Honorable Joseph M. Souki
Speaker, House of Representatives
Seventeenth State Legislature
Regular Session of 1994
State of Hawaii

Sir:

Your Committee on Finance, to which was referred S.B. No. 2272, S.D. 1, H.D. 1, entitled:

"A BILL FOR AN ACT MAKING AN APPROPRIATION FOR THE WAIKOLU WELL DEVELOPMENT PROJECT,"

begs leave to report as follows:

The purpose of this bill is to make an appropriation to the Department of Agriculture for the implementation of a Biological and Hydrologic Monitoring Program for the Waikolu Well Development Project on Molokai.

The Molokai Farm Bureau and a concerned citizen submitted testimony in support of this measure. The Chairperson of the Board of Agriculture submitted testimony in support of the intent of this measure.

Upon careful consideration, your Committee has amended this bill by:

(1) Clarifying that $200,000 is to be appropriated out of the Irrigation System Revolving Fund for fiscal year 1994-1995;

(2) Clarifying that the specified sum shall be in addition to the operating appropriation made for Agricultural Resource Management (AGR 141); and
(3) Making technical, nonsubstantive revisions for purposes of style, clarity, and consistency.

As affirmed by the record of votes of the members of your Committee on Finance that is attached to this report, your Committee is in accord with the intent and purpose of S.B. No. 2272, S.D. 1, H.D. 1, as amended herein, and recommends that it pass Third Reading in the form attached hereto as S.B. No. 2272, S.D. 1, H.D. 2.

Respectfully submitted on behalf of the members of the Committee on Finance,

Calvin K.Y. Say, Chair
State of Hawaii  
House of Representatives  
The Seventeenth Legislature

Record of Votes of the Committee on Finance

Bill/Resolution No.: SB 2272 SD1 HD1  
Date: 4/4/94

Committee Referral: WLP/EEP, FIN  
The committee is reconsidering its previous decision on this measure.

The recommendation is to:  
☐ Pass, unamended  ☑ Pass, with amendments  
☐ Hold  
☐ Recommit

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<tr>
<th>FIN Members</th>
<th>Ayes</th>
<th>Ayes (WR)</th>
<th>Nays</th>
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<td>3. ALCON, Emilio</td>
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<td>4. CHANG, Jerry L.</td>
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<td>5. KANOH, Ezra R.</td>
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<td>7. NAKASONE, Bob</td>
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<td>✓</td>
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<td>12. TAJIRI, Harvey S.</td>
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<td>13. TAM, Rod</td>
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<td>14. MARUMOTO, Barbara</td>
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<td>15. WARD, Gene</td>
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TOTAL 13 ☑ 0 ☑ ☑

The measure is:  
☐ Passed, unamended  ☑ Passed, with amendments  
☐ Recommitted

☐ Held  
If joint referral, committee acronym(s) did not support recommendation.

Vice Chair's or designee's signature: [Signature]

Distribution:  
☐ If passed, attach to Committee Report  ☐ Data Entry

Record of Votes FIN
A BILL FOR AN ACT

MAKING AN APPROPRIATION FOR THE WAIKOLU WELL DEVELOPMENT PROJECT.

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF HAWAII:

SECTION 1. There is appropriated out of the irrigation system revolving fund of the State of Hawaii the sum of $200,000, or so much thereof as may be necessary for fiscal year 1994-1995, for the implementation of a biological and hydrologic monitoring program for the Molokai irrigation system. The program shall:

(1) Last for a minimum of one year;

(2) Document the existing operating procedures of the Molokai irrigation system;

(3) Identify the impacts of all operating alternatives on Waikolu stream;

(4) Evaluate the effectiveness of diversion weir modifications; and

(5) Test the effects that the pumping of three new wells have on the stream ecosystem.

The specified sum shall be in addition to the operating appropriation made for agricultural resource management (AGR 141) by Act 289, Session Laws of Hawaii 1993.
SECTION 2. The sum appropriated shall be expended by the department of agriculture for the purposes of this Act.

SECTION 3. This Act shall take effect on July 1, 1994.
February 10, 1994

Ms. Rae Louis
CWRM, DLNR, Deputy Director
P.O. Box 621
Honolulu, Hawaii 96809

Dear Rae,

I have talked Anne Brasher, Cliff Smith and others about early data release from Anne's project on Waikolu Stream. The answer universally is that if such release compromises the normal scientific process, then no, it cannot happen. The research investigator must be allowed to draw his/her own conclusion from the data. Early release of information in other projects has led to incorrect, unscientific, or biased conclusions.

We were encouraged by the commission's January 12 decision on the Department of Agriculture's Waikolu Stream permit application. Please extend my thanks to commission members for their diligent attention to existing rules, guidelines and declarations that pertain to Waikolu. I am confident that we are together on track for an ultimate decision which will maximize developable northshore water for all valid users, and save the aquatic and riparian ecosystems.

Yours very truly,

(SGD) Peter Thompson

Peter Thompson

Looks like Anne's study will be extended to Aug. 95.

I asked Thompson again for a copy of Anne's program plan. 2/15/94 phone call.

If they don't cooperate by coordinating with DoA Tunnel Rae
Sarah E. Sykes  
January 12, 1994

State of Hawai‘i-Department of Land and Natural Resources  
Commission on Water Resource Management  
Honolulu, Hawai‘i 96813

RE: Waikolu Valley-Hoolehua Water Management Area

Chairman Ahue and Commissioners,

Thank you for the opportunity to speak with you about this matter on Molokai.

Your Commission staff has done a truly admirable job recognizing and attempting to resolve all controversial issues regarding the water use permit application filed by the Department of Agriculture for Waikolu wells.

Because my testimony changes in light of the final staff submittal, I hope I'm remembering correctly everything said. As a petitioner for Permanent Instream Flow Standards for Waikolu Stream, I have only a few remaining concerns:

   a. The Commission's Molokai Water Working Group recommendations relative to the Northeast Sector included no additional withdrawals "unless assessments indicate more water can be withdrawn without further impacts to the natural ecosystems." Because of this and other indications of their concern for the north shore watersheds throughout their final report, could they please be added to the Recommendation as recipients of the semi-annual reports? Or, in some other way formally included in the decision-making process in their usual advisory capacity to the Commission? I would feel a lot better for Molokai if the Molokai Working Group were formally listed as necessary participants in the process.

   b. When the two-year study is completed this Commission will make a life-or-death decision about Waikolu Stream. The Homesteaders need the water, the stream needs the water, the ocean needs the water from the stream. What needs to be learned at Waikolu in two short years is what does the Commission need to know about every stream ecosystem in the state before making any potentially stream-related decisions. We need the
data now to make certain the questions being asked will lead to the management answers this Commission needs. This problem at Waikolu is really an opportunity to finally learn enough about Hawai‘i’s few remaining streams to lay the groundwork for informed management decision-making models. I fear waiting for data to be published, accepted, reviewed before the community has an opportunity to use it to help make decisions.

In response to Mr. Matsuo’s statement that environmental concerns must sometimes be set aside in favor of economic interests, I believe no Homesteader would want to kill a Hawaiian stream in favor of money. For now, there is enough water for the Homesteaders. So, I also do not want to let the water amount granted be a variable number, or an unknown number. The process exists to amend interim instream flow standards to meet existing needs temporarily. That should be enough water for the Homesteaders until the stream study is completed and fact-based decision-making can proceed.

The Permanent Instream Flow Standards petition for Waikolu Stream remains temporarily, cooperatively, on hold. As stated in my November 17, 1993 testimony to the Commission, this statement of cooperation is not a waiver of any claims regarding the timeliness of appropriate action on the pending petitions. The PIFS petitions were received by the Commission prior to the DOA permit application. Information gathered in the two-year study envisioned for the Waikolu Stream Team should help establish appropriate permanent flows.

Thank you for your patience and understanding. And thank you for the excellent efforts of your staff to resolve this in the best interest of all concerned.

Sarah E. Sykes

(Could I please be sent a final amended copy of the recommendation as approved by the Commission? Thank you!)

P.O. Box 370  Kaunakakai, Hawai‘i 96748  (808) 553-3831
DATE: 1-19-1994

TO: Jerro Makini
Water Res. Engr.

FROM: Tom Matsumoto
MOLOKAI IRRIGATION SYSTEM
DEPARTMENT OF AGRICULTURE

SUBJECT: Jan. to Dec. 1998 Revise Paying Schedule

REMARKS:

Total number of pages (including this page): 2

If you do not receive the total number of pages noted above and/or have problems with our transmission, please contact the sender at (808) 567-6150.
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This is the revised pumping schedule for 1993.
Keith W. Ahue, Chairman  
Commission on Water Resource Management  
State of Hawaii  
P.O. Box 621  
Honolulu, HI 96809  

We, the undersigned residents of Molokai, feel that agriculture is essential to our livelihood and lifestyle on Molokai. The Molokai Irrigation System is a key part of that agriculture. Our friends, family and selves are employed in agriculture and related activities. Therefore, we respectfully petition your commission to allow the Molokai Irrigation System a quantity of water adequate to fill the Kualapuu Reservoir each year and allow Molokai to continue as an agricultural community. Our jobs and lifestyle depend on this.

<table>
<thead>
<tr>
<th>NAME</th>
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<tr>
<td>Peter H. Ichihara</td>
<td>Box 948 KU; 1024</td>
<td></td>
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<tr>
<td>Leon W. Kauanu</td>
<td>Box 1053</td>
<td></td>
</tr>
<tr>
<td>Leo K. Kea Sr.</td>
<td>Box 1264</td>
<td></td>
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<tr>
<td>Veronica TeA Au</td>
<td>Box 701</td>
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<tr>
<td>Kalai Makua</td>
<td>Box 728</td>
<td></td>
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<tr>
<td>Arturo</td>
<td>Box 76</td>
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<tr>
<td>Helena Miguel</td>
<td>Box 32 Kumuhi</td>
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<tr>
<td>Filipa Afelin</td>
<td>Box 1439</td>
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<tr>
<td>Olivia K. Kasakula</td>
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<tr>
<td>Franklin Augustine</td>
<td>Box 80</td>
<td></td>
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<tr>
<td>Numariano Domingo</td>
<td>Box 141</td>
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<td>Massaro</td>
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NAME   ADDRESS   SIGNATURE
Julie Melchin  P.O. Box 241 K’uai 96748  Sigrid Melchin
Julie A. Lopez  P.O. Box 35 Kula 96751  Julie Lopez
Jeanette Miranda Wangle  P.O. Box 1821 K’uai  Shyla Wangle
Donna Gann  Box 348 K’uai  Donna Gann
Kimberly Aki  Box 731 K’ualihi  Kim Aki
Kaila Kama  P.O. Box 265 K’uai  Kamaella
Dylre A. Kelly  P.O. Box 27 Huleia  Dylre Kelly
Karl A. Carlucci  Kapuno  Karl Carlucci
Bill Phipps  Box 317 K’uai  Bill Phipps
Christina Marisc  Box 1618 K’uai  April Marisc
Edward F. Morgan  P.O. Box 518 K’uai  Edward Morgan
Pauline Tani  Box 34 Huleia  Paul Tani
Frank Codero  Box 785 K’uai
Rudy D. Carlon  Box 734 R. K’uai  Rudy D. Carlon
Barbara Coelho  Box 683 K’uai  Barbara Coelho
Jaana Catarino  Box 604 K’uai  Jaana Catarino
Donna Jackson  Box 199 K’uai  Donna Jackson
Dan McRae  1401 Haalae Kauai  Dan McRae
Regina Thom  K’uai  Regina Thom

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George Marado
Mariko Denison
Scott Kauhane Adams
Alika Kalanihaia
Henry K. Pali
Marlene Sproat
Robert Calef Jr.
Yokomi Yasho
Jeanette Warlick
Nancy Donnell
Bob Forr

Keelth Y. Ahue, Chairman
Commission on Water Resource Management
State of Hawaii
P.O. Box 621
Honolulu, HI 96809
Keith W. Ahue, Chairman  
Commission on Water Resource Management  
State of Hawaii  
P.O. Box 621  
Honolulu, HI 96809

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<td>Richard Satake</td>
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<td>April K. Apo</td>
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<td>April K. Apo</td>
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<td>Edward R. Okada</td>
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<td>John Osawa</td>
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<td>Dusan Gordan</td>
<td>Box 164, Hapahua, Oheka</td>
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<td>Michael Weie</td>
<td>Box 197, Hapahua, Oheka</td>
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<td>Kathleen F. Waipua</td>
<td>Box 772, Kaunakakai, Molokai</td>
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<tr>
<td>Larry I. Kaai</td>
<td>Box 44, Kaunakakai</td>
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<td>James L. Kauwahine</td>
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<td>Unita C. Awai</td>
<td>P.O. Box 185, Hikuenia</td>
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<td>Joseph L. Lemos</td>
<td>P.O. Box 86, Kaunakakai</td>
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<td>Daniel K. Eshleman</td>
<td>Box 7, K.Kai</td>
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<tr>
<td>Pat Tumashin</td>
<td>P.O. Box 1403, K.Kai</td>
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<td>Charles A. Pelekane</td>
<td>Box 1403, K.Kai</td>
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<td>Charles Pelekane</td>
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<td>Joseph Pelekane</td>
<td>Box 581, K.Kai</td>
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<tr>
<td>Bevin M. Cameron</td>
<td>Box 451, K.Kai</td>
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NAME            ADDRESS            SIGNATURE
Koa Buncas       P.O. Box 654 K'Kai    Koa
Kalamu Dudoit    P.O. Box 1701 K, Ka.  
Venmna Dudoit    P.O. Box 1534 K'Kai    Dudoit
Bertrand Smith   Box 1481 K'Kai    Bernand Smith
Wendell Dodoit   P.O. Box 294 K'Kai    Wendell Dudoit
Phillip K. Keli'i Sr. 531 K'Kai    Phillip K. Keli'i Sr.
Eleanor Osborne  HC1 Box 500 K'Kai    86748
Keith W. Ahue, Chairman
Commission on Water Resource Management
State of Hawaii
P.O. Box 621
Honolulu, HI 96809

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=================================================================

NAME ADDRESS SIGNATURE
Tom DeCony K'Kai Box 803
Scren Nacina P.O.B 162
Vincent Taao K'Kai
Evidence Makelkle K'Kai
Charlotte Pepe K'Kai
Charlotte Pozo
We, the undersigned residents of Molokai, feel that agriculture is essential to our livelihood and lifestyle on Molokai. The Molokai Irrigation System is a key part of that agriculture. Our friends, family, and selves are employed in agriculture and related activities. Therefore, we respectfully petition your commission to allow the Molokai Irrigation System a quantity of water adequate to fill the Kualapuu Reservoir each year and allow Molokai to continue as an agricultural community. Our jobs and lifestyle depend on this.

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<td>Lawrence Makekau</td>
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<tr>
<td>Jonathan Remagea</td>
<td>P.O. Box 383, K.Kai</td>
<td>Signature</td>
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<tr>
<td>Donna Uahinu</td>
<td>P.O. Box 675, K.Kai</td>
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<tr>
<td>Madele Kopea</td>
<td>P.O. Box 33, K.Kai</td>
<td>Signature</td>
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<tr>
<td>Keana C. Makou</td>
<td>P.O. Box 1766, K.Kai</td>
<td>Signature</td>
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<tr>
<td>Frank Kekinoa</td>
<td>615 W. Papa Ave., Hilo 96752</td>
<td>Signature</td>
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<tr>
<td>Isabella Kauwai</td>
<td>Kailua, Hilo 96748</td>
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<td>Susan N.K. AhHue</td>
<td>P.O. Box 504, 96748</td>
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<tr>
<td>Edison D. Makekau</td>
<td>P.O. Box 1766, K.Kai</td>
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State of Hawaii
DEPARTMENT OF AGRICULTURE
Division of Agricultural Resource Management
Molokai Irrigation System
P. O. Box 208
Honnolulua, HI 96729-0208

FAX TRANSMITTAL

DATE: 9-10-93
TO: Roy Hardy

FROM: Tom Nagayoshi

SUBJECT: Objective on Water Use Permit

REMARKS: FOR WENTS 0440-01

Total number of pages (including this page): 6

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1993 August 30

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

OBJECTIONS TO AND COMMENTS ON WATER USE PERMIT APPLICATIONS
/Public notice of July 27, 1993/Comments due August 30, 1993/

GENERAL OBJECTIONS

We reiterate our general objections to current COWRM water use permit application processing and decisionmaking practices as previously submitted on numerous occasions [10/12/92, 10/21/92, 12/1/92, 6/22/93, & 7/8/93].

We also have specific comments on and objections to several of the applications listed in this notice, particularly those of Maui Department of Water Supply, State Department of Agriculture, Laini Water Co., Inc., and Campbell Estate. In each case NHAC represents water source registrants, water use declarants, water use permit applicants, and others with property interest in land within the hydrologic unit of the source of water supply who would be directly and immediately affected by the proposed water use.

Because of the complexity, importance, and late arrival of some of these applications to our office, we are requesting an extended review period (as provided on your memorandum) to September 3, 1993, when we will submit all objections and comments for both this set of applications and those whose objections due date is September 3.

Thank you for your consideration of this request.

David L. Martin

David L. Martin, Water Claims Manager
1993 September 3

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

OBJECTIONS TO AND COMMENTS ON WATER USE PERMIT APPLICATIONS
(Public notice of July 27, 1993/Comments due August 30, 1993)
(Extension to September 3, 1993 requested on August 30, 1993)

GENERAL OBJECTIONS

We reiterate our general objections to current COWRM water use
permit application processing and decisionmaking practices as
previously submitted on numerous occasions [10/12/92, 10/21/92,
12/1/92, 6/22/93, & 7/8/93].

SPECIFIC OBJECTIONS

NHAC represents water source registrants, water use declarants,
water use permit applicants, and others with property interest in
land within the hydrologic units of the sources of water supply who
would be directly and immediately affected by the proposed water
uses.

1. Ualapue Shaft 0449-0:

14.(c) Hawaiian Home Lands uses affected

In its final report dated July 1993, the Molokai Working Group
recommends that "... DHHL's demonstrable needs which are currently
tied to lands at Hoolehua and Kalamaula through 2010, be reserved
first."

Since reservations of water to Hawaiian Home Lands have not yet
been accomplished, this application should be deferred until that
time. Additionally, mechanisms for bulk allocation of water to the
Molokai Department of Water Supply, similar to those being developed
for O'ahu, should be implemented, rather than processing each
individual County source under separate water use permit
applications.

14.(d) The Molokai Working Group recommends that "other
rights which may exist pertaining to Hawaiians not residing on DHHL
lands must also be honored" (Final Report page 6).
The proximity of the Vaiapue shaft to shoreline fishponds and Loipunawai raises questions of its impacts upon groundwater flows which nourish these resources. Permitted use of the shaft should be restricted to avoid affecting subsurface flows required to maintain the productivity of nearby fishponds, Loipunawai, and nearshore ecosystems, and to honor the rights of Native Hawaiians to utilize these resources for traditional and customary practices.

