalized.

Thank you for your cooperation.

Very truly yours,

SUSUNU ONO  
Chairman of the Board

RTC:ES:ko
October 5, 1981

Park Engineering, Inc.
Suite 2085, Pacific Trade Center
190 S. King Street
Honolulu, Hawaii 96813

Attention: Mr. Alan B. Sugihara, Engineer

Gentlemen:

HECo Waiau Tunnel Source

The HECo Waiau Tunnel is located in the Pearl Harbor Ground Water Control Area administered by the Department of Land and Natural Resources. Because of its free flowing conditions, the Waiau Tunnel was not considered for control under the provisions of the State's Ground Water Use Law (Chapter 177, HRS).

The Department, however, will be monitoring the proposed conversion of the Waiau source to a municipal water source. In this connection, your design proposal should not in any way alter the present free flowing conditions which are subjected to seasonal flow variations. We would appreciate reviewing the plans when they become available.

The Division of Water and Land Development has information on wells and springs for your use. Additional information are also available at the U.S. Geological Survey whose offices are located in the Federal Building.

If you have any questions, please contact Manabu Tagomori at 548-7619.

Very truly yours,

ROBERT T. CHUCK
Manager-Chief Engineer

MT: dh
cc: BWS
USGS
Mr. Alan B. Sugihara, Engineer  
Park Engineering, Inc.  
Suite 2085, Pacific Trade Center  
190 South King Street  
Honolulu, Hawaii 96813

Dear Mr. Sugihara:

In response to your letter of August 19, 1981, we have the following comments and suggestions regarding your study of utilization for municipal supply of fresh-water sources within the Waiau generator site of the Hawaiian Electric Company (HECo).

The water sources at the HECO plant site are part of the system of discharge of basal ground water that extends in a narrow zone around the shore of Pearl Harbor. The main flow at the site is from a horizontal tunnel at about sea level in which the discharge is augmented by artesian flow from vertical wells drilled to depths of about 100 feet below sea level.

A principal concern in the use of water from the HECO tunnel and wells probably will be that of design and operation of a diversion that will not cause local or regional increases in the salinity of the basal water supply. This concern, I am sure, is an element in the overall study and possible planning of a diversion. In our district and subdistrict files, are information on the tunnel and drilled wells at the HECO site and data collected at irregular intervals on flow from the tunnel and concentrations of chloride in the water. You are welcome to examine the records in our offices and to make use of them.

Regarding permits needed for a diversion, the base source of information is the State Department of Land and Natural Resources, which has responsibility for administration of regulations developed under the Ground Water Use Act of 1961. The Department is also the best source of information on the State's responsibility in the preservation of wildlife and historic sites.

Among Federal agencies that could have an interest in the proposed diversion are the U.S. Fish and Wildlife Service, relative especially to endangered species, and the National Park Service relative to historic sites. These offices are in the Prince Kuhio Federal Building on Ala Moana Boulevard.
If you have questions, especially regarding hydrologic data for your area of interest, we would be pleased to hear from you.

Sincerely,

Benjamin L. Jones
District Chief
October 5, 1981

Park Engineering, Inc.
Suite 2085, Pacific Trade Center
190 S. King Street
Honolulu, Hawaii 96813

Attention: Mr. Alan B. Sugihara, Engineer

Gentlemen:

HECo Waiau Tunnel Source

The HECo Waiau Tunnel is located in the Pearl Harbor Ground Water Control Area administered by the Department of Land and Natural Resources. Because of its free flowing conditions, the Waiau Tunnel was not considered for control under the provisions of the State's Ground Water Use Law (Chapter 177, HRS).

The Department, however, will be monitoring the proposed conversion of the Waiau source to a municipal water source. In this connection, your design proposal should not in any way alter the present free flowing conditions which are subjected to seasonal flow variations. We would appreciate reviewing the plans when they become available.

The Division of Water and Land Development has information on wells and springs for your use. Additional information are also available at the U.S. Geological Survey whose offices are located in the Federal Building.

If you have any questions, please contact Manabu Tagomori at 548-7619.

Very truly yours,

ROBERT T. CHUCK
Manager-Chief Engineer

MT: dh
cc: BWS
USGS
September 9, 1981

Department of Land and Natural Resources
Division of Water and Land Development
P. O. Box 373
Honolulu, Hawaii 96809

Gentlemen:

Subject: HECO Waiau Tunnel Source

Our firm has been requested by the Honolulu Board of Water Supply to investigate the possibility of utilizing an existing fresh water source for the municipal water supply. The source is within the Hawaiian Electric Company's (HECO) Waiau generator plant site. Presently, about 10 million gallons per day of fresh and slightly brackish water empties into East Loch, Pearl Harbor. This water is used by HECO periodically for maintenance purposes. When not used, it flows freely into East Loch.