2. Waikolu Wells 0855-01 to -06

The combined application for existing and proposed sources is confusing and requires further explanation before objections and comments can be completed. Specific items requiring clarification include:

4. SOURCE LOCATION

While wells 01-03 can be located using existing groundwater indices, new wells 04-06 cannot be located except within a 270' elevational range. In order to assess potential restrictions on use, more detailed locations for the new wells are required.

8. QUANTITY OF WATER REQUESTED

What is the quantity requested from each individual source? From the existing sources combined? From the new sources combined?

15.(a) Impact on Sustainable yield

The entry of "7,488,000 GPD" on this line requires further explanation.

15.(b) Permanent or Interim Instream Flow Standards affected

Applicant should specify which sources affect which streams. Permitted use should be restricted to end and avoid any such effects.

15.(c) Hawaiian Home Lands uses affected

Operation of the Molokai Irrigation system was originally intended to be solely for the benefit of Molokai Hawaiian Home Lands. Subsequent State legislation which allowed 1/3 of the system capacity to be used for other purposes violates the spirit and intent of the original enacting federal legislation. Thus use of existing and new sources by the Department of Agriculture affects Hawaiian Home Lands uses, and permitted use should be restricted to avoid any such effects.
15. (d) Other existing legal uses affected

When instream flow standards are affected, other legal uses of streams are also affected. Permitted use should be restricted to end and avoid any such effects.

16. REMARKS, EXPLANATIONS

The Molokai Working Group recommends:

III.L. ... all additional water supply should first be sought in the sector for which it shall be used.

III.P. ... new water supplies should be sought first through conservation.

IV.A.1. The development of new water resources from the undeveloped portions of the Northeast Sector should be held in reserve to maintain the 39 mgd developable yield.

IV.A.3. Development beyond the existing water systems in the Northeast Sector should not be allowed, unless assessments indicate more water can be withdrawn without further impacts to the natural ecosystems.

NHAC believes that applicant's request for proposed new source does not follow the Molokai Working Group recommendations and thus should not be permitted. However, we defer our objections to those of Molokai Hawaiian Home Lands beneficiaries and of the Molokai Working Group.

3. Laie Water Co., Inc. Wells 3855-06 to 08 & 3956-03
   Polynesian Cultural Center Lagoon Well 3855-09

NHAC supports the objections filed by Mui Malama 'Aina 'O'La'ie on August 30, 1993.

4. Campbell Estate Well 3957-01

3.(a) EXISTING SOURCE NAME AND STATE NUMBER

The Public Notice only covers Well 01, while the completed application is for a battery of wells also including Well 02 and 04 to 06. It seems that the Commission must republish this notice with the complete information and allow additional time for objection and comment.

8. QUANTITY OF WATER REQUESTED
13. TOTAL ACRES PROPOSED FOR IRRIGATION AND TYPE OF CROP

One million gpd for 80 acres of various unspecified crops works out to 12,500 gpd. Without greater specification of the proposed crops, it is impossible to compare proposed use with Water Plan
guidelines and to determine if the proposed use is reasonable and beneficial.

Mahalo

David L. Martin
David L. Martin, Water Claims Manager

pc: Maui Department of Water Supply
   State Department of Agriculture
   R.E. White, Jr.
   Laie Water Co, Inc.
   Polynesian Cultural Center
   Campbell Estate
Mr. Thomas Matayoshi  
State of Hawaii  
Dept. of Agriculture  
Agriculture Resource Management Division  
P.O. Box 205  
Hoolehua, HI  96829  

Dear Mr. Matayoshi:  

Commission Submittal for Your Water Use Permit  
Waikolu Ground Water Management Area, Molokai  

The Commission on Water Resource Management will be acting on your water use permit application for your WELL #22 Well (Well No. 0855-01) at its September 15, 1993 meeting at 9:00 a.m. p.m. at the Mitchell Pauoli Center.  

A copy of the submittal for action on your water use application is enclosed for your information and review. You may wish to attend the meeting in case the Commissioners have questions regarding your application. Otherwise, we will notify you of the Commission's decision soon thereafter.  

If you have any questions, please contact Roy Hardy at 587-0274.  

Sincerely,  

RAE M. LOUI  
Deputy Director  

RH:fc  
Attach.
September 7, 1973

MEMORANDUM FOR THE RECORD

FROM: Franklin Yap

SUBJECT: Graphical Representation of Water Supply Data for Period October 1966-September 1972, Molokai Water Project

This study covers the period between October 1966 and September 1972. The objectives of the study are:

1. To determine the flow rates and thus the trends of the Molokai Tunnel flows.
2. To determine the flow from the various sources.
3. To investigate the effects of rain on the ground water supply.

These objectives are carried out through the compilation of the following graphs.

Graph I was done by first plotting the West portal flow, and then East portal flow. The difference, in red, is the tunnel inflow plus the well 22 pumpage.

Subtracted from the East Portal flow is the pumpage of wells 23 and 24, shown in blue. The remainder is the streamflow, shown as the double hatched area.

This graph then, clearly shows the magnitude of the streamflow as it varies monthly.

Graph II

While Graph I clearly shows the monthly streamflow variance, the monthly tunnel inflow variance is hard to follow. This monthly tunnel inflow variance is shown on Graph II.

First, the pumpage of well 22 was subtracted from the West Portal-East Portal difference to get the tunnel inflow alone. This was plotted and is shown as the black hatched area.

Next the streamflow was taken from Graph I and was added to the tunnel inflow. This is shown as the green hatched area.

Lastly, the pumpage of well 22 was added to the pumpage of wells 23 and 24. This sum was then added on top of the streamflow to give the red hatched area.

The sum of all three flows equal the West Portal flow of Graph I.
In order to see any relationship between rainfall and associated Molokai Tunnel flows, a nearby rain gauge station was selected and studied. Starting one year before the period of record, the amount of rainfall for each month was plotted for rain gauge station #540 at Waikolu, Molokai.

Monthly means and the annual mean for the thirty year period of 1930-1959 were obtained for this station and are listed on Graph III.

The thirty year monthly means were used to determine whether the period of record studied was a relative wet one or dry one. Deviation from the thirty year means were plotted and can be completed with the tunnel inflow of the same period.

From Graph II, it can be seen that there was a rapid drop in the water table following June 1969.

Graph IV shows that most of the period of record was a wet period relative to its past. There was a drought starting in 1971, but the water table started to drop before the drought started.

References


2. Well data taken from chart recorders for wells 22, 23, 24.


4. 30-year record from "An inventory of Basic Water Resources Data: Molokai", 1961; DOWALD.
September 7, 1973

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Graph IV

The thirty year monthly means were used to determine whether the period of record studied was a relative wet one or dry one. Deviation from the thirty year means were plotted and can be completed with the tunnel inflow of the same period.

Observations

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Graph IV shows that most of the period of record was a wet period relative to its past. There was a drought starting in 1971, but the water table started to drop before the drought started.

Attachments

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4. 30-year record from "An inventory of Basic Water Resources Data: Molokai", 1961; DOWALD.
### MOLOKAI TUNNEL INFLOW
#### Oct. 1966 - Sept. 1967

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### MOLOKAI TUNNEL INFLOW

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## MOLOKAI TUNNEL INFLOW

### Oct. 1968 - Sept. 1969

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**Annual**

|          | 1,024.5       | 662.0        | 2,727.5       | 1,471.7       | 1,253.1       | 809.8        | 3.75                | 2.301             |

## MOLOKAI TUNNEL INFLOW


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<th>East Portal MG</th>
<th>West Portal CFS</th>
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<td>62.1</td>
<td>189.0</td>
<td>122.2</td>
<td>92.9</td>
<td>60.0</td>
<td>3.00</td>
<td>1.94</td>
</tr>
<tr>
<td>Nov.</td>
<td>58.8</td>
<td>38.0</td>
<td>143.3</td>
<td>92.6</td>
<td>84.5</td>
<td>54.6</td>
<td>2.82</td>
<td>1.82</td>
</tr>
<tr>
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<td>111.4</td>
<td>256.7</td>
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<td>1.76</td>
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<td>42.6</td>
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<td>67.3</td>
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<td>208.4</td>
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<td>63.8</td>
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**Annual**

|          | 1,394.5       | 901.1        | 2,325.8       | 1,503.0       | 931.3         | 601.8        | 2.55                | 1.65              |
## MOLOKAI TUNNEL INFLOW

<table>
<thead>
<tr>
<th>Month</th>
<th>East Portal CFS</th>
<th>East Portal MG</th>
<th>West Portal CFS</th>
<th>West Portal MG</th>
<th>Difference CFS</th>
<th>Difference MG</th>
<th>Mean Daily Flow CFS</th>
<th>Mean Daily Flow MG</th>
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<tbody>
<tr>
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<td>68.5</td>
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<tr>
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<td>57.1</td>
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<tr>
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<td>277.9</td>
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<td>249.3</td>
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<td>2.6</td>
<td>1.68</td>
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<td>249.3</td>
<td>161.1</td>
<td>81.3</td>
<td>52.5</td>
<td>2.6</td>
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<td>249.3</td>
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<tr>
<td>Sept.</td>
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<td>108.6</td>
<td>249.3</td>
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<td>81.3</td>
<td>52.5</td>
<td>2.6</td>
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**Annual** 1,365.1 882.2 2,235.6 1,444.8 870.5 562.6 2.4 1.55

## MOLOKAI TUNNEL INFLOW

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<tr>
<th>Month</th>
<th>East Portal CFS</th>
<th>East Portal MG</th>
<th>West Portal CFS</th>
<th>West Portal MG</th>
<th>Difference CFS</th>
<th>Difference MG</th>
<th>Mean Daily Flow CFS</th>
<th>Mean Daily Flow MG</th>
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<tbody>
<tr>
<td>Oct.</td>
<td>55.6</td>
<td>35.9</td>
<td>132.8</td>
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<td>77.2</td>
<td>49.9</td>
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<tr>
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<td>144.3</td>
<td>73.9</td>
<td>182.1</td>
<td>117.7</td>
<td>67.8</td>
<td>43.8</td>
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<td>229.2</td>
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<td>67.0</td>
<td>43.3</td>
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<td>1.42</td>
</tr>
<tr>
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<td>247.5</td>
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<td>68.3</td>
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**Annual** 1,335.6 863.1 2,161.7 1397.2 826.1 533.8 2.2 1.42
The previous data have not been adjusted to show pumpage of Well 22. In most cases it is negligible. In the following table those months which are significant and their flows are displayed.

<table>
<thead>
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<th>Year</th>
<th>Month</th>
<th>Gal.</th>
<th>MGD</th>
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<td>.7520</td>
</tr>
<tr>
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<td>Oct.</td>
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<td>.5620</td>
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<tr>
<td>1970</td>
<td>May</td>
<td>1,393,000</td>
<td>.0449</td>
</tr>
<tr>
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<td>Aug.</td>
<td>7,347,500</td>
<td>.2370</td>
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<tr>
<td>1971</td>
<td>Jul.</td>
<td>9,763,840</td>
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<td>.1883</td>
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<tr>
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<td>Apr.</td>
<td>1,910,480</td>
<td>.0637</td>
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<tr>
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<td>May</td>
<td>2,016,910</td>
<td>.0651</td>
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<tr>
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<td>Jun.</td>
<td>1,197,580</td>
<td>.0399</td>
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### WELL PUMPAGE

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<th>Well 22</th>
<th>Well 23</th>
<th>Well 24</th>
<th>East Portal (23+24)</th>
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<td>MGD</td>
<td>Gal.</td>
<td>MGD</td>
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<tr>
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<tr>
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<td>Confused</td>
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<tr>
<td></td>
<td>(last 9 days omitted)</td>
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<td>17,160,000</td>
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<td>0.050</td>
<td>320,770</td>
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<tr>
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<td>100,600</td>
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<td>289,870</td>
<td>0.094</td>
<td>230,610</td>
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<td>803,510</td>
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<td>9,909,920</td>
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<tr>
<td><strong>1970</strong></td>
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<tr>
<td>Jan.</td>
<td>549,100</td>
<td>2,697,160</td>
<td>0.0870</td>
<td>3,813,770</td>
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## MOLOKAI TUNNEL CUMULATIVE FLOWS

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²Streamflow is East Portal flows less the pumpage of well 23 & 24.
³Wells is the total pumpage of wells 22, 23 & 24.
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**ANNUAL** 72.41
COMMISSION ON WATER RESOURCE MANAGEMENT

DATE: 8/2/93

PLEASE:

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

FOR YOUR:

- Approval
- Signature
- Information

I assume these are for the WWAs that went to Pub Not/9/93
8/6 & 8/13 @9/3
8/12 & 8/19 9/02/93
Copies for files.

0855-01
1993 August 30

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

OBJECTIONS TO AND COMMENTS ON WATER USE PERMIT APPLICATIONS
(Public notice of July 27, 1993/Comments due August 30, 1993)

GENERAL OBJECTIONS

We reiterate our general objections to current COWRM water use permit application processing and decisionmaking practices as previously submitted on numerous occasions (10/12/92, 10/21/92, 12/1/92, 6/22/93, & 7/8/93).

We also have specific comments on and objections to several of the applications listed in this notice, particularly those of Maui Department of Water Supply, State Department of Agriculture, Laie Water Co., Inc., and Campbell Estate. In each case NHAC represents water source registrants, water use declarants, water use permit applicants, and others with property interest in land within the hydrologic unit of the source of water supply who would be directly and immediately affected by the proposed water use.

Because of the complexity, importance, and late arrival of some of these applications to our office, we are requesting an extended review period (as provided on your memorandum) to September 3, 1993, when we will submit all objections and comments for both this set of applications and those whose objections due date is September 3.

Thank you for your consideration of this request.

David L. Martin, Water Claims Manager
NATIVE HAWAIIAN ADVISORY COUNCIL
A Nonprofit Corporation
1088 Bishop Street, Suite 1204, Honolulu, Hawaii 96813
Telephone (808) 523-1445
Facsimile (808) 599-4380

FAX TRANSMITTAL

DATE: 08/30/93
TO: COWRM

FAX NO.: 587-0219
FROM: Elizabeth Martin
       David L. Martin
       David C. Penn
       Eric Yamamoto
       Tina

PHONE: (808) 523-1445  FAX NO:  (808) 599-4380

Description of Items FAXED:  Total Number of Pages 2

Objections & Comments, Water Use, Permit Apple

(8/30/93)

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0355-01
1993 August 30

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

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Thank you for your consideration of this request.

David L. Martin

David L. Martin, Water Claims Manager
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<th>Laboratory Number</th>
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<td>6-19-71</td>
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<td>Turbidity (JUT)</td>
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HAW 1854 - Waikolu Tunnel, Molokai. Sample from West Portal, consisting of tunnel infiltration and surface water diverted from Waikolu Stream.
HAW 1855 - Well 0321-01, Wailua, Kauai; Use - public supply; Depth - 275± ft; Drilled April 71; W.L. 16.7± ft above MSL; Yield - 1180 GPM; Appearance - clear; Collected by J. Menor after pumping 72 hrs.
ROUTE SLIP

DIVISION OF WATER AND LAND DEVELOPMENT

From: [Name] Date: 7/8 File in: [File Information]

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<td>Take action</td>
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<td>Route to your branch</td>
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<td>Review &amp; comment</td>
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REMARKS:

Please estimate how much water can be totally developed from Malibai Well. What effect will tunnel have on this plan.
MOLOKAI TUNNEL WELL 22
30 DAY PUMPING TEST
SEPT. 15 TO OCT. 10, 1967

REMARKS
PUMPING RATE: 1180 TO 1150 GPM
PUMPING SCHEDULE: 21 HOURS ON, 3 HOURS OFF
TOTAL PUMPAGE: 42,182,000 GALLONS

NOTE: RELATIVE WATER LEVEL PLUS 111.0' = ELEV. OF WATER LEVEL
Drawdown in well 23 after 68 hrs. at 1,000 gpm = 80 ft.

Drawdown in well 24 after 68 hrs. at 1,000 gpm = 130 ft.

Drawdown in observation wells during pumping at wells 22, 23 & 24.
August 3, 1966

MEMORANDUM FOR THE RECORD

FROM: Daniel Lum

SUBJECT: Molokai Wells 22, 23, & 24

Preliminary Evaluation of Existing Data

Description of Wells

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</tr>
<tr>
<td>Depth of Well</td>
<td>400'</td>
<td>300'</td>
</tr>
</tbody>
</table>

Yield-Drawdown Data

<table>
<thead>
<tr>
<th>Well 22</th>
<th>Well 23</th>
<th>Well 24</th>
</tr>
</thead>
<tbody>
<tr>
<td>68 hrs. at 1000 gpm</td>
<td>200 ft.</td>
<td>80 ft.</td>
</tr>
<tr>
<td>68 hrs. at 1000 gpm</td>
<td>--</td>
<td>(12.5 ft)(^a)</td>
</tr>
<tr>
<td>90 hrs. at 1000 gpm</td>
<td>(8 ft)(^b)</td>
<td>--</td>
</tr>
<tr>
<td>30 days at 1000 gpm</td>
<td>232 ft(^b)</td>
<td>105 ft(^c)</td>
</tr>
<tr>
<td>60 days at 1000 gpm</td>
<td>268 ft(^b)</td>
<td>154 ft(^c)</td>
</tr>
<tr>
<td>90 days at 1000 gpm</td>
<td>304 ft(^b)</td>
<td>193 ft(^c)</td>
</tr>
<tr>
<td>120 days at 1000 gpm</td>
<td>--</td>
<td>232 ft(^c)</td>
</tr>
<tr>
<td>130 days at 1000 gpm</td>
<td>--</td>
<td>245 ft(^c)</td>
</tr>
<tr>
<td>150 days at 1000 gpm</td>
<td>--</td>
<td>271 ft(^c)</td>
</tr>
<tr>
<td>168 days at 1000 gpm</td>
<td>--</td>
<td>295 ft(^c)</td>
</tr>
</tbody>
</table>

\(^a\) Drawdown in satellite observation hole.
\(^b\) Estimated drawdown in well, based on a rate of 1.2 ft. per day observed in satellite hole.
\(^c\) Estimated drawdown in well, based on a rate of 1.3 ft. per day observed in satellite hole.

NOTE: Basic data obtained from U.S.G.S. The above estimates of drawdown are believed conservative because a linear rate of drawdown was assumed.

Assuming a logarithmic trend in drawdown in the respective satellite holes, estimated drawdown in the wells pumping at 1,000 gpm for one year would be:
Well 22         Well 23         Well 24
223 ft.        110 ft.        155 ft.

based upon projected drawdowns in the satellite holes of 23 ft.,
30 ft., and 25 ft., respectively.

Recovery Data (satellite holes)

<table>
<thead>
<tr>
<th>Satellite 22</th>
<th>Satellite 23</th>
<th>Satellite 24</th>
</tr>
</thead>
<tbody>
<tr>
<td>End of pumping</td>
<td>8.2 ft.</td>
<td>12.4 ft.</td>
</tr>
<tr>
<td>5 hrs. after pumping stopped</td>
<td>3.7 ft.</td>
<td>12.4 ft.</td>
</tr>
<tr>
<td>20 hrs.</td>
<td>0.6 ft.</td>
<td>3.9 ft.</td>
</tr>
</tbody>
</table>

Based upon projection of the recovery data,

Well 22 would recover in 30 ± hrs.,
Well 23 would recover in 140 ± hrs.,
Well 24 would recover in 175 ± hrs.

Summary

Conservative estimates indicate that:

(1) Well 22 could be pumped continuously for 90 days at 1000 gpm.
(2) Well 23 could be pumped continuously for 168 days at 1000 gpm.
(3) Well 24 could be pumped continuously for 130 days at 1000 gpm.

The above limits are based upon drawdowns in the wells to within
5 feet of bottom of casing. A linear rate of drawdown was assumed.

Optimistic estimates indicate that all three wells can be
pumped one year continuously with drawdowns of 223 ft., 110 ft.,
and 155 ft. in Wells 22, 23, and 24, respectively. (Depth to
bottom of casing is 300 ft.).

According to Hong Fong, the dike compartment of Well 22 was
isolated from tunnel flow during the pumping test by using sand
bags and pipe diversion. This would suggest effect of tunnel flow
from other dike compartments was minimized in the test results.

DH

Daniel Lum
August 3, 1966

MEMORANDUM FOR THE RECORD

FROM Daniel Lum

SUBJECT: Molokai Wells 22, 23, & 24
Preliminary Evaluation of Existing Data

Description of Wells

<table>
<thead>
<tr>
<th></th>
<th>Well 22</th>
<th>Well 23</th>
<th>Well 24</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top of Cs. (Elev.)</td>
<td>990'</td>
<td>904'</td>
<td>965'</td>
</tr>
<tr>
<td>S.W.L. (Elev.)</td>
<td>988'</td>
<td>866.5'</td>
<td>947'</td>
</tr>
<tr>
<td>Depth to S.W.L.</td>
<td>2'</td>
<td>37.5'</td>
<td>18'</td>
</tr>
<tr>
<td>Bot. of Cs. (Elev.)</td>
<td>693'</td>
<td>604'</td>
<td>665'</td>
</tr>
<tr>
<td>Depth to Bot of Cs</td>
<td>297'</td>
<td>300'</td>
<td>300'</td>
</tr>
<tr>
<td>Depth of Well</td>
<td>400'</td>
<td>300'</td>
<td>300'</td>
</tr>
</tbody>
</table>

Yield-Drawdown Data

<table>
<thead>
<tr>
<th></th>
<th>Well 22</th>
<th>Well 23</th>
<th>Well 24</th>
</tr>
</thead>
<tbody>
<tr>
<td>68 hrs. at 1000 gpm</td>
<td>200 ft.</td>
<td>80 ft.</td>
<td>130 ft.</td>
</tr>
<tr>
<td>68 hrs. at 1000 gpm</td>
<td>--</td>
<td>(12.5 ft)(^a)</td>
<td>(8.5 ft)(^a)</td>
</tr>
<tr>
<td>90 hrs. at 1000 gpm</td>
<td>(8 ft)(^b)</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>30 days at 1000 gpm</td>
<td>232 ft(^b)</td>
<td>105 ft(^c)</td>
<td>155 ft(^c)</td>
</tr>
<tr>
<td>60 days at 1000 gpm</td>
<td>268 ft(^b)</td>
<td>154 ft(^c)</td>
<td>204 ft(^c)</td>
</tr>
<tr>
<td>90 days at 1000 gpm</td>
<td>304 ft(^b)</td>
<td>193 ft(^c)</td>
<td>243 ft(^c)</td>
</tr>
<tr>
<td>120 days at 1000 gpm</td>
<td>--</td>
<td>232 ft(^c)</td>
<td>282 ft(^c)</td>
</tr>
<tr>
<td>130 days at 1000 gpm</td>
<td>--</td>
<td>245 ft(^c)</td>
<td>295 ft(^c)</td>
</tr>
<tr>
<td>150 days at 1000 gpm</td>
<td>--</td>
<td>271 ft(^c)</td>
<td>--</td>
</tr>
<tr>
<td>168 days at 1000 gpm</td>
<td>--</td>
<td>295 ft(^c)</td>
<td>--</td>
</tr>
</tbody>
</table>

\(^a\) Drawdown in satellite observation hole.

\(^b\) Estimated drawdown in well, based on a rate of 1.2 ft. per day observed in satellite hole.

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NOTE: Basic data obtained from U.S.G.S. The above estimates of drawdown are believed conservative because a linear rate of drawdown was assumed.

Assuming a logarithmic trend in drawdown in the respective satellite holes, estimated drawdown in the wells pumping at 1,000 gpm for one year would be:
Memo for the Record -2- August 3, 1966

Well 22  Well 23  Well 24
223 ft.  110 ft.  155 ft.

based upon projected drawdowns in the satellite holes of 23 ft., 30 ft., and 25 ft., respectively.

Recovery Data (satellite holes)

<table>
<thead>
<tr>
<th></th>
<th>Satellite 22</th>
<th>Satellite 24</th>
<th>Satellite 23</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exit pumping</td>
<td>8.2 ft.</td>
<td>8.4 ft.</td>
<td>12.5 ft.</td>
</tr>
<tr>
<td>5 hrs. after pumping stopped</td>
<td>3.7 ft.</td>
<td>5.4 ft.</td>
<td>8.2 ft.</td>
</tr>
<tr>
<td>20 hrs.</td>
<td>0.6 ft.</td>
<td>3.9 ft.</td>
<td>5.9 ft.</td>
</tr>
</tbody>
</table>

Based upon projection of the recovery data,

Well 22 would recover in 30 ± hrs.,
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Summary

Conservative estimates indicate that:

(1) Well 22 could be pumped continuously for 90 days at 1000 gpm.
(2) Well 23 could be pumped continuously for 168 days at 1000 gpm.
(3) Well 24 could be pumped continuously for 130 days at 1000 gpm.

The above limits are based upon drawdowns in the wells to within 5 feet of bottom of casing. A linear rate of drawdown was assumed.

Optimistic estimates indicate that all three wells can be pumped one year continuously with drawdowns of 223 ft., 110 ft., and 155 ft. in Wells 22, 23, and 24, respectively. (Depth to bottom of casing is 300 ft.).

According to Hong Fong, the dike compartment of Well 22 was isolated from tunnel flow during the pumping test by using sand bags and pipe diversion. This would suggest effect of tunnel flow from other dike compartments was minimized in the test results.

DANIEL LUM

dh
CHINON TUNNEL WELL 22  (23)

Top of casing - 990 ft., mast
Static water level - 988 ft. mast
Bottom of hole - 590 ft. mast
Depth of hole - 400 ft.
Casing - 287 ft., unperforated
Open hole - 103 ft.

Satellite test hole - Pumping well at 1000 gpm
After 90 min. a total drawdown of 8 ft.

\[ \frac{1000}{3600} \text{ gpm} \times 24 \text{ hr/m} = 1.2 \text{ ft/day} \] (D. Davis, 1963, I/I)

Pumping at 1000 gpm, initial drawdown = 0 ft.
### Tunnel Well Test Log
#### Well 22

**Location:** Inside Molokai Tunnel, Well #1

**For:** Hawaiian Dredging & Construction Co.

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>G.P.M.</th>
<th>Water Level</th>
<th>Draw Down</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>8/7/61</td>
<td>8:00 AM</td>
<td>1,000</td>
<td>1002.82</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>8:40</td>
<td></td>
<td>860.06</td>
<td>142.76</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9:15</td>
<td></td>
<td>832.34</td>
<td>169.98</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10:00 PM</td>
<td>965</td>
<td>831.18</td>
<td>171.14</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11:00</td>
<td></td>
<td>831.18</td>
<td>172.14</td>
<td></td>
</tr>
<tr>
<td></td>
<td>12:30</td>
<td></td>
<td>828.87</td>
<td>173.45</td>
<td></td>
</tr>
<tr>
<td>8/10/61</td>
<td>2:30 AM</td>
<td></td>
<td>828.87</td>
<td>173.45</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3:00</td>
<td></td>
<td>827.72</td>
<td>174.50</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3:30</td>
<td></td>
<td>827.72</td>
<td>174.50</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4:00</td>
<td></td>
<td>827.72</td>
<td>174.50</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11:00</td>
<td></td>
<td>827.72</td>
<td>174.50</td>
<td></td>
</tr>
<tr>
<td>8/13/61</td>
<td>2:00 AM</td>
<td></td>
<td>827.72</td>
<td>174.50</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2:00</td>
<td></td>
<td>824.25</td>
<td>172.07</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2:30</td>
<td></td>
<td>824.25</td>
<td>172.07</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3:00</td>
<td></td>
<td>827.72</td>
<td>174.60</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3:30</td>
<td></td>
<td>827.72</td>
<td>174.60</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3:00 PM</td>
<td></td>
<td>827.72</td>
<td>174.60</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6:00</td>
<td></td>
<td>827.72</td>
<td>174.60</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11:00</td>
<td></td>
<td>827.72</td>
<td>174.60</td>
<td></td>
</tr>
<tr>
<td>8/14/61</td>
<td>2:00 AM</td>
<td></td>
<td>827.72</td>
<td>174.60</td>
<td>Stop pump</td>
</tr>
<tr>
<td></td>
<td>2:00</td>
<td></td>
<td>824.41</td>
<td>176.91</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3:00</td>
<td></td>
<td>825.41</td>
<td>176.91</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3:00 PM</td>
<td></td>
<td>824.41</td>
<td>176.91</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6:00</td>
<td></td>
<td>824.41</td>
<td>176.91</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11:00</td>
<td></td>
<td>824.41</td>
<td>176.91</td>
<td></td>
</tr>
</tbody>
</table>

*Start, well not recovered after air lifting.*
Tunnel | WELL TEST LOG | Well 1
---|---|---
Location: Inside Molokai Tunnel, Well No. 1
For: Hawaiian Dredging & Construction Co.

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>J.P.M.</th>
<th>Water Level</th>
<th>Draw Down</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>29/61</td>
<td>4:10 PM</td>
<td>650</td>
<td>873.0</td>
<td>129.0</td>
<td>Measured water level 3.05' below pump base. Static difference 0.2'</td>
</tr>
<tr>
<td>10</td>
<td>4:20</td>
<td>705</td>
<td>877.6</td>
<td>124.4</td>
<td>Adjust valve 800 GPM</td>
</tr>
<tr>
<td>20</td>
<td>4:30</td>
<td>&quot;</td>
<td>907.7</td>
<td>94.3</td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>4:45</td>
<td>&quot;</td>
<td>908.9</td>
<td>93.1</td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>5:00</td>
<td>&quot;</td>
<td>910.0</td>
<td>92.0</td>
<td></td>
</tr>
<tr>
<td>51</td>
<td>5:15</td>
<td>&quot;</td>
<td>916.0</td>
<td>92.0</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>5:18</td>
<td>800</td>
<td>908.4</td>
<td>103.6</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>5:30</td>
<td>&quot;</td>
<td>880.1</td>
<td>121.9</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>5:45</td>
<td>&quot;</td>
<td>880.1</td>
<td>121.9</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>6:00</td>
<td>&quot;</td>
<td>880.1</td>
<td>121.9</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>7:00</td>
<td>&quot;</td>
<td>879.9</td>
<td>122.1</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>8:00</td>
<td>&quot;</td>
<td>882.3</td>
<td>119.7</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>9:00</td>
<td>&quot;</td>
<td>883.4</td>
<td>118.6</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>10:00</td>
<td>&quot;</td>
<td>883.4</td>
<td>118.6</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>11:00</td>
<td>&quot;</td>
<td>883.4</td>
<td>118.6</td>
<td></td>
</tr>
<tr>
<td>70</td>
<td>12:00</td>
<td>&quot;</td>
<td>883.4</td>
<td>118.6</td>
<td></td>
</tr>
<tr>
<td>6/30</td>
<td>1:00 AM</td>
<td>4:00</td>
<td>884.5</td>
<td>117.5</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>2:00</td>
<td>&quot;</td>
<td>885.7</td>
<td>116.3</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>3:00</td>
<td>&quot;</td>
<td>886.9</td>
<td>115.1</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>4:00</td>
<td>&quot;</td>
<td>886.9</td>
<td>115.1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>5:00</td>
<td>&quot;</td>
<td>886.9</td>
<td>115.1</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>6:00</td>
<td>&quot;</td>
<td>886.9</td>
<td>115.1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>7:00</td>
<td>&quot;</td>
<td>885.7</td>
<td>116.3</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>8:00</td>
<td>&quot;</td>
<td>885.2</td>
<td>115.8</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>9:00</td>
<td>&quot;</td>
<td>885.2</td>
<td>115.8</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>10:00</td>
<td>&quot;</td>
<td>886.4</td>
<td>115.6</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>11:00</td>
<td>&quot;</td>
<td>886.6</td>
<td>115.4</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>12:00 PM</td>
<td>&quot;</td>
<td>886.9</td>
<td>115.1</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>1:00 PM</td>
<td>&quot;</td>
<td>885.7</td>
<td>116.3</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>2:00</td>
<td>&quot;</td>
<td>885.7</td>
<td>116.3</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>2:30</td>
<td>705</td>
<td>912.1</td>
<td>100.1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>2:35</td>
<td>&quot;</td>
<td>912.3</td>
<td>89.7</td>
<td>Adjust to 705 GPM @ 2:03</td>
</tr>
<tr>
<td>9</td>
<td>2:40</td>
<td>&quot;</td>
<td>912.3</td>
<td>89.7</td>
<td>Adjust to 604 GPM @ 2:16</td>
</tr>
<tr>
<td>8</td>
<td>2:45</td>
<td>&quot;</td>
<td>926.7</td>
<td>74.3</td>
<td>Adjust to 500 GPM @ 2:31</td>
</tr>
<tr>
<td>9</td>
<td>3:00</td>
<td>500</td>
<td>933.1</td>
<td>68.9</td>
<td>Adjust to 900 GPM @ 2:45</td>
</tr>
<tr>
<td>12</td>
<td>3:15</td>
<td>895</td>
<td>864.8</td>
<td>115.2</td>
<td>Adjust to 800 GPM @ 3:02</td>
</tr>
<tr>
<td>13</td>
<td>3:15</td>
<td>800</td>
<td>889.2</td>
<td>112.8</td>
<td></td>
</tr>
<tr>
<td>Date</td>
<td>Time</td>
<td>G.P.M.</td>
<td>Water Level</td>
<td>Drawdown</td>
<td>Remarks</td>
</tr>
<tr>
<td>------------</td>
<td>------------</td>
<td>--------</td>
<td>-------------</td>
<td>----------</td>
<td>---------</td>
</tr>
<tr>
<td>6/30/61</td>
<td>12:00 PM</td>
<td>800</td>
<td>890.3</td>
<td>11.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1:00 AM</td>
<td></td>
<td>889.2</td>
<td>112.8</td>
<td></td>
</tr>
<tr>
<td></td>
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Pump Base: 1002.92
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**Notes:**

- Pump edge only up to 600.
- Need to break 8am.
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May 16, 1960

To: Chief, Bureau of Sanitary Engineering (Thru Official Channels)
From: Bureau of Laboratories
Subject: Water, Chemical Analysis: Molokai Irrigation Tunnels Water sample from 236' at 10'

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F. Takezawa, Ph.D.
Public Health Chemist

Kingston S. Wilcox, Ph.D.
Chief, Bureau of Laboratories
Sarah E. Sykes  
March 18, 1995

State of Hawai'i-DLNR-Commission on Water Resource Management  
Mr. Mike Wilson, Chair  
Ms. Rae Loui, Deputy Director  
P.O. Box 621  
Honolulu, Hawai'i 96809

Good thing we're almost finished with Molokai existing use allocations. And, we're almost finished with the Waikolu controversies. But not quite.

First... I had discussed general objections with David Higa a few months back, and I sent CWRM a copy of my December 8, 1994 objections to the Draft Environmental Assessment. It is attached again for your review. I did not receive a copy of the interim instream flow standard amendment petition!

Second... please keep a close eye on this project and its procedures... and please, require regular six-month reporting to CWRM as well as the interested non-official public, such as me. There are problems. O'opu are showing up in the MIS reservoir. Something's not working right. And, it doesn't seem like DOWALD or DOA cares one way or the other. We do.

Third... whatever happened to our petitions for permanent streamflow standards for, among many Molokai streams, Waikolu Stream? Ms. Loui's April 27, 1994 letter stated, "I would like to take up your petition for Permanent Instream Flow Standards at the same time we take up DOA's petition to amend Waikolu Stream flows."

Finally, as stated at the March 14, 1995 CWRM meeting, I do want to see the studies done. I do want DOA/DOWALD to have the necessary permits to accomplish some real experimentation in the interest of getting verifiable data. But, regrettably, I must again ask to be put back on whatever notification or report list CWRM maintains for Molokai matters.

Sincerely,

Sarah E. Sykes

P.O. Box 370  
Kaunakakai, Hawai'i 96748  
(808) 553-3831
Thank you for the opportunity to comment. We have been discussing the problems with the wells and pumps in Waikolu Valley for a few years. Please incorporate by reference all the information submitted by me to both agencies in letter and testimony regarding that situation since 1989.

Before I tackle the inadequacies of the subject draft EA, please note that the need for this project is clearly disputable. DHHL Homesteaders have not yet fully tapped their two-thirds allocation from the Waikolu watershed. Of equal importance, the Molokai Ranch, Ltd. diversions above this project perhaps illegally remove significant quantities of water before it ever reaches the Waikolu watershed, reducing the amounts available for public use. These two facts should be given full consideration before deciding to spend more taxpayer dollars on a potentially unnecessary project.

The original plans for Waikolu were formulated years ago, lacking current information about the fragility of Molokai's Sole Source Aquifer, and its inability to continue to sustain withdrawals in the amounts recommended, without threatening the entire island's water supply for all uses. The project and concept must be re-examined in light of this new information. There simply may not be enough water in the vicinity to justify any further investment.

Issues such as impacts on biota, including instream, near-stream, estuary and ocean, have not been addressed in this draft EA. It is not known if the "fish ladders" will work. Instream water temperature may be a key condition for species survival. This has not been addressed. It is wrong to
proceed with any further investment in this project before the agreed-upon studies have been completed and a feasibility determination made in light of that still-to-come information. Money has been made available to proceed with those studies. All other planning should stop until all the information is available to all interested parties. To go ahead now violates both the letter and the intent of S11-200-9 (a)(4).