The project would involve connecting to the existing artesian wells and tunnel complex and installing pumping equipment, necessary piping and appurtenances. A transmission pipeline would carry this water from the site to an existing BWS transmission main in Moanalua Road. All work would be within the HECO plant site and existing State and County roadways. Enclosed is a sketch showing the approximate project location.

At this time, we are gathering data to determine the nature and scope of any impacts that this project may have on the physical, social and economic environment. We would appreciate your comments on necessary permits to be filed, areas or concerns to be aware of, or any other information which would assist us in properly assessing the impacts of this project. Also, please inform us of any special conditions, e.g., other wells or springs, in the project area or which may be affected by the project.

We would appreciate it if your response would be sent directly to Park Engineering, Inc.

Thank you for your assistance in this matter.

Sincerely yours,

PARK ENGINEERING, INC.

Alan B. Sugihara
Engineer

Enclosure
February 9, 1981

Mr. Kazu Hayashida  
Manager & Chief Engineer  
Board of Water Supply  
City & County of Honolulu  
Honolulu, Hawaii 96813

Dear Mr. Hayashida,

HECO Waiau Tunnel Development

As a follow-up to our discussion on the HECO Waiau tunnel development, we would appreciate your keeping us informed on the progress of your negotiations with HECO and we would like to review any development plans that may become available as detailed engineering is completed.

Our interests and concerns stem from the responsibility of the Department of Land and Natural Resources to properly manage the water resources of the Pearl Harbor Ground Water Control Area.

Your cooperation is greatly appreciated.

Very truly yours,

SUSUMU ONO  
Chairman of the Board

RTC: MT: dh
At the Hawaiian Electric Co. Wai'anae Power Plant.
by W. W. Mullins. Altitude, 15 ft. Diameter, 20".
Casing, 38 ft. Depth, 101 ft. Use, service water
supply and irrigation. Head (ft) Jan. 27, 1939, 18.15
Yield 4.6 mgd, Mar 31 1941

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<td>Brown rock</td>
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<td>Blue puka-puka</td>
</tr>
<tr>
<td>Red and brown soft rock</td>
</tr>
<tr>
<td>Blue rock, very hard</td>
</tr>
<tr>
<td>Water rock, small flow</td>
</tr>
<tr>
<td>Blue rock</td>
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<tr>
<td>Brown soft rock, water came</td>
</tr>
<tr>
<td>in heavy</td>
</tr>
<tr>
<td>Soft puka-puka water rock</td>
</tr>
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</table>
OFFICE OF COMMISSIONER OF PUBLIC LANDS  
DIVISION OF HYDROGRAPHY

Record of Head on Herrian Electric 15.01 Drilled in 1938

Location: 24.740311

Diameter: 20

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<th>Head above M. S. L. in ft.</th>
<th>Method</th>
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<td>Date</td>
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At the Hawaiian Electric Co. Waian Power Plant.
Owner, Hawaiian Electric Co. Drilled Nov. 26, 1939
by W. N. Mullin. Altitude, 32 ft. Diameter, 20".
Casing, 48 ft. Depth, 107 ft. Use, service water
supply and irrigation. Chloride (p.p.m.) Oct. 28, 1939
for Wells 199-5, -8, -4 combined, 110. HecO (ft) Jan 30 1939

Yield 3.0 mgd Mar. 31, 1941

Log

Red soil 0 - 3 ft.
Decomposed brown rock 3 - 21
Blue rock, medium soft, crumbling 21 - 35
Hard blue rock 33 - 54
Brown and blue puka-puka rock 54 - 72
Hard blue rock 72 - 85
Softer blue rock 65 - 87
Brown water rock 87 - 103
Hard blue rock 103 - 107
**OFFICE OF COMMISSIONER OF PUBLIC LANDS**  
**DIVISION OF HYDROGRAPHY**

Record of Head on: Hawaii Electric Co. drilled in 1926

Location: 37' Mystery

Diameter: 80".

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At the Hawaiian Electric Co. Waiau Power Plant.  
Owner, Hawaiian Electric Co. Drilled Dec. 10, 1928  
by W. M. Mullin. Altitude, 36 ft. Diameter, 20".  
Casing, 46 ft. Depth, 83 ft. Use, service water  
supply and irrigation.  
Yield 11 m.g.d. Mar. 31, 1941  

Log  

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Depth in feet.
# Office of Commissioner of Public Lands
## Division of Hydrography

**Record of Head on Hawaiian Electric Well**

- Drilled in: 1938
- Location: St. Helens
- Diameter: 20"  

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