S11-200-7 requires that all proposed projects be described in their entirety, not segmented in the manner evident in the subject EA. Long term negative impacts of the overall project are extensive. They have not been properly presented, nor mitigating actions proposed.

Please require a full Environmental Impact Statement for this project, one which properly addresses all areas of impact.

Thank you for your time and attention in reviewing our concerns.

Sincerely,

Sarah E. Sykes
P.O. Box 370
Kaunakakai, Hawai‘i  96748
(808) 553-3831
Testimony Presented to the  
State of Hawaii  
Commission on Water Resource Management  
1/12/94  
on the Regular Commission Meeting  
Agenda Items 2 and 3

AGENDA  
ITEM 2. Waikolu Wells

Analysis & Issues

If "Restoration of flow through the dewatered section [of Waikolu stream] is being addressed by conditions of the Conservation District Use Permit for the three new wells," there is an implication that BLNR is assuming COWRM authority over groundwater extractions and stream protection and management, including instream flow standards for particular stream reaches. In any case, management and regulatory coordination and consistency seems confused. Perhaps BLNR and COWRM should hold a joint proceeding about the situation.

Objections filed by OHA note that the wells are located on ceded lands. One-third of the extracted water (the portion not subject to DHHL priority) should therefore be subjected to water leasing and licensing requirements with appropriate revenues returned to OHA and DHHL.

It seems that a stream channel alteration permit is required for construction of improvements to the diversion dam.

WATER USE PERMIT DETAILED INFORMATION

Why is there a lack of detailed technical information for wells 4-6, particularly ground elevations and water levels? The Analysis & Issues section states that these "... are new wells that have not been active to date," implying that the wells have already been constructed. When were the wells constructed and when (if applicable) were the well construction permits issued?

The Department of Agriculture previously responded (ATTACHMENT F, Response to NHAC) that "(1) A more detailed location of the wells is not available because of the remoteness of the site, and
the wells are close together." We know of many wells in remote sites, close together, whose detailed locations are known. DOA's previous response is not acceptable.

AGENDA
ITEM 3. Big Island Country Club Well No. 2

Action Requested:

What is the breakdown of proposed water use between private/municipal and golf course irrigation? What is (are) the name(s) of the project(s) for which the water would be used? What is the current status of necessary county approvals for the project(s).

Water Availability:

What has been done since July 23, 1992 to include the proposed well in the Hawaii County Water Use and Development Plan?

Mahalo

David L. Martin, Water Claims Manager

pc: Department of Agriculture
ATTACHMENT F

In its response to NHAC, DOA maintains that "(5) The project wasn't restricted by such federal law as claimed ..." Although DOA is correct in stating that "... a special loan was obtained through the Bureau of Reclamation involving both state and federal tax funds reflecting contributions by all citizens, not only Hawaiians," initial priority usage of all the water developed by the project was reserved to Hawaiian Home Lands. Later, the State of Hawaii amended the enabling legislation to reduce Hawaiian Homes priority to 2/3 of the water. There are many projects "... involving both state and federal tax funds reflecting contributions by all citizens..." which by law limit their benefits to specific groups such as Hawaiians and Native Americans.

DOA claims that "(6) There are no other legal uses within Waikolu Valley at the present time." Instream uses of Waikolu, including but not limited to maintenance of aquatic habitat and support of traditional and customary Hawaiian cultural beliefs, values, and practices, are existing legal uses. The objections of the National Park Service indicate its existing legal use of Waikolu as well.

We disagree with DOA's suggestion that the National Park Service should "... represent their objections through a State agency" [DOA responses to NPS (2)]. While state agencies have indeed reserved control over Waikolu water management matters regulatory and decision-making) and water rights, NPS is not restricted from advocating its interests in public forums and from using water within the established legal framework. In fact, the Cooperative Agreement explicitly states that "... all discussions, actions, or activities related to water and aquatic resources within the park are beyond [not within] the purview of this cooperative agreement" [emphasis and commentary added]. We know of many cases where lessees advocate for the water rights of landowners - it is not unreasonable.

Also in its responses to the National Park Service, DOA erroneously states that "(5) ... [instream flow] standards have not been established." While the existing diversions and wells precede any instream use standards, they are still subject to existing standards and any future changes to these standards. Furthermore, continuance of their existing use is only assured to the extent it is deemed reasonable and beneficial and in the public interest by COWRM and not violative of other water rights.
Ms. Sarah E. Sykes  
P.O. Box 370  
Kaunakakai, HI 96748

Dear Ms. Sykes:

We are responding to your request for a contested case hearing on the water use permit application submitted by the Department of Agriculture, Agricultural Resource Management Division, for the Waikolu Wells #22-#24 and #4-#6 (Well Nos. 0855-01 to 03 and 0855-06,05,&04).

Under Section 13-167-54(a)(3) of the Hawaii Administrative Rules,

"All persons within a hydrologic unit who have some land, who are adjacent property owners, or who otherwise can demonstrate that they will be so directly and immediately affected by the proposed change that their interest in the proceeding is clearly distinguishable from that of the general public shall be admitted as parties [in a contested case hearing] upon timely application."

Because you do not have any property interest in land within, or adjacent to, the Waikolu Aquifer System, do not lawfully reside on the land, and have not demonstrated that your interest in the proceeding is clearly distinguishable from that of the general public, the Office of the Attorney General has advised the Commission that you do not have standing to be admitted as a party in a contested case hearing as provided by §13-167-54(a)(3). However, staff has attempted to address the concerns raised in your petition through the conditions within the staff recommendation.

If you have any questions, please contact Rae Loui at 587-0214.

Very truly yours,

[Signature]
KEITH W. AHUE
DEPUTY
unofficial and off-the-record, also not for attribution... cover 'em all?

Wednesday, January 12 is also Maui County hearing on water, but they're in the evening (6:00 p.m.). Just FYI.

We're close to agreement, very close.

Logistics of meetings with such a large group as a Waikolu Stream Team as originally proposed indeed something of a nightmare. Perhaps a simple directive resembling that process used for Environmental Assessments and Environmental Impact Statements... such that the smaller operative group send the study proposal as well as the final report to DOFAW, DOWALD, DOH, DIHL, OHA, MPC, USGS, EPA, etc., for comment in a timely manner (e.g., thirty day review). Everybody has to defer to CWRM anyway.

Stating within the recommendation the specific Molokai Working Group role re: plans, study, applications.

Curious re: 2.a. since there already exists a Permanent Instream Flow Standard petition for Waikolu Stream which should probably be decided before any amendment to an Interim Instream Flow Standard petition could be appropriately considered... and upon which no action should be taken until the minimum two-year study is completed and accepted. Even so-called Permanent Instream Flow Standards can be amended. Maybe easier to leave that issue out of the recommendations for this decision. I don't know.

2.b. Argument in favor of adding the MIS-User Advisory Group rep. even if Molokai Working Group involved: DOA wants to de-water Waikolu Stream... they see this as their duty and their right. DAR was willing to give up Waikolu Stream and concentrate on saving the remaining "untapped" streams to the east, in spite of the fact that pumping the east side of Waikolu may well impact Pelekunu Flows. USFWS ready to "give up" on Waikolu and concentrate on saving the other streams. NPS must not have a legal leg to stand on, since they didn't apply for contested case... Peter Thompson refuses to share any data yet generated and said we can't see any of it for at least a year-and-a-half. He also refuses to have

(oo'd.)

P.O. Box 370  Kaunakakai, Hawai'i  96748  (808) 553-3831
anything to do with USCOE, who’ve been the only ones willing to immediately share all data generated. This is the same kind of (un)professional turf battle crap we heard at the Hilo Streams Conference. Stand ‘em all in the corner ‘til they can come out and mind their manners properly, including all cooperating with all.

So, I want to see someone on that de facto but down-scaled Stream Team who actually gives a damn whether Walkolu lives or dies, whether the Homesteaders have a reasonable source of water or not, whether the plan makes common sense as well as scientific and legal sense. The reason I suggested Noelani joy is I trust she will never quit on the Homesteaders and she will never quit on the stream. And, this year she got stuck being chair of the MIS-User Advisory Group. But, please, if not Noe, add anyone real from the community of steward-users who’s willing and able to do the homework.

Otherwise looks great.

I really should ask an attorney about this, but I won’t without your permission. There is not yet an attorney of record on this, because I really believed and still believe we can work this out in a way I can wholeheartedly agree with the CWRM decision. Please let me know one way or other if we’re getting closer or farther apart.

Mahalo and Hau’oli Makahiki Hou!
Sarah E. Sykes
December 23, 1993

State of Hawai'i-Department of Land and Natural Resources
Commission on Water Resource Management
Honolulu, Hawai'i 96813

RE: Waikolu Valley-Hoolehua Water Management Area

Chairman Ahue and Commissioners,

I write to you today to clarify all issues regarding my request to be a party in a contested case hearing for the water use permit application filed by the Department of Agriculture for Waikolu wells.

If the Commission agrees that it is reasonable and beneficial to defer the decision on additional withdrawals and existing use conditional upon installation and monitoring of mitigative measures, as well as cooperative experimental data generation to be shared with all identified concerned parties -- a realistic cooperative minimum two-year test on Waikolu Stream -- then I am in agreement with the Commission decision and will not contest it. However, if the permits are approved as presented, then I must contest the Commission decision. Please understand, existing withdrawals have at times already dewatered Waikolu Stream in violation of Interim Instream Flow Standards.

The Commission on Water Resource Management must make the ultimate life-or-death decision for Waikolu Stream. The allocation responsibility is yours alone. I simply want to make certain that decisions are based on valid data. Along with your responsibility goes the authority to bring all parties to the table, and keep them there. Although it was in their best interest to compile and disseminate information before this time, the applicant did not do so. They will not do so without the Commission’s direct intervention, through the creation of a Waikolu Stream Team. Such a Stream Team might also be able to work out a good operational model for future data-based problem resolution. And, if they keep the Commission’s Molokai Working Group apprised on a continuing basis, the MWG might eventually be able to make the most reasonable and beneficial recommendations to the Commission.

(con’d.)

P.O. Box 370 Kaunakakai, Hawai'i 96748 (808) 553-3831
The Permanent Instream Flow Standards petition for Waikolu Stream remains temporarily, cooperatively, on hold. As stated in my November 17, 1993 testimony to the Commission, this statement of cooperation is not a waiver of any claims regarding the timeliness of appropriate action on the pending petitions. The PIFS petitions were received by the Commission prior to the DOA permit application. Information gathered in the two-year study envisioned for the Waikolu Stream Team should help establish appropriate permanent flows.

While thinking through the logistics and possible experiments, with available technology, video-conferencing and tele-conferencing should keep involved agencies' expenses to a minimum. CWRM (Edmunds), DLNR (Young), DOFAW (Wong), DAR (Devick), DOWALD, DOCARE, DOH, DHHL, OHA, DOA, MIS-DOA, MIS-Advisory Group, Homestead Association reps, MPC, NPS (Thompson), USFWS (Yuen), COE (Lee), USGS (Anthony) and EPA should all be involved. (I mention names affiliated with departments above only because these are the people who I know have already worked on the issues involved. I had earlier asked Noelani Joy if she thought she could keep everyone working together, so I had her permission to suggest her involvement.)

I truly believe a Waikolu Stream Team needs to have two years' worth of structured information answering all important environmental and legal questions to help the Commission make an eventual informed decision. We hope to help carry out simultaneous parallel experiments generating comparable data in Wailau Stream, so the Commission will have a relatable benchmark. All of it can work together to make the best management plans possible.

Thank you for your patience!

Sincerely,

Sarah E. Sykes

P.O. Box 370 Kaunakakai, Hawai'i 96748 (808) 553-3831
State of Hawai'i-DLNR
Commission on Water Resource Management
ATTN: Rae Loui, Deputy Director
P.O. Box 621
Honolulu, Hawai'i 96809

Dear Ms. Loui,

Response to Department of Agriculture testimony re: Water Use Permit, Waikolu Groundwater Management Area, Molokai:

Beginning with Mr. Kitagawa's cover memo, I take issue with his statement in defense of the permit application being granted: "The Department of Agriculture asks that the Commission consider... based only on environmental benefits." The National Environmental Policy Act of 1969 established that environmental concerns are to be considered with scientific evidence, without pressure from economic motivations. While the Commission on Water Resource Management holds tremendous authority in the State of Hawai'i, I do not believe that authority is so great that it may purposely violate federal law. Slowly, perhaps too slowly, we approach the realization that a healthy economy requires a healthy environment. The challenge is not jobs or environment... it is to establish a balance promoting good jobs in a good environment.

Re: Response to DAR Concerns:

(1) "The MIS will make allowances..." Pumping and diversions historically have degraded and dewatered Waikolu Stream, but DOA has not admitted this, and there is no assurance they will do so now or in the future if their water permit application is approved.

(2) "The construction...wetted channel..." This may not be the best solution relative to maintaining the habitat, maintaining appropriate streamflow. It may not be enough to support lifeforms' migration to ocean and return. It may not be enough to support food production on which lifeforms depend. Not enough is yet known to determine what will work.
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(con'd.)

P.O. Box 370 Kaunakakai, Hawai'i 96748 (808) 553-3831
Sarah E. Sykes

Re: Response to NPS objections:

(2) "In relation to their objections... We already have the solutions to these concerns and are preparing to put them into action." Oh, yeah? I do not know from whence DOA has obtained their data, but DOWALD was convinced 20 MGD would be produced by the tunnel (they only consistently get about 1 MGD); they were certain the wells could produce 6 MGD without any measurable effect on Waikolu Stream (they dewatered it test-pumping only one new pump); and they were convinced there's 83 MGD available on Molokai for development when the last people to actually measure it (USGS, 1935) gave an optimistic estimate of 55 MGD total for the island. And that amount leaves none for maintaining streamflow or normally increasing domestic use. I am not at all convinced they know what they're talking about, and certainly don't want to put the fox in charge of the henhouse.

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(con'd.)

P.O. Box 370 Kaunakakai, Hawai'i 96748 (808) 553-3831
Sarah E. Sykes

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Please, make a Waikolu Stream Team and defer action on this application for at least two years, until they have reported and recommended the best possible management practices in favor of all the land and people of Molokai.

Sincerely,

[Signature]
Sarah E. Sykes

P.O. Box 370 Kaunakakai, Hawai'i 96748 (808) 553-3831
State of Hawai‘i-Department of Land and Natural Resources  
Commission on Water Resource Management  
Honolulu, Hawai‘i  96813

RE: Waikolu Valley-Hoolehua Water Management Area

Chairman Ahue and Commissioners,

In the interest of saving time, because I am a co-petitioner for establishing Permanent Instream Flow Standards for Waikolu Stream, please incorporate by reference that petition as part of my testimony. Also, please incorporate by reference all the letters sent to the Commission about Molokai water issues since we first submitted the petition to designate the island a Water Management Area. I would especially appreciate your review of the known hydrogeological facts, and the nature of Molokai’s one-to-one ground-surface water relationship relative to north shore’s gaining streams.

I support both the National Park Service position in response to this application; and the Molokai Water Working Group recommendations relative to conservation as the first source for additional water supplies, and first seeking water in the sectors of proposed use.

I also support Noelani Joy’s recommendation to run a minimum two-year test on Waikolu Stream. Please defer action on that part of the application requesting water use permits for wells #4, #5 and #6 until the test results are in, and mitigation measures have been tested as well. Please require close monitoring of all ecosystem effects of withdrawal on flows for wells #22, #23, #24, so immediate mitigative measures can be applied, if necessary. (However, if the test study group reaches consensus about which wells to test when, please give them authority to turn on even wells #4, or #5, or #6 for test purposes as necessary.) And please, to make certain the user-community as well as the community-at-large is granted easy and timely access to the data generated, have the suggested test study group report directly and regularly to the Molokai Working Group on Water, as well as to the Molokai Planning Commission. May I suggest consulting with prior identified responsible state and federal agencies as

(con’d.)

P.O. Box 370  
Kaunakakai, Hawai‘i  96748  
(808) 553-3831
well as the USGS and COE in the interest of developing the best test possible. Perhaps the SCS River Basin Study might be expanded to serve as the research umbrella for all testing. May I finally suggest that Noealani Joy be put in charge of keeping all involved working together, since she is a member of the Molokai Planning Commission, the Molokai Working Group on Water, and the Molokai Irrigation System User Advisory Group. She is also a co-petitioner for establishing Permanent Instream Flow Standards for Molokai north shore streams, including Waikolu Stream.

The Permanent Instream Flow Standards petition for Waikolu Stream remains temporarily, cooperatively, on hold. Soon, the Commission’s Stream Protection and Management Plan will be adopted. After that, the Molokai streams petitions must move forward. If we can remain patient in protecting the resource, certainly the non-Homesteader MIS users might be reasonably asked to remain patient while a real test is implemented. This statement of cooperation is not a waiver of any claims regarding the timeliness of appropriate action on the pending petitions.

We know the Homesteaders need the water. We know the land and the life of the land need the water. Their mutual dependence is not mutually exclusive. But, to make the best management decision requires data that doesn’t exist today. Please defer the decision on additional withdrawals, and grant the application for existing use conditional upon installation and monitoring of mitigative measures, as well as cooperative experimental data generation… a realistic cooperative effort.

We may make mistakes in our stewardship of the land and her waters, but we have the capacity to learn from our mistakes and never make them again. This is an opportunity to finally learn enough about Hawai’i’s few remaining streams to lay the groundwork for real management decision-making models within two years.

If you do not accept this opportunity to do it right on Molokai, then I request an administrative contested case hearing on the matter of DOA’s requested withdrawals at Waikolu Stream.

Thank you for the opportunity to speak with you about this matter on Molokai.

Sarah E. Sykes

P.O. Box 370 Kaunakakai, Hawaii 96748 (808) 553-3831
PETITION TO AMEND INTERIM INSTREAM FLOW STANDARD

I. PETITIONER

Name/s Rachael Kamakana, Noelani Joy, Judy Caparida, Sarah Sykes
Address Molokai
Contact Person Any of the above
Telephone 553-5363, 557-6370, 553-8553, 553-7831, respectively

II. PROJECT

Project title Not applicable; this is a Petition to the Commission to amend the Interim Instream Flow Standards for Waikolu Stream and to initiate the surveys, inventories, and other investigations necessary to establish (permanent) Instream Flow Standards.

Project location Not applicable. Petition is to amend the Interim Instream Flow Standards for Waikolu Stream and its tributaries.

Stream(s) affected Waikolu

Tax Map key(s) Not applicable

Landowner(s) United States (D.O. - HPSC, State of Hawai'i)

State land use district Conservation

County Zoning Conservation
3. EXISTING INSTREAM AND OFFSTREAM WATER USES

Drinking water, irrigation water; critical habitat threatened species
DOWALD-DOA-MIS Pumps, Diversions

4. STREAMFLOW

USGS stream gaging station 16405100, 16405300, 16405500, 16408000

5. PROJECT IMPACT

Not applicable

6. FACTUAL BACKGROUND

From DLNR's "Resource," Volume III, Number 1, February 1992, "All the native freshwater species can be preserved if habitat is protected and a vigorous effort is made to understand the relationships between these species and their supporting ecosystems. Such understanding is prerequisite to management. With a good information base, and decision-makers who give highest priority to the perpetuation of the native biological resources, the survival of these species along with their natural ecosystems should be assured."

Please incorporate, by reference, the May 13, 1992 DLNR-CWRM amendments to the Hawai'i Stream Assessment-Molokai streams, relative to Waikolu stream.

The state doesn't know how much water is in the stream today. Threats to the stream flow are imminent due to potential agricultural development. Before permitting away the rest of the water, before committing funds to projects designed to carry away the water, necessary studies must be done.

7. LEGAL BACKGROUND

Section 174C-71 of the State Water Code requires the Commission to "establish and administer a statewide instream use protection program." Section 174C-71(1) requires the Commission to "establish Instream Flow Standards on a stream-by-stream basis whenever necessary to protect the public interest in the waters of the State," and Section 174C-71(4) requires the Commission to "establish an instream flow program to protect, enhance, and reestablish, where practicable, beneficial instream uses of water. The commission shall conduct investigations and collect instream flow data including fishing, wildlife, aesthetic, recreational, water quality, and ecological information and basic streamflow characteristics necessary for determining instream flow requirements."

The Interim Instream Flow Standard for all streams on Molokai -- established by the Commission on June 15, 1988 -- is the amount of water flowing in each stream ("the status quo flow") on the effective date of the standard (June 15, 1988), and as that flow may naturally vary throughout the year and from year to year without further amounts of water being diverted offstream through new or expanded diversion (via groundwater withdrawal or direct surface diversion), and under the stream conditions existing on the effective date of the standard, except as may be modified by certain conditions set forth by the Commission. These conditions are specifically enumerated in the July 18, 1988 memorandum to all interested parties from William W. Paty, Commission Chair.

The Commission has not yet initiated any protection programs for environmentally and culturally significant streams on Molokai. Furthermore, Petitioners assert that the Commission has not adequately assessed existing water uses, proposed water uses, Native Hawaiian water rights, Department of Hawaiian Home Lands water rights, appurtenant water rights and the ecological requirements of native stream ecosystems of any Molokai surface water resources.

Based upon additional information or a compelling public need, any person may petition the Commission on Water Resource Management to
amend the interim instream standard to allow future diversion, restoration or other utilization of any streamflow (see June 15, 1988 declaration by the Commission establishing Interim Instream Flow Standards for streams on Moloka'i). Section 13-169-36 of the Administrative Rules implementing the State Water Code provides that the modification of an existing Interim Instream Flow Standard may be initiated by the Commission, or by a petition to the Commission by any interested person.

Additional and significant information about the value of Waikolu stream has become available to the Commission and is reflected in the Commission's May 13, 1992 DLNR-CWRM amendments to the Hawai'i Stream Assessment-Molokai streams. Also, state pumps and diversions have de-watered Waikolu stream on test, and threaten to do so when in full operation.

Also, in light of the Commission's acceptance that Moloka'i water resources are inter-connected in one aquifer, and that ground-surface water interactions are basically linked in a one-to-one relationship, it is clear to Petitioners that significant threats to the streamflow exist for Waikolu stream.

There is also a compelling public need to amend the Interim Instream Flow Standard for Waikolu stream and to initiate the studies, surveys, inventories and other investigations necessary to establish Permanent Instream Flow Standards. As set forth above, Waikolu stream is an ecologically and culturally significant stream.

Therefore, we submit this Petition to the Commission to amend the Interim Instream Flow Standard for Waikolu Stream and to initiate the studies, surveys, inventories and other investigations necessary to establish Permanent Instream Flow Standards.

(signed and submitted, July 15, 1992)
FAX TRANSMITTAL

DATE: December 22, 1993

TO: Lenor Nakama
   State of Hawaii
   Water Development
   Honolulu, Hawaii

FROM: Thomas Matayoshi
   via Olivia Mollen
   MOLOKAI IRRIGATION SYSTEM
   DEPARTMENT OF AGRICULTURE

SUBJECT: Letter(s) - 2 from Maui Electric Company, Molokai Branch
         from Mrs. Agnes Delia Cruz in reply to our request.

REMARKS: Note: Letter #2, Followed-up with Mr. Matayoshi re; paragraph
         #2, Pump #1 run 24 hours. Pump #2 (?) Pumps #22, #23, & #24
         pump 8 hours only at night.

Total number of pages (including this page): 4

If you do not receive the total number of pages noted above and/or have
problems with our transmission, please contact the sender at (808) 567-6891.
December 21, 1993

Thomas Matayoshi  
SOH, Dept. of Agriculture  
P.O. Box 205  
Hoolehua, HI 96729  

Dear Tom:

Your recent letter of December 10th prompted me to review the current billing status of your account with us — in particular as it relates to your most recent pumping schedule dated October 23, 1993.

In that letter you indicate pump #1-75 hp scheduled to run all day; pump #2 is on automatic which means it may be required to run day or night. In addition, well #22-100 hp is running at night, as is well #23-100 hp, and well #24 is running both day and night.

<table>
<thead>
<tr>
<th></th>
<th>Day</th>
<th>Night</th>
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<tbody>
<tr>
<td>#1</td>
<td>75 hp</td>
<td>75 hp</td>
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<tr>
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<td>75 hp</td>
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<td>#22</td>
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<td>#23</td>
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<td>#24</td>
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<td>100 hp</td>
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<tr>
<td>Total</td>
<td>250 hp</td>
<td>450 hp</td>
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</table>

This schedule indicates the potential connected load during daytime hours, billed on Rate P, to be a total of 250 hp and during the night hours, your connected load may be as high as 450 hp.

I continue to anticipate a change in our rate structure which will affect the way the billing demand is handled. Upon notification of those changes, I will discuss with you your pumping schedule, and establish the corrected billing demand.

I will be in touch with you in the near future.

Sincerely,

[Signature]

Agnes DeLa Cruz  
Administrator, Customer Service

An HEI Company
December 21, 1993

Thomas Matayoshi
S&H, Dept. Of Agriculture
P.O. Box 205
Hoolau, HI 96729

RE: Supplying Electric Power to M.I.S.

Dear Tom:

I apologize for the delay in responding to your December 10th letter; it was necessary to concur with Mike Ribao, and I had been off-island. To answer the questions you indicate the water commissioners are asking, I will address each one separately:

1) Why was the M.I.S. limited to their pumping needs in 1960? It is difficult to address this question, since our file does not carry any information that far back and none of our staff was employed with Molokai Electric at that time. I tried to reach retiree Mits Watanabe, but he was not at home. He might be a good resource on this, when I am able to make contact with him.

2) Can Maui Electric Company provide all the power demand that the M.I.S. need today? "Yes", according to Mike Ribao, Production Supervisor.

3) What are your plans for future power demands? (per Mike Ribao): Two new generator additions of 2.2 MW each will be added in April, 1995, and one generator addition of 2.2 MW will be added in January, 1996.

4) With the Department of Hawaiian Homes, Kaluakoi, County Water Works and Molokai Irrigation System and others, can the M.I.S. run all these pumps in the near future? #1-75 hp; #2-75 hp; #22-100 hp; #23-100 hp; #24-100 hp.

Mike Ribao indicated that "Yes" this load of 450 hp can be run.

The two new pumps - #5 - 100 hp and #6 - 75 hp may also be run.
Of course the cost for additional connected load will need to be reflected in increased charges to your demand billing, which currently is billed at a total of 200 kw, representing no more than 200 hp of pumping running at any given time. This amount will need adjusting.

If you have any questions in regard to generation, please contact Mike Ribac at 553-3234. If I can answer any questions regarding the billing, please contact me at the same number.

Sincerely,

[Signature]

Agnes dela Cruz
Administrator, Customer Service
Ms. Sarah E. Sykes  
P.O. Box 370  
Kaunakakai, HI 96748

Dear Ms. Sykes:

State Dept. of Agriculture  
Water Use Permit Application  
Waikolu Ground Water Management Area, Molokai  
Request for Contested Case Hearing

We acknowledge receipt, on November 30, 1993, of your application to be a party in a contested case hearing for the water use permit application filed by the Dept. of Agriculture for the Waikolu Wells #22-24 & #4-6 (Well Nos. 0855-01 to 06). We have forwarded your request to the Office of the Attorney General for their review and comment.

If you have any questions, please call Lenore Nakama at 587-0218.

Sincerely,

RAE M. LOUI  
Deputy Director

LN:ky
MEMORANDUM

TO: Johnson H. Wong, Supervisor
    Land/Transportation Division

FROM: Keith W. Ahue, Chairperson
    Commission on Water Resource Management

SUBJECT: Application to be a Party in a Contested Case Hearing

In response to objections filed by the Division of Aquatic Resources and the National Park Service, a public hearing was held on November 17, 1993 to gather testimony on the water use permit application filed by the Dept. of Agriculture for the Waikolu Wells #22-24 & #4-6 (Well Nos. 0855-01 to 06) located in the Waikolu Ground Water Management Area, Molokai.

In accordance with HAR 13-167-52, an oral request for a contested case hearing was made before the close of this public hearing, and a written petition was filed with the Commission on November 30, 1993 by the interested party.

We request a determination of the petitioner’s status and standing to be admitted as a party to the contested case hearing.

If you have any questions, please call Deputy at 587-0214.

Attachment

cc: William Tam, Deputy Attorney General
State of Hawai‘i-DLNR
Commission on Water Resource Management
ATTN: Rae Loui, Deputy Director
P.O. Box 621
Honolulu, Hawai‘i 96809

Dear Ms. Loui,

Response to Department of Agriculture testimony re: Water Use Permit, Waikolu Groundwater Management Area, Molokai:

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(con'd.)
P.O. Box 370       Kaunakakai, Hawai'i 96748       (808) 553-3831
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P.O. Box 370  Kaunakakai, Hawai'i 96748  (808) 553-3831
Sarah E. Sykes

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Please, make a Waikolu Stream Team and defer action on this application for at least two years, until they have reported and recommended the best possible management practices in favor of all the land and people of Molokai.

Sincerely,

Sarah E. Sykes
Dear Ms. Loui,

Enclosed please find a completed Contested Case Application form, as provided by your office. Attached to the completed form, and to be considered part of the application, are a copy of my testimony and the reference copy of the July 15, 1992 petition to establish Permanent Instream Flow Standards for Waikolu Stream.

Because I read the testimony on November 17, 1993 at the Molokai meeting of the Commission on Water Resource Management, I hope it is only necessary for me to sign the Contested Case Application. I consulted with, and obtained the approval of Noelani Joy, Rachael Kamakana and Judy Caparida to proceed. This was necessary because all four of us are affected. Noelani Joy is a Homesteader who relies on Molokai Irrigation System (MIS) water from Waikolu watershed. Rachael Kamakana is a Kalamaula Homesteader who one day should be served by the MIS. Judy Caparida remains on the DHHL waiting list for her Homestead. I live on Molokai, so my safe drinking water is at risk if the aquifer is degraded by over-pumping. Also, living in Wailau, I know streams in that valley are at risk if the pumping is allowed to proceed without better information about the potential negative effects of significant drawdowns. If island residents are only offered "monitoring" of the devastation at Waikolu, then there truly is no citizen input to what is reasonable and beneficial in their estimation.

I read something in a book by Thor Heyerdahl about progress. It's so close to what I believe, and the situation we face today, I'd like to quote him here. He said, "It is progress when a farmer leaves his hoe and a fisherman his net to step on to an assembly line the day the cornfield is leased to industry, which needs the river as its sewer. It is progress when
Sarah E. Sykes

cities grow bigger and fields and forests smaller. ... When children get a sidewalk in exchange for a meadow, when the fragrance of flowers and the view of hills and forests are replaced by air conditioning and a view across the street. It is progress when a centuries-old oak is cut down to give space for a road sign. ... Nothing in all the "progressive" procedure that modern man, helped by all his modern middle-men, goes through before he earns money to buy a fish or a potato will ever be as simple as pulling them out of the water or the soil. Without the farmer and the fisherman who share their crumbs with the rest of us, modern "progressive" society would collapse... the rest of us who run about with papers and screwdrivers, attempting to build a better world without a blueprint."

We cannot manage what we do not understand. We do not understand enough about Hawai'i stream ecosystems (including "available" water for withdrawal) to make a reasonable determination of what should or should not be permitted to be taken from the Waikolu watershed.

My request is not to stop all the pumping, to dismantle all the diversions... it is a plea to take the time to do this right. Department of Agriculture, Department of Water and Land Development have never before been willing to share data, share initial assumptions, share management authority. So long as their permits are not automatically approved, they must stay at the table and cooperate. The Commission has the authority to bring everyone to the table and keep them there. This worked exceptionally well for the Molokai Working Group on Water; I believe a CWRM-convened Waikolu Stream Team will work to develop the best plan possible for Waikolu Stream.

Thank you so much for your patience and assistance.

Sincerely,

Sarah E. Sykes

P.O. Box 370       Kaunakakai, Hawai'i  96748       (808) 553-3831
APPLICATION TO BE A PARTY IN A CONTESTED CASE HEARING BEFORE THE COMMISSION ON WATER RESOURCE MANAGEMENT

NOTE: THIS PETITION IS TO BE FILED IN PERSON OR MAILED AND POSTMARKED WITHIN 10 DAYS OF PUBLIC HEARING OR COMMISSION MEETING AT WHICH THE REQUEST FOR A CONTESTED CASE HEARING IS MADE.

IF MAILED, SEND TO: Commission on Water Resource Management
P.O. Box 621
Honolulu, Hawaii 96809

Please provide the following information:

1. NAME: SARAH E. SYKES PHONE: (808) 553-3831

2. ADDRESS: P.O. Box 370
   Keaau, Hawaii 96749

3. ATTORNEY (IF ANY):

4. ATTORNEY ADDRESS:

   PHONE:

5. SUBJECT MATTER: Water Use Permit (004), Waikoloa Groundwater Management Area, Kohala

6. DATE OF PUBLIC HEARING/COMMISSION MEETING: November 17, 1993

7. LEGAL AUTHORITY: Commission on Water Resource Management

8. WHAT STATUTORY OR OTHER RIGHT OF YOURS IS BEING AFFECTED?
   Right to safe drinking water in perpetuity; right to healthy environment; right to participate in determining what is reasonable and beneficial.

8. SPECIFIC LEGAL ISSUE: Whether or not 004 may continue to divert Waikoloa Stream in spite of constitutional and statutory constraints.

9. PROVIDE YOUR TAX MAP KEY AND THE TAX MAP KEY OF THE PROPERTY
CONSIDERED IN THIS ISSUE. ARE YOU AN ADJACENT OR NEIGHBORING PROPERTY OWNER? DESCRIBE THE NATURE AND EXTENT OF YOUR INTEREST IN THIS MATTER.

10. WHAT IS YOUR SPECIFIC DISAGREEMENT REGARDING THIS ISSUE? Appropriate streamflow standards are currently being violated; contested application, if granted, would significantly degrade habitat and the native island's safe drinking water source. Past actions by applicant indicate unwillingness to value and respect resources for good environment and good economy.

11. OUTLINE THE SPECIFIC ISSUES. Please incorporate by reference all the testimony and written information submitted by petitioner to Day 2 since the initial petition to designate Molokai as a Water Management Area was submitted.

12. OUTLINE OF THE BASIC FACTS: Insufficient information available to enable to conclude whether streamflow standards if permit granted. Current inaction on Permanent instream flow standards petition received prior to contested application. Stream needs the water. HMS needs the water. With better information, possibly all reasonable needs can be met.

13. WHAT RELIEF OR REMEDY DO YOU SEEK: Commence a two-year monitoring cooperative program with petitioner in determining effects of groundwater use confined to within watershed before any water use permit granted or denied. We the Steering Team, Petitioner. Opponents, by reference all oral and written testimony by petitioner at November 12, 1993. Petitioner

If there is not sufficient space to fully answer any of the items noted above, please use additional sheets of paper.

The above-named person hereby requests and petitions the Commission on Water Resource Management for a Contested Case Hearing in the matter described above.

DATED: 11-24-93

[Signature]
Petitioner
State of Hawai‘i-Department of Land and Natural Resources  
Commission on Water Resource Management  
Honolulu, Hawai‘i 96813

RE: Waikolu Valley-Hoolehua Water Management Area

Chairman Ahue and Commissioners,

In the interest of saving time, because I am a co-petitioner for establishing Permanent Instream Flow Standards for Waikolu Stream, please incorporate by reference that petition as part of my testimony. Also, please incorporate by reference all the letters sent to the Commission about Molokai water issues since we first submitted the petition to designate the island a Water Management Area. I would especially appreciate your review of the known hydrogeological facts, and the nature of Molokai's one-to-one ground-surface water relationship relative to north shore's gaining streams.

I support both the National Park Service position in response to this application; and the Molokai Water Working Group recommendations relative to conservation as the first source for additional water supplies, and first seeking water in the sectors of proposed use.

I also support Noelani Joy's recommendation to run a minimum two-year test on Waikolu Stream. Please defer action on that part of the application requesting water use permits for wells #4, #5 and #6 until the test results are in, and mitigation measures have been tested as well. Please require close monitoring of all ecosystem effects of withdrawal on flows for wells #22, #23, #24, so immediate mitigative measures can be applied, if necessary. (However, if the test study group reaches consensus about which wells to test when, please give them authority to turn on even wells #4, or #5, or #6 for test purposes, as necessary.) And please, to make certain the user-community as well as the community-at-large is granted easy and timely access to the data generated, have the suggested test study group report directly and regularly to the Molokai Working Group on Water, as well as to the Molokai Planning Commission. May I suggest consulting with prior identified responsible state and federal agencies as

(con'd.)

P.O. Box 370  
Kaunakakai, Hawai‘i 96748  
(808) 553-3831
well as the USGS and COE in the interest of developing the best test possible. Perhaps the SCS River Basin Study might be expanded to serve as the research umbrella for all testing. May I finally suggest that Noelani Joy be put in charge of keeping all involved working together, since she is a member of the Molokai Planning Commission, the Molokai Working Group on Water, and the Molokai Irrigation System User Advisory Group. She is also a co-petitioner for establishing Permanent Instream Flow Standards for Molokai north shore streams, including Waikolu Stream.

The Permanent Instream Flow Standards petition for Waikolu Stream remains temporarily, cooperatively, on hold. Soon, the Commission’s Stream Protection and Management Plan will be adopted. After that, the Molokai streams petitions must move forward. If we can remain patient in protecting the resource, certainly the non-Homesteader MIS users might be reasonably asked to remain patient while a real test is implemented. This statement of cooperation is not a waiver of any claims regarding the timeliness of appropriate action on the pending petitions.

We know the Homesteaders need the water. We know the land and the life of the land need the water. Their mutual dependence is not mutually exclusive. But, to make the best management decision requires data that doesn’t exist today. Please defer the decision on additional withdrawals, and grant the application for existing use conditional upon installation and monitoring of mitigative measures, as well as cooperative experimental data generation... a realistic cooperative effort.

We may make mistakes in our stewardship of the land and her waters, but we have the capacity to learn from our mistakes and never make them again. This is an opportunity to finally learn enough about Hawai‘i’s few remaining streams to lay the groundwork for real management decision-making models within two years.

If you do not accept this opportunity to do it right on Moloka‘i, then I request an administrative contested case hearing on the matter of DOA’s requested withdrawals at Waikolu Stream.

Thank you for the opportunity to speak with you about this matter on Molokai.

Sarah E. Sykes

P.O. Box 370  Kaunakakai, Hawai‘i 96748  (808) 553-3831
We cannot drink this. The life in the stream cannot live in this. The life of the land cannot live on this. We do not think it is reasonable and beneficial for you to take the water from Waikolu Stream until it is dead and all the life once in it is dead, too. Why don't you go to Manawainui and hold water there for the Homesteaders? Please stop them from killing our streams. Mahalo for listening.

Ryko Henderson
(Caparida/Naki family)
PETITION TO AMEND INTERIM INSTREAM FLOW STANDARD

1. PETITIONER

Name/s  Rachael Kamakana, Noelani Joy, Judy Caparida, Sarah Sykes

Address  Molokai

Contact Person  Any of the above

Telephone  553-5363, 567-6370, 558-8558, 553-3831, respectively

2. PROJECT

Project title  Not applicable; this is a Petition to the Commission to amend the Interim Instream Flow Standards for Waikolu Stream and to initiate the surveys, inventories, and other investigations necessary to establish (Permanent) Instream Flow Standards.

Project location  Not applicable; Petition is to amend the Interim Instream Flow Standards for Waikolu Stream and its tributaries

Stream(s) affected  Waikolu

Tax Map key(s)  Not applicable

Landowner(s)  United States (D.O.I.-NPS), State of Hawai'i

State land use district  Conservation

County Zoning  Conservation
3. EXISTING INSTREAM AND OFFSTREAM WATER USES

Drinking water, irrigation water; critical habitat threatened species
DOWALD-DOA-MIS Pumps, Diversions

4. STREAMFLOW

USGS stream gaging station 16405100, 16405300, 16405500, 16408000

5. PROJECT IMPACT

Not applicable

6. FACTUAL BACKGROUND

From DLNR's "Resource," Volume III, Number 1, February 1992, "All the native freshwater species can be preserved if habitat is protected and a vigorous effort is made to understand the relationships between these species and their supporting ecosystems. Such understanding is prerequisite to management. With a good information base, and decision-makers who give highest priority to the perpetuation of the native biological resources, the survival of these species along with their natural ecosystems should be assured."

Please incorporate, by reference, the May 13, 1992 DLNR-CWWM amendments to the Hawai'i Stream Assessment-Molokai streams, relative to Waikolu stream.

The state doesn't know how much water is in the stream today. Threats to the stream flow are imminent due to potential agricultural development. Before permitting away the rest of the water, before committing funds to projects designed to carry away the water, necessary studies must be done.

7. LEGAL BACKGROUND

Section 174C-71 of the State Water Code requires the Commission to "establish and administer a statewide instream use protection program." Section 174C-71(1) requires the Commission to "establish Instream Flow Standards on a stream-by-stream basis whenever necessary to protect the public interest in the waters of the State," and Section 174C-71(4) requires the Commission to "establish an instream flow program to protect, enhance, and reestablish, where practicable, beneficial instream uses of water. The commission shall conduct investigations and collect instream flow data including fishing, wildlife, aesthetic, recreational, water quality, and ecological information and basic streamflow characteristics necessary for determining instream flow requirements."

The Interim Instream Flow Standard for all streams on Moloka'i -- established by the Commission on June 15, 1988 -- is the amount of water flowing in each stream ("the status quo flow") on the effective date of the standard (June 15, 1988), and as that flow may naturally vary throughout the year and from year to year without further amounts of water being diverted offstream through new or expanded diversion (via groundwater withdrawal or direct surface diversion), and under the stream conditions existing on the effective date of the standard, except as may be modified by certain conditions set forth by the Commission. These conditions are specifically enumerated in the July 18, 1988 memorandum to all interested parties from William W. Paty, Commission Chair.

The Commission has not yet initiated any protection programs for environmentally and culturally significant streams on Moloka'i. Furthermore, Petitioners assert that the Commission has not adequately assessed existing water uses, proposed water uses, Native Hawaiian water rights, Department of Hawaiian Home Lands water rights, appurtenant water rights and the ecological requirements of native stream ecosystems of any Molokai surface water resources.

Based upon additional information or a compelling public need, any person may petition the Commission on Water Resource Management to
amend the interim instream standard to allow future diversion, restoration or other utilization of any streamflow (see June 15, 1988 declaration by the Commission establishing Interim Instream Flow Standards for streams on Molokai). Section 13-169-36 of the Administrative Rules implementing the State Water Code provides that the modification of an existing Interim Instream Flow Standard may be initiated by the Commission, or by a petition to the Commission by any interested person.

Additional and significant information about the value of Waikolu stream has become available to the Commission and is reflected in the Commission's May 13, 1992 DLNR-CWRM amendments to the Hawaii Stream Assessment-Molokai streams. Also, state pumps and diversions have de-watered Waikolu stream on test, and threaten to do so when in full operation.

Also, in light of the Commission's acceptance that Molokai water resources are inter-connected in one aquifer, and that ground-surface water interactions are basically linked in a one-to-one relationship, it is clear to Petitioners that significant threats to the streamflow exist for Waikolu stream.

There is also a compelling public need to amend the Interim Instream Flow Standard for Waikolu stream and to initiate the studies, surveys, inventories and other investigations necessary to establish Permanent Instream Flow Standards. As set forth above, Waikolu stream is an ecologically and culturally significant stream.

Therefore, we submit this Petition to the Commission to amend the Interim Instream Flow Standard for Waikolu Stream and to initiate the studies, surveys, inventories and other investigations necessary to establish Permanent Instream Flow Standards.

(signed and submitted, July 15, 1992)
JOHN WAIHEI
GOVERNOR

TO:

State of Hawaii
DEPARTMENT OF AGRICULTURE
Division of Agricultural Resource Management
Molokai Irrigation System
P. O. Box 208
Hoolehua, HI 96729-0205

FAX TRANSMITTAL

DATE: December 14, 1993
TIME: 

TO: Mr. Roy Hardy
Dept. of Land & Natural Res.
Water Management Division
Honolulu, Hawaii

FROM: Thomas N. Matayoshi

FAX NO.: (808) 567-0219

SUBJECT: Information of HIS Waikolu Valley & Kumulapuu Reservoir

REMARKS: 

Total number of pages (including this page): 2

If you do not receive the total number of pages noted above and/or have problems with our transmission, please contact the sender at (808) 567-6891.
STATE OF HAWAII
DEPARTMENT OF AGRICULTURE
Division of Agricultural Resource Management
Molokai Irrigation System
P.O. Box 205
Hoolehua, HI. 96729-0205

TO: MR. ROY HARDY
FROM: THOMAS MATAYOSHI M.I.S. MANAGER

SUBJECT: INFORMATION ON M.I.S. WAIKOLU VALLEY & KUALAPUU RESERVOIR.

OCT 19, 1982-POWER FAILED TO WELL #23 & #24
AUG. 7, 1984-TEST RUN WELL #22 FOR 24 HOURS. NO RAIN FOR MANY
MONTHS RESERVOIR LEVEL DROPPING LOW.
AUG. 7, 1984-LESS THAN (11) FEET IN THE 1.4 BILLION GALLON
RESERVOIR.
AUG. 29, 1984-RESERVOIR LEVEL DOWN TO 7 FEET 4 INCH.
SEPT. 12, 1984-ASK KALUA-KOI TO HELP PUMP EXTRA WATER INTO THE
RESERVOIR FROM WELL #17. PROBLEM WITH M.I.S. PUMP
# 23.
FEB. 4, 1987-PULL OUT PUMP #23 FOR REPAIR BY ROSCO MOSS CO.
FEB. 12, 1988-INSTALLED CASING TO WELL #4.
APR. 18, 1989-HAUL THE NEW 150 K.V.A. TRANSFORMER TO WAIKOLU
VALLEY TO REPLACE THE OLD 300 K.V.A. TRANSFORMER.
MAY 31, 1989-FINISH INSTALLING AND TEST RUN THE 150 K.V.A.
TRANSFORMER.
JUN. 29, 1989-RESERVOIR LEVEL DOWN TO 7 FEET 4 INCH.
NOV. 6, 1989-STARTED TO FOUNT THE CEMENT CASING TO WELL #5 & #6.
NOV. 6, 1990-STARTED TO LOWER THE RESERVOIR WATER TO DO SOME REPAIR
WORK IN THE KUALAPUU RESERVOIR.
JAN. 3, 1991-STARTED ON RESERVOIR CEMENT LINING WORK.
SEPT. 5, 1991-FINISH THE CEMENT LINING WORK.
NOV. 29, 1991-ELECTRICAL FAILED TO ALL THE WAIKOLU PUMPS.
JAN. 24, 1992-THUMPER TEST THE ENTER HIGH VOLTAGE ELECTRICAL SYSTEM
THROUGH THE TUNNEL AND WAIKOLU VALLEY BY TED'S WIRING
SERVICE AND FOUND THREE ELECTRICAL FAIL.
JAN. 30, 1992-TEST AND FOUND POWER FAILED TO WELL #22. REPAIRED BY
TED'S WIRING SERVICE.
MAR. 11, 1992-TRIP THE RE-CLOSER BY THE EAST-PORTAL (H)-POLE. AGAIN
FOUND POWER FAILED TO WELL #24. (CONTROL-PANEL-FAIL)
JUN. 15, 1992-CONTROL PANEL FOR WELL #24 TOOK 7 MONTHS TO OVER-HAUL
BY PACIFIC ELECTRO-MECHANICAL INC.
MAR 19 TO 23, 1992 REPAIR TO THE SOUTH-EAST CORNER OF KUALAPUU
RESPONDED BY PATTERSON CONSTRUCTION.
JUNE 23, 1992-CALL TED'S WIRING SERVICE AGAIN TO THUMPER TEST THE
WAIKOLU PUMPS. FOUND POWER FAILED BETWEEN THE EAST-
GALLEY AND THE LOWER DIVERSION DAM. RE-SPlice (3)
HIGH-VOLTAGE CABLE BY INNOVATIVE ELECTRICAL INC.
JUN, 9, TO 19, 1992-RE-SPlice ALL THE 480 VOLTAGE CABLE THROUGH THE
5.3 MILL TUNNEL BY INNOVATIVE ELECTRICAL INC. DEC.
17, 1992 POWER FAILED AGAIN. CALLED INNOVATIVE ELECTRICAL INC.
TO RE-CHECK THE ENTIRE ELECTRIC SYSTEM. ALL O.K.
MAY 27, 1993-FOUND THAT ONE OF THE 4 in. STAND-PIPE AT THE END OF
MOOMOMI RIVE, WAS OPEN. ESTIMATED LOSS OF 15 MILLION
GALLON. REPORTED TO THE D.L.N.R. CONSERVATION OFFICER.
SINTER 2, 1993-POWER FAILED AGAIN. TESTED AND FOUND THE HIGH AND LOW
VOLTAGE WIRE TO WELL #23 WAS BAD. REPLACE ALL THE
WIRE TO WELL #23 BY APPLIED TECHNICAL SERVICE INC.
DATE: December 13, 1993

TO: Mr. Roy Hardy
   DLNR
   Water Management
   Honolulu, Hawaii

FROM: Thomas N. Matayoshi
   MOLOKAI IRRIGATION SYSTEM
   DEPARTMENT OF AGRICULTURE

SUBJECT: PUMPING SCHEDULE

REMARKS: Waiting for a reply also from Maui (Molokai) Electric Company.

Total number of pages (including this page): 2

If you do not receive the total number of pages noted above and/or have problems with our transmission, please contact the sender at (808) 567-6891.
STATE OF HAWAII
DEPARTMENT OF AGRICULTURE
AGRICULTURE RESOURCE MANAGEMENT DIVISION
MOLOKAI IRRIGATION SYSTEM (M.I.S.)

#1. CHANGE THE PUMPING SCHEDULE.
PUMP LESS DOING THE SUMMER MONTHS. AS WE KNOW THE SUMMER IS OUR DRY MONTHS.
PUMP MORE DOING THE WINTER MONTHS AS WATER ARE AVAILABLE.

#2. THE PUMPING SCHEDULE WILL BE:

#3. BY DIVIDING THE HOURS:
WE NEED TO PUMP ONLY EIGHT (8) HOURS AT NIGHT.
BY DOING THESE CHANGES WE WOULD PUMP LESS OUT OF ONE WELL.
THE TIME TO RECOVER OR RECHARGE THESE WELLS WILL BE SHORTER.
THE TOTAL NUMBER OF GALLONS PER DAY WILL REMAIN SAME.

#4. THE NEW TELEMETRY SYSTEM WILL ALLOW THE M.I.S. TO CONTROL AND MONITOR:
A. THE PUMPING HOURS.
B. RAIN GAUGE.
C. STREAM FLOW.
D. TUNNEL FLOW. (EAST & WEST PORTAL)
C. MONITOR THE TOTAL NUMBER OF GALLONS FOR EACH WELL.
D. DAM #1 & #2.
E. THE TOTAL NUMBER OF GALLON COMING INTO THE RESERVOIR.
F. THE TOTAL NUMBER OF GALLON GOING OUT OF THE RESERVOIR.
G. THE HEIGHT OF WATER IN THE RESERVOIR. (IN FEET)
H. THE WEATHER TEMPERATURE AT THE RESERVOIR.
I. THE TRANSMISSION LINE FROM THE WEST PORTAL TO THE RESERVOIR CAN DELIVER ONLY 21 MILLION GALLONS OF WATER PER DAY BY THIS SYSTEM THE PUMPS ARE PROGRAM TO GO ON AND OFF AUTOMATICALLY. AS THE TUNNEL FLOW REACHES ITS MAXIMUM CAPACITY THE PUMPS WILL AUTOMATICALLY SHUT DOWN.
IT WILL ALSO START UP AUTOMATICALLY AS THE TUNNEL FLOW DECREASE.
J. THE COMPUTER AT THE M.I.S. OFFICE WILL ALLOW US TO SEE AND PRINT A DAILY REPORT.
FACSIMILE TRANSMITTED PAGE

Please deliver the following pages to:

Name:     STAN MOKAY
Company:  DECKO MOLOKAII
From:     RAY HARRIS
Date:     11/3/91 Time:  11:00 A.M.
Message:
1. INFORMATION FROM WATER USE PERMIT
2. GROUND WATER TRENDS TUMULUS
3. DIFFERENCE IN X-AXIS TIMELINES; IT
   WOULD BE HELPFUL TO SHOW RESERVOIR WORK;
   PUMPS PAUSE PERIODS IF YOU THINK IT AFFECTS
   USES STANDARDS. RIGHT NOW WE ARE LOOKING AT
   RECOMMENDED USES ESTABLISHED PUBLISHED
Total number of pages (including Transmittal Page):

If you did not receive all of the pages legibly, please call back: (808) 587-0274
Sending Facsimile Number:  (808) 587-0219
Receiving Facsimile Number: (546) 507-9014

TRANSMISSION REPORT

THIS DOCUMENT (REDUCED SAMPLE ABOVE) WAS SENT

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# 3

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FACSIMILE TRANSMITTAL PAGE

Please deliver the following pages to:

Name: Tom Matayoshi

Company: DOA MOLOKAI

From: Roy Hardy

Date: 12/9/93 Time: 11:00 A

Message:

1. Stream & En caval Water Use From Wailuku

2. Ground Water Only

Notice Difference in X-Axis Timelines. It

Would Be Helpful To Show Reservoir Work?

Pumpage Problem Periods If You Think It Affects

NIFS Standards. Right Now We Are Looking At

Recommend NIFS Established Published

Total number of pages (including Transmittal Page): 3

* * * * * * *

If you do not receive all of the pages legibly, please call back: (808) 587-0214

Sending Facsimile Number: (808) 587-0219
Receiving Facsimile Number: (808) 587-9014
MIS Ground & Surface Diversions
Annual Averages

[Diagram showing annual diversions with dates and flow rates from 1966 to 1990, noting key events such as Interim Instream Flow Standards Established and Grandfathered Diversions.]

MWG Ground Water Est. = 1.13 mgd

Legend:
- Total = Sur + Ground
- Ground water only

*Note: Long-term ave flow of Waikou Stream = 8.815 mgd (based on 26 years of data from west portal and 30 years of USGS gage station 40555)*
MIS Ground Water Pumpage
Wells 22, 23, 24

Grandfathered Diversions
IIFS Established

MWG Ground Water Est. = 1.13 mgd
Dear Mr. Chairman:

I support the request of residents of Molokai to have a study performed in Waikolu Valley to establish flow characteristics of the stream before additional water is extracted for use in central Molokai.

I am aware that the demand for agricultural and municipal water supply is increasing, and I believe that the Hawaiian community needs to be properly served. Nevertheless it is critical that an understanding of the interplay between water withdrawals from Waikolu and the stream environment be established so that reasonable decisions are made in the future.

Sincerely,

PATSY T. MINK
Member of Congress
24 November 93

Mr. Keith Ahue, Chairperson
Commission on Water Resource Management
State of Hawaii
P.O. Box 621
Honolulu, HI 96809

RE: Application of the Department of Agriculture
Testimony in Favor

We would like to thank you for the opportunity to provide additional written testimony. We were ourselves somewhat confused at the public testimony session on November 17 regarding exactly how many million gallons pumping the commission will consider at its decision making meeting in January. Our current understanding is that the commission will vote on an appropriation of approximately 1.3 million gallons per day and that this is based on the history of pumping in recent years.

Our concern is that this figure is inadequate to meet the needs of the current users of the system. During recent years the reservoir was intentionally lowered to allow for maintenance and pouring of cement. When it was time to restore the reservoir level, problems with the wiring through the tunnel, compounded by budget constraints, prevented normal pumping for a period of almost one year. Thus the reservoir has been on an average declining level for several years and needs to be raised to allow for the normal seasonal rise and decline. Thus the recent historic level of pumping will not sustain the current level of agriculture.

We would like to note that the MIS serves as a public utility and needs to be able to accommodate new requests for service. Subdivision of agricultural lands by the Hawaiian Homes Commission in recent years has and will continue to result in new requests for service. The system has pending requests for additional water. We would hope that at a minimum, the commission will approve the pumping of an amount adequate to refill the reservoir and allow pumping for the system to deliver about ten percent more than recent years.

We thank you for your consideration. We are looking forward to additional dialogue as we petition for additional source to meet Molokai's anticipated agricultural growth.

Sincerely,

Baron Okimoto, President
CONOBSSION ON WATER RESOURCE MANAGEMENT

FROM: 

DATE: 11/29/93

FILE IN: 

TO: INITIALS

G. Matsumoto
E. Sakoda
Y. Shiroma
E. Hirano
D. Higa
G. Bauer
R. Hardy

PLEASE:

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

FOR YOUR:

Approval
Signature
Information

For 0855-01 to 6 files (copies attached).
Kiko was so shaken by the experience of public speaking, she can't recall if she handed in her testimony. Thus, per Mr. Stina's direction, enclosed please find ten copies of her statement as stated orally at the 11-17-93 public meeting of CWRM on Molokai at MPC, 6 pm - 10 pm.

Mahalo nui,

[Signature]

Sarah E. Sykes
We cannot drink this. The life in the stream cannot live in this. The life of the land cannot live on this. We do not think it is reasonable and beneficial for you to take the water from Waikolu Stream until it is dead and all the life once in it is dead, too. Why don't you go to Manawainui and hold water there for the Homesteaders? Please stop them from killing our streams. Mahalo for listening.

Ryko Henderson
(Caparida/Naki family)
The National Park Service (Service) has objected to the application for water use permit by the Hawaii, Department of Agriculture, Agricultural Resource Management Division, to divert ground water from Waikolu Stream, Molokai, within Kalaupapa National Historical Park. The Service has requested denial of this Application in an August 26, 1993, letter to the Deputy Director of the Commission on Water Resource Management. The Service submitted its objection for the following reasons:

The Department of Agriculture is presently operating a system of wells and surface water diversions along a reach of Waikolu Stream within Kalaupapa National Historical Park. The Department's present diversions greatly reduce flows in Waikolu Stream, especially during the drier summer months. At times, the stream is dewatered in sections from the upper surface water diversion to just below the pumphouse due to those diversions.

The Application by the Department is for ground water diversions for existing and new wells for agricultural irrigation uses. The proposed additional diversions can only further extend the period of dewatering and, possibly, expand the dewatered portion of the stream. The proposed decrease in surface water flows will adversely affect the scenic, aquatic and historical (interpretive) resources within the Kalaupapa National Historical Park.
The National Park Service holds that the altered stream flows will have detrimental effects on the aquatic species found in Waikolu Stream. Presently, the National Park Service is conducting studies to determine the impacts of stream diversion upon selected aquatic species within Waikolu Stream. Aquatic macrofauna which are being studied include several species of 'opae, hihiwai and 'o'opu. As you may be aware, the U.S. Fish and Wildlife Service has been petitioned to list 'o'opu alamo'o as a threatened species. These species are described in greater detail in the Service's August 26, objection.

The National Park Service also plans to reestablish the cultivation of Native Hawaiian food crops and other plants important to Native Hawaiian culture and religion in Waikolu Valley for purposes of interpretation of the historical scene. As a result, there may be appurtenant water rights and traditional and customary rights associated with these uses as described in Chapter 174C-101 of the State Water Code. The Service holds that these Native Hawaiian Water Rights will be impaired as a result of the appropriation proposed by this Application.

As you know, an interim instream flow standard was adopted by the Commission on June 15, 1988, for all streams on Molokai, including Waikolu Stream. The Commission protected "...that amount of water flowing in each stream on the effective date of this standard, and as that flow may naturally vary throughout the year and from year to year without further amounts of water being diverted offstream through new or expanded diversions, and under
the stream conditions existing on the effective date of the
standard,...".

The Hawaii revised Statutes, Chapter 13-169-2, defines an
"Instream flow standard" as "...a quantity or flow of water or
depth of water which is required to be present at a specific
location in a stream system at certain specified times of the year
to protect aquatic life, wildlife, recreational, aesthetic, scenic,
and other beneficial instream uses". Beneficial instream uses are
defined by Statute to include: "Maintenance of aquatic life and
wildlife habitats; Outdoor recreational activities; Maintenance of
ecosystems such as estuaries, wetlands, and stream vegetation;
Aesthetic values such as waterfalls and scenic waterways; (and) The
protection of traditional and customary Hawaiian rights".

The Service recognizes that surface water diversions and three
wells were in place in Waikolu Stream prior to the effective date
of the interim standard. However, authorization to pump additional
ground water from the three new wells covered by this Application
conflicts with the purpose for which the interim standard was
established. The Department of Agriculture recognized this
conflict in its Application by admitting, in response to question
15(b), that the interim instream flow standard would be affected
"during the summer when rainfall is less".

In addition to the foregoing, the Department's application is
defective. In the response to question 8, "QUANTITY OF WATER
REQUESTED: ", the Department stated "3,360,000 gallons per day (or
20 hours per day". In response to Question 15 "(a) Impact on
Sustainable yield (?):", the Department stated "7,488,000 gallons per day". The Application should be returned to the Department to rectify this discrepancy.

After submitting its Objection to the Department's Application, the National Park Service learned from the Water Resource Protection Plan (1992), published by the Commission on Water Resource Management, that the total amount of water applied for will be greater than the basin's estimated sustainable yield. The Plan estimates the sustainable yield from the Waikolu Aquifer to be 5 million gallons per day of high level water. The Department's application exceeds the State's estimated sustainable yield by 2.488 million gallons per day. This overdraft of water, if approved, will almost certainly result in decreased surface water flows in Waikolu Stream and will detrimentally effect those attributes which the National Park Service is charged to protect in Kalaupapa National Historical Park.

As I mentioned previously, the National Park Service is conducting studies designed to determine the impacts of water diversion upon the streamflow-dependant aquatic resources in Waikolu Stream. Baseline population surveys and data on habitat use and stream discharge are being collected to make it possible to assess impacts from streamflow depletion. These studies were only recently initiated, and several years will be required before the results can be used to answer management questions.

Therefore, while the National Park Service lacks the necessary data to describe the impacts of present levels of diversion, its
on-going research is expected to provide the information to make such an assessment. Once the National Park Service has scientific information in hand, it will re-evaluate its position with regard to existing and future diversions. However, even without research results, the Service cannot condone the dewatering of portions of Waikolu Stream.

As mitigation of dewatering effects, fish ladders have been considered for Waikolu Stream. While the Service supports the objective to be served, the effectiveness of such devices is uncertain according to available research. The National Park Service supports construction and testing of a fish ladder in Waikolu Stream, however, an increase in the amount of water diverted during this testing would likely aggravate an already difficult situation. Further increases in diversion should not occur until such time as scientifically sound assessments of impact are in hand.

The Service is opposed to any further appropriations of water within the Waikolu surface and ground water system until substantial scientific evidence can show that existing and proposed diversions will not affect the water-related resources of Kalaupapa National Historical Park.

In sum, for the aforementioned reasons the proposed water uses by the Department of Agriculture is not in the public interest and the application should be DENIED. At such time as credible scientific studies reveal that diversion will cause no harm to water-dependent resources, both biotic and cultural, in Waikolu
Basin, the Department of Agriculture may again apply for a water use permit.

The National Park Service appreciates this opportunity to offer comments for the Commission's consideration. If we may be of further assistance, please feel free to contact either the local National Park Service office at Kalaupapa, the area office in Honolulu, or the Water Resources Division office in Colorado.
TELECOPIER TRANSMITTAL SHEET

DATE
11/26/93

TELECOPIER TO:
Kieth Ahne via Rae Loui
687-0219

SENDER NAME:
Tom Hill for
Molokai Farm Bureau

SENDER TELEPHONE: (808) 553-3330

NUMBER OF PAGES
(including cover) 2

COMMENTS: Original will be
sent by mail today

Thank you
24 November 93

Mr. Keith Ahue, Chairperson
Commission on Water Resource Management
State of Hawaii
P.O. Box 621
Honolulu, HI 96209

RE: Application of the Department of Agriculture
Testimony in Favor

We would like to thank you for the opportunity to provide additional written testimony. We were ourselves somewhat confused at the public testimony session on November 17 regarding exactly how many million gallons pumping the commission will consider at its decision making meeting in January. Our current understanding is that the commission will vote on an appropriation of approximately 1.3 million gallons per day and that this is based on the history of pumping in recent years.

Our concern is that this figure is inadequate to meet the needs of the current users of the system. During recent years the reservoir was intentionally lowered to allow for maintenance and pouring of cement. When it was time to restore the reservoir level, problems with the wiring through the tunnel, compounded by budget constraints, prevented normal pumping for a period of almost one year. Thus the reservoir has been on an average declining level for several years and needs to be raised to allow for the normal seasonal rise and decline. Thus the recent historic level of pumping will not sustain the current level of agriculture.

We would like to note that the MIS serves as a public utility and needs to be able to accommodate new requests for service. Subdivision of agricultural lands by the Hawaiian Homes Commission in recent years has and will continue to result in new requests for service. The system has pending requests for additional water. We would hope that at a minimum, the commission will approve the pumping of an amount adequate to refill the reservoir and allow pumping for the system to deliver about ten percent more than recent years.

We thank you for your consideration. We are looking forward to additional dialogue as we petition for additional source to meet Molokai’s anticipated agricultural growth.

Sincerely,

Baron Okimoto

Baron Okimoto, President
(TESTIMONY OF NATIONAL PARK SUPERINTENDENT, PETER THOMPSON,
KALAUPAPA NATIONAL HISTORICAL PARK, NOVEMBER 17, 1993 BEFORE THE
STATE COMMISSION ON WATER RESOURCES MANAGEMENT CONCERNING A PERMIT
APPLICATION TO ACTIVATE NEW WELLS IN WAIKOLU STREAM).

WE HAVE NEVER LEARNED TO ASSIGN A VALUE TO THE EARTH, OR THE
SKY, CLEAN WATER OR CLEAN AIR. WE DO ASSIGN VALUE TO WHAT WE DO TO
THE EARTH.

WAIKOLU STREAM HAS NO ECONOMIC VALUE AS IT FLOWS INTO THE SEA.
IT SUPPORTS A LARGE COMMUNITY OF ANIMALS AND PLANTS, AND WAS USED
HISTORICALLY AS A WATER SOURCE FOR KALAUPAPA, AND PREHISTORICALLY
AS A WATER SOURCE FOR A COUPLE HUNDRED ACRES OF LO'I.

WAIKOLU STREAM BEGAN TO HAVE ECONOMIC VALUE WHEN THE
DIVERSIONS AND FIRST WELLS WERE PUT IN OPERATION IN 1970. SINCE THEN SEVERAL MILLION GALLONS A DAY HAVE BEEN REMOVED TO THE BIG
POND AT KUALAPUU.

BEGINNING IN 1973 THE STREAM BEGAN TO DRY UP BELOW THE
DIVERSIONS FOR THE FIRST TIME IN HUMAN MEMORY.

IN 1980 KALAUPAPA NHP WAS ESTABLISHED AND BY 1985 THE NPS HAD
PUT IN PLACE A NEW WELL IN WAIHANAU TO REPLACE THE SURFACE WATER
SYSTEM IN WAIKOLU THAT HAD BEEN IN PLACE SINCE DAMIEN'S TIME.
THIS UNCONSCIOUS SIGNAL (THAT THE PATIENT COMMUNITY AT KALAUPAPA NO
LONGER NEEDED THE STREAM) MAY HAVE HELPED THE STATE DECIDE TO DRILL
THREE MORE WELLS IN 1988 AND INSTALL PUMPS AND TELEMETRY WITH WHICH
TO CONTROL THEM IN 1991 AND '92. NOW THEY ARE READY TO GO. THEIR
PERMIT APPLICATION TO PUMP THESE WELLS IS BEFORE YOU TODAY.

I BELIEVE THE EQUATION IS SIMPLE: IF THE PERMIT AS WRITTEN IS
ISSUED, WAIKOLU STREAM WILL BE DRAINED.

FOR YEARS THE MOLOKAI IRRIGATION SYSTEM (MIS) HAS BEEN
EXTRACTING SOME WATER. AS PARK SUPERINTENDENT I DO NOT OBJECT TO
THAT, AS IT HAS NOT YET BEEN DEMONSTRATED THAT TAKING 3 OR 4 MGD IS
JEOPARDIZING THE LIVES OF CREATURES THAT LIVE IN AND AROUND THE
STREAM. I DO NOT CONDONE THE DEWATERING WHICH HAS TAKEN PLACE.

SINCE 1988 THE STATE HAS BEEN BUSY DEVELOPING WAIKOLU,
PREPARING TO TAKE ALOT OF WATER. IT HAS DRILLED THREE NEW WELLS,
PLACED PUMPS ON ALL, AND INSTALLED HUNDREDS OF THOUSANDS DOLLARS
WORTH OF TELEMETRY SO THAT THE WHOLE SYSTEM CAN BE CONTROLLED FROM
HOOLEHUA.

DID THE PUBLIC KNOW THAT MORE WELLS WERE BEING ADDED,
INSTALLED WITH TAXPAYER DOLLARS IN ADEQUATE NUMBERS TO DRAIN
WAIKOLU? WHY WASN'T AN ENVIRONMENTAL IMPACT STATEMENT PREPARED?
IT IS ABSOLUTELY REQUIRED UNDER THE NATIONAL ENVIRONMENTAL
PROTECTION ACT WHENEVER A DEVELOPMENT IS PROPOSED ON FEDERAL LANDS
OR USES FEDERAL MONEY. D.O.T. AIRPORTS WENT THROUGH THE ENTIRE
E.I.S. PROCESS AS PART OF THE KALAUPAPA AIRPORT REPAIR PROJECT TWO
YEARS AGO. WHY ISN'T THE DEPARTMENT OF AGRICULTURE REQUIRED TO GO
THROUGH A SIMILAR PROCESS TO ACTIVATE WELLS EXPRESSLY INSTALLED TO
DRAIN THE ONLY PERRENIAL STREAM IN THE ONLY NATIONAL PARK ON
MOLOKAI?
NATIONAL PARKS MIGHT BE ONE OF THE BEST IDEAS THAT ANYBODY EVER HAD. AS NATIONAL PARK SUPERINTENDENT I CANNOT STEP ASIDE AND LET ALL THE WATER FROM THE ONLY SIGNIFICANT STREAM IN KALAUPAPA NATIONAL HISTORICAL PARK DISAPPEAR. WHATEVER THE VALUE IS OF A FREEFLOWING STREAM, IT WILL BE LOST IF THE PUMPS ON WELLS 04, 05 AND 06 ARE TURNED ON.

I REQUEST THAT YOU DENY PERMISSION TO TURN ON WELLS 04, 05, AND 06, AND REQUIRE A FULL BLOWN ENVIRONMENTAL IMPACT STATEMENT, ON THEIR INSTALLATION AND OPERATION. THIS PROCESS WILL ALLOW ALL CONCERNED CITIZENS ACCESS TO ALL THAT IS KNOWN OF THE PROBABLE IMPACTS OF TURNING ON OR NOT EVER TURNING ON, THOSE WELLS. I FURTHER REQUEST THAT THE PUMPS WHICH MAY BE ALREADY INSTALLED ON 4, 5, AND 6 BE REMOVED AS A GOOD FAITH GESTURE UNTIL AND UNLESS THEIR USE IS APPROVED THROUGH THE REQUESTED E.I.S. PROCESS.
State of Hawai‘i-DLNR  
Commission on Water Resource Management  
ATTN: Rae Loui, Deputy Director  
P.O. Box 621  
Honolulu, Hawai‘i  96809  

Dear Ms. Loui,

Response to Department of Agriculture testimony re: Water Use Permit, Waikolu Groundwater Management Area, Molokai:

Beginning with Mr. Kitagawa's cover memo, I take issue with his statement in defense of the permit application being granted: "The Department of Agriculture asks that the Commission consider... based only on environmental benefits.” The National Environmental Policy Act of 1969 established that environmental concerns are to be considered with scientific evidence, without pressure from economic motivations. While the Commission on Water Resource Management holds tremendous authority in the State of Hawai‘i, I do not believe that authority is so great that it may purposely violate federal law. Slowly, perhaps too slowly, we approach the realization that a healthy economy requires a healthy environment. The challenge is not jobs or environment... it is to establish a balance promoting good jobs in a good environment.

Re: Response to DAR Concerns:

(1) "The MIS will make allowances..." Pumping and diversions historically have degraded and dewatered Waikolu Stream, but DOA has not admitted this, and there is no assurance they will do so now or in the future if their water permit application is approved.

(2) "The construction...wetted channel..." This may not be the best solution relative to maintaining the habitat, maintaining appropriate streamflow. It may not be enough to support lifeforms' migration to ocean and return. It may not be enough to support food production on which lifeforms depend. Not enough is yet known to determine what will work.
(3) "We are awaiting details for the monitoring program...." Monitoring alone is not enough. Without constant monitoring, measuring, reporting, decision-making, trials and tests, over time, irreversible damage may be done to the stream for which no restorative measures may succeed.

(4) "The MIS is not contemplating...." The wet season flows may be the key to continuing recruitment and streamlife replenishment. They are known to be key to completing the reproduction cycle as eggs and larvae are carried to the ocean in the floodflows. They may not be available for "harvesting." Would certainly rather see DOA fix the leaks throughout the system, and mandate lower usage, even setting limits appropriate to less water-consuming crops than are currently grown. DOA references "dike-confined compartments," using the term to imply intact, well-cased-type geological structures. 'Taint true for Molokai north shore. The dikes weep, seep, emit springflows. They are all interconnected, and ultimately interconnected to the entire water-bearing rock of Molokai. The water collected in these dikes ultimately flows downgradient to the Kualapuu aquifer, among other places. This is where so many of the island's wells draw the residents' drinking water. If too much is taken from the source, it's obvious what DOA's diversions and pumping risk for the entire island.

Re: Response to NHAC:

(4) "The only stream...." There used to be three distinct streams in Waikolu watershed, as well as many springs. There are no other streams because the DOA (and possibly the Molokai Ranch mountain) diversions have dewatered them.

(6) "There are no other legal uses...." I believe instream flows, and the lifeforms supported by the habitat instream flows provide, are recognized legal uses of the water.

(8) "Lastly, NHAC states '... defers their objections...."' Homesteaders on Molokai were told point-blank by DOA that if this permit was opposed in any way, DOA would shut down the MIS.

(con'd.)

P.O. Box 370      Kaunakakai, Hawai'i  96748   (808) 553-3831
Sarah E. Sykes

Re: Response to NPS objections:

(2) "In relation to their objections... We already have the solutions to these concerns and are preparing to put them into action." Oh, yeah? I do not know from whence DOA has obtained their data, but DOWALD was convinced 20 MGD would be produced by the tunnel (they only consistently get about 1 MGD); they were certain the wells could produce 6 MGD without any measurable effect on Waikolu Stream (they dewatered it test-pumping only one new pump); and they were convinced there’s 83 MGD available on Molokai for development when the last people to actually measure it (USGS, 1935) gave an optimistic estimate of 55 MGD total for the island. And that amount leaves none for maintaining streamflow or normally increasing domestic use. I am not at all convinced they know what they’re talking about, and certainly don’t want to put the fox in charge of the henhouse.

(4) "The NPS indicates...." Please incorporate by reference Catherine C. Summers Waikolu references found in "Molokai: A Site Survey, 1971." The index indicates pertinent materials on pages 2, 25, 145, Ko’olau divider, 185-188, 209 and 214. In the Ko’olau divider section, see page 158.

(5) "We are bothered by the instream flow...." Interim Instream Flow Standards, at status quo flows, were adopted by the Commission on Water Resource Management prior to the submittal of this water use permit application. There is a pending petition to establish Permanent Instream Flow Standards to protect Waikolu Stream from unnecessary degradation, and perhaps return inappropriately diverted flows (mitigating both surface and groundwater negative effects). The Commission has a statutory mandate, reflecting a constitutional mandate, to protect Hawai’i’s few remaining streams regardless of economic considerations.

Re: Closing arguments:

(1) "The MIS requests the approval...." In my simple homemaker view of the world, I truly believe dewatering Waikolu Stream and eliminating most of the springflows are adverse environmental impacts. The tunnel alone impacts negatively on the environment!

(con’d.)
P.O. Box 370  Kaunakakai, Hawai’i  96748  (808) 553-3831
(2) "All of the objections..." Baseline date development is exactly what is needed, and until it is in the hands of those responsible for decision-making, these permits should remain on hold. To do so does not negatively impact on the Homesteaders' use of the water, since no one is being required to shut down until all water use permits are approved.

(3) "The MIS has the capability..." Who is using the water? If increased amounts of water are needed to grow watermelons in a desert environment, I object! This system is supported with taxpayer dollars. There is no "Right to make money at the expense of all around you, including the environment" in the Bill of Rights. Such a "right" does not even exist in the Hawai'i Constitution. Leak repair has not been a priority. It was difficult to get DOW ALD, during their administration of the system, to even admit leaks might exist.

(4) "In closing..." Waikolu Stream has regularly purposely been dewatered by the applicant. A balanced flow regime is desirable but no one in the state currently knows what constitutes a balanced flow regime and I do not trust DOA to be the arbiter of what constitutes balance. Molokai's economy might or might not benefit from the approval of this water use permit. Malihini investor's personal economy looks more like the probable beneficiaries. The other consideration must be Molokai's clearly expressed need to malama 'aina, malama pono.

Please, make a Waikolu Stream Team and defer action on this application for at least two years, until they have reported and recommended the best possible management practices in favor of all the land and people of Molokai.

Sincerely,

Sarah E. Sykes

P.O. Box 370    Kaunakakai, Hawai'i  96748    (808) 553-3831
State of Hawai‘i-DLNR
Commission on Water Resource Management
ATTN: Rae Loui, Deputy Director
P.O. Box 621
Honolulu, Hawai‘i  96809

Dear Ms. Loui,

Enclosed please find a completed Contested Case Application form, as provided by your office. Attached to the completed form, and to be considered part of the application, are a copy of my testimony and the reference copy of the July 15, 1992 petition to establish Permanent Instream Flow Standards for Waikolu Stream.

Because I read the testimony on November 17, 1993 at the Molokai meeting of the Commission on Water Resource Management, I hope it is only necessary for me to sign the Contested Case Application. I consulted with, and obtained the approval of Noelani Joy, Rachael Kamakana and Judy Caparida to proceed. This was necessary because all four of us are affected. Noelani Joy is a Homesteader who relies on Molokai Irrigation System (MIS) water from Waikolu watershed. Rachael Kamakana is a Kalamaula Homesteader who one day should be served by the MIS. Judy Caparida remains on the DHHL waiting list for her Homestead. I live on Molokai, so my safe drinking water is at risk if the aquifer is degraded by over-pumping. Also, living in Wailau, I know streams in that valley are at risk if the pumping is allowed to proceed without better information about the potential negative effects of significant drawdowns. If island residents are only offered “monitoring” of the devastation at Waikolu, then there truly is no citizen input to what is reasonable and beneficial in their estimation.

I read something in a book by Thor Heyerdahl about progress. It’s so close to what I believe, and the situation we face today, I’d like to quote him here. He said, “It is progress when a farmer leaves his hoe and a fisherman his net to step on to an assembly line the day the cornfield is leased to industry, which needs the river as its sewer. It is progress when
Sarah E. Sykes

cities grow bigger and fields and forests smaller ... When children get a sidewalk in exchange for a meadow, when the fragrance of flowers and the view of hills and forests are replaced by air conditioning and a view across the street. It is progress when a centuries-old oak is cut down to give space for a road sign ... Nothing in all the "progressive" procedure that modern man, helped by all his modern middle-men, goes through before he earns money to buy a fish or a potato will ever be as simple as pulling them out of the water or the soil. Without the farmer and the fisherman who share their crumbs with the rest of us, modern "progressive" society would collapse ... the rest of us who run about with papers and screwdrivers, attempting to build a better world without a blueprint."

We cannot manage what we do not understand. We do not understand enough about Hawai'i stream ecosystems (including "available" water for withdrawal) to make a reasonable determination of what should or should not be permitted to be taken from the Waikolu watershed.

My request is not to stop all the pumping, to dismantle all the diversions ... it is a plea to take the time to do this right. Department of Agriculture, Department of Water and Land Development have never before been willing to share data, share initial assumptions, share management authority. So long as their permits are not automatically approved, they must stay at the table and cooperate. The Commission has the authority to bring everyone to the table and keep them there. This worked exceptionally well for the Molokai Working Group on Water; I believe a CWRM-convened Waikolu Stream Team will work to develop the best plan possible for Waikolu Stream.

Thank you so much for your patience and assistance.

Sincerely,

Sarah E. Sykes

P.O. Box 370  Kaunakakai, Hawai'i 96748  (808) 553-3831
APPLICATION TO BE A PARTY IN A CONTESTED CASE HEARING
BEFORE THE COMMISSION ON WATER RESOURCE MANAGEMENT

NOTE: THIS PETITION IS TO BE FILED IN PERSON OR MAILED AND POSTMARKED WITHIN
10 DAYS OF PUBLIC HEARING OR COMMISSION MEETING AT WHICH THE REQUEST
FOR A CONTESTED CASE HEARING IS MADE.

IF MAILED, SEND TO: Commission on Water Resource Management
P.O. Box 621
Honolulu, Hawaii 96809

Please provide the following information:

1. NAME: SARAH E. SYKES          PHONE: (808) 553-3383

2. ADDRESS: P.O. Box 370
Kauna'akakai, Hawaii 96748

3. ATTORNEY (IF ANY):

4. ATTORNEY ADDRESS:

5. SUBJECT MATTER: Water Use Permit (DoA) Waikoloa Groundwater Management Area, Holualoa

6. DATE OF PUBLIC HEARING/COMMISSION MEETING: November 19, 1998

7. LEGAL AUTHORITY: Commission on Water Resource Management

8. WHAT STATUTORY OR OTHER RIGHT OF YOURS IS BEING AFFECTED?
Right to safe drinking water in perpetuity; right to healthy environment; right to participate in determining what is reasonable and beneficial.

9. SPECIFIC LEGAL ISSUE: Whether or not DoA may continue to divert Waikoloa Stream in spite of constitutional and statutory constraints.

9. PROVIDE YOUR TAX MAP KEY AND THE TAX MAP KEY OF THE PROPERTY
CONSIDERED IN THIS ISSUE. ARE YOU AN ADJACENT OR NEIGHBORING PROPERTY OWNER? DESCRIBE THE NATURE AND EXTENT OF YOUR INTEREST IN THIS MATTER.

Please see attached letter and background information.

10. WHAT IS YOUR SPECIFIC DISAGREEMENT REGARDING THIS ISSUE? Appropriate streamflow standards are currently being violated. A contested application, if granted, would significantly degrade habitat and threatened wildlife, as well as community water source. Past actions by applicant indicate unwillingness to conserve resources for good environment and good economy.

11. OUTLINE THE SPECIFIC ISSUES. Please incorporate the referenced written testimony and evidence submitted by petitioner to demonstrate the initial petition to designate Metropolitan Water Management Area was submitted.

12. OUTLINE OF THE BASIC FACTS: Insufficient information available to clearly to consider information from due process. If permit granted, covers injection or removal of water. All standards petition received prior to contested application. Store needs the water, there are others who need the water. With better information, possibly all reasonable needs can be met.

13. WHAT RELIEF OR REMEDY DO YOU SEEK: Deny two-year mandatory cooperative pumping test study determining effects of groundwater withdrawal in water. And that the water will be permitted or denied -- unless that decision incorporated by reference -- all oral and written testimony by petitioner at November 12, 1993 county meeting on Mattie.

If there is not sufficient space to fully answer any of the items noted above, please use additional sheets of paper.

The above-named person hereby requests and petitions the Commission on Water Resource Management for a Contested Case Hearing in the matter described above.

DATED: 11-24-93

Petitioner
State of Hawai‘i-Department of Land and Natural Resources
Commission on Water Resource Management
Honolulu, Hawai‘i 96813

RE: Waikolu Valley-Hoolehua Water Management Area

Chairman Ahue and Commissioners,

In the interest of saving time, because I am a co-petitioner for establishing Permanent Instream Flow Standards for Waikolu Stream, please incorporate by reference that petition as part of my testimony. Also, please incorporate by reference all the letters sent to the Commission about Molokai water issues since we first submitted the petition to designate the island a Water Management Area. I would especially appreciate your review of the known hydrogeological facts, and the nature of Molokai’s one-to-one ground-surface water relationship relative to north shore’s gaining streams.

I support both the National Park Service position in response to this application; and the Molokai Water Working Group recommendations relative to conservation as the first source for additional water supplies, and first seeking water in the sectors of proposed use.

I also support Noelani Joy’s recommendation to run a minimum two-year test on Waikolu Stream. Please defer action on that part of the application requesting water use permits for wells #4, #5 and #6 until the test results are in, and mitigation measures have been tested as well. Please require close monitoring of all ecosystem effects of withdrawal on flows for wells #22, #23, #24, so immediate mitigative measures can be applied, if necessary. (However, if the test study group reaches consensus about which wells to test when, please give them authority to turn on even wells #4, or #5, or #6 for test purposes, as necessary.) And please, to make certain the user-community as well as the community-at-large is granted easy and timely access to the data generated, have the suggested test study group report directly and regularly to the Molokai Working Group on Water, as well as to the Molokai Planning Commission. May I suggest consulting with prior identified responsible state and federal agencies as

(con’d.)

P.O. Box 370 Kaunakakai, Hawai‘i 96748 (808) 553-3831
well as the USGS and COE in the interest of developing the best test possible. Perhaps the SCS River Basin Study might be expanded to serve as the research umbrella for all testing. May I finally suggest that Noelani Joy be put in charge of keeping all involved working together, since she is a member of the Molokai Planning Commission, the Molokai Working Group on Water, and the Molokai Irrigation System User Advisory Group. She is also a co-petitioner for establishing Permanent Instream Flow Standards for Molokai north shore streams, including Waikolu Stream.

The Permanent Instream Flow Standards petition for Waikolu Stream remains temporarily, cooperatively, on hold. Soon, the Commission's Stream Protection and Management Plan will be adopted. After that, the Molokai streams petitions must move forward. If we can remain patient in protecting the resource, certainly the non-Homesteader MIS users might be reasonably asked to remain patient while a real test is implemented. This statement of cooperation is not a waiver of any claims regarding the timeliness of appropriate action on the pending petitions.

We know the Homesteaders need the water. We know the land and the life of the land need the water. Their mutual dependence is not mutually exclusive. But, to make the best management decision requires data that doesn't exist today. Please defer the decision on additional withdrawals, and grant the application for existing use conditional upon installation and monitoring of mitigative measures, as well as cooperative experimental data generation... a realistic cooperative effort.

We may make mistakes in our stewardship of the land and her waters, but we have the capacity to learn from our mistakes and never make them again. This is an opportunity to finally learn enough about Hawaii's few remaining streams to lay the groundwork for real management decision-making models within two years.

If you do not accept this opportunity to do it right on Molokai, then I request an administrative contested case hearing on the matter of DOA's requested withdrawals at Waikolu Stream.

Thank you for the opportunity to speak with you about this matter on Molokai.

Sarah E. Sykes

P.O. Box 370 Kaunakakai, Hawaii 96748 (808) 553-3831
We cannot drink this. The life in the stream cannot live in this. The life of the land cannot live on this. We do not think it is reasonable and beneficial for you to take the water from Waikolu Stream until it is dead and all the life once in it is dead, too. Why don't you go to Manawainui and hold water there for the Homesteaders? Please stop them from killing our streams. Mahalo for listening.

Ryko Henderson
(Caparida/Naki family)
PETITION TO AMEND INTERIM INSTREAM FLOW STANDARD

1. PETITIONER

Name/s Rachael Kamakana, Noelani Joy, Judy Caparida, Sarah Sykes
Address Molokai
Contact Person Any of the above
Telephone 553-5363, 567-6370, 558-8558, 553-3831, respectively

2. PROJECT

Project title Not applicable; this is a Petition to the Commission to amend the Interim Instream Flow Standards for Waikolu Stream and to initiate the surveys, inventories, and other investigations necessary to establish (Permanent) Instream Flow Standards.

Project location Not applicable; Petition is to amend the Interim Instream Flow Standards for Waikolu Stream and its tributaries

Stream(s) affected Waikolu
Tax Map key(s) Not applicable
Landowner(s) United States (D.O.I.-NPS), State of Hawai‘i
State land use district Conservation
County Zoning Conservation
3. EXISTING INSTREAM AND OFFSTREAM WATER USES

Drinking water, irrigation water; critical habitat threatened species
DOWALD-DOA-MIS Pumps, Diversions

4. STREAMFLOW

USGS stream gaging station 16405100, 16405300, 16405500.
16408000

5. PROJECT IMPACT

Not applicable

6. FACTUAL BACKGROUND

From DLNR's "Resource," Volume III, Number 1, February 1992, "All the native freshwater species can be preserved if habitat is protected and a vigorous effort is made to understand the relationships between these species and their supporting ecosystems. Such understanding is prerequisite to management. With a good information base, and decision-makers who give highest priority to the perpetuation of the native biological resources, the survival of these species along with their natural ecosystems should be assured."

Please incorporate, by reference, the May 13, 1992 DLNR-CWRM amendments to the Hawai'i Stream Assessment-Molokai streams, relative to Waikolu stream.

The state doesn't know how much water is in the stream today. Threats to the stream flow are imminent due to potential agricultural development. Before permitting away the rest of the water, before committing funds to projects designed to carry away the water, necessary studies must be done.

7. LEGAL BACKGROUND

Section 174C-71 of the State Water Code requires the Commission to "establish and administer a statewide instream use protection program." Section 174C-71(1) requires the Commission to "establish Instream Flow Standards on a stream-by-stream basis whenever necessary to protect the public interest in the waters of the State," and Section 174C-71(4) requires the Commission to "establish an instream flow program to protect, enhance, and reestablish, where practicable, beneficial instream uses of water. The commission shall conduct investigations and collect instream flow data including fishing, wildlife, aesthetic, recreational, water quality, and ecological information and basic streamflow characteristics necessary for determining instream flow requirements."

The Interim Instream Flow Standard for all streams on Moloka'i -- established by the Commission on June 15, 1988 -- is the amount of water flowing in each stream ("the status quo flow") on the effective date of the standard (June 15, 1988), and as that flow may naturally vary throughout the year and from year to year without further amounts of water being diverted offstream through new or expanded diversion (via groundwater withdrawal or direct surface diversion), and under the stream conditions existing on the effective date of the standard, except as may be modified by certain conditions set forth by the Commission. These conditions are specifically enumerated in the July 18, 1988 memorandum to all interested parties from William W. Paty, Commission Chair.

The Commission has not yet initiated any protection programs for environmentally and culturally significant streams on Moloka'i. Furthermore, Petitioners assert that the Commission has not adequately assessed existing water uses, proposed water uses, Native Hawaiian water rights, Department of Hawaiian Home Lands water rights, appurtenant water rights and the ecological requirements of native stream ecosystems of any Molokai surface water resources.

Based upon additional information or a compelling public need, any person may petition the Commission on Water Resource Management to
amend the interim instream standard to allow future diversion, restoration or other utilization of any streamflow (see June 15, 1988 declaration by the Commission establishing Interim Instream Flow Standards for streams on Moloka'i). Section 13-169-36 of the Administrative Rules implementing the State Water Code provides that the modification of an existing Interim Instream Flow Standard may be initiated by the Commission, or by a petition to the Commission by any interested person.

Additional and significant information about the value of Waikolu stream has become available to the Commission and is reflected in the Commission's May 13, 1992 DLNR-CWRM amendments to the Hawai'i Stream Assessment-Molokai streams. Also, state pumps and diversions have de-watered Waikolu stream on test, and threaten to do so when in full operation.

Also, in light of the Commission's acceptance that Moloka'i water resources are inter-connected in one aquifer, and that ground-surface water interactions are basically linked in a one-to-one relationship, it is clear to Petitioners that significant threats to the streamflow exist for Waikolu stream.

There is also a compelling public need to amend the Interim Instream Flow Standard for Waikolu stream and to initiate the studies, surveys, inventories and other investigations necessary to establish Permanent Instream Flow Standards. As set forth above, Waikolu stream is an ecologically and culturally significant stream.

Therefore, we submit this Petition to the Commission to amend the Interim Instream Flow Standard for Waikolu Stream and to initiate the studies, surveys, inventories and other investigations necessary to establish Permanent Instream Flow Standards.

(signed and submitted, July 15, 1992)
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**Sarah (1/29):**
- Latitude to a "team" to get test done.
- Would not contest existing withdrawals, but which pumps?
- Wants to look at pump test results. We asked: within 2 months, said old.
- COE & DAR to coord. re. testing - what is a stable flow for environment, what is necessary to flow stream.

- Wants a formal study - design one & Sarah will probably be content w/ it.
Sarah E. Sykes  
November 26, 1993

State of Hawai‘i-DLNR  
Commission on Water Resource Management  
ATTN: Rae Loui, Deputy Director  
P.O. Box 621  
Honolulu, Hawai‘i 96809

Dear Ms. Loui,

Enclosed please find a completed Contested Case Application form, as provided by your office. Attached to the completed form, and to be considered part of the application, are a copy of my testimony and the reference copy of the July 15, 1992 petition to establish Permanent Instream Flow Standards for Waikolu Stream.

Because I read the testimony on November 17, 1993 at the Molokai meeting of the Commission on Water Resource Management, I hope it is only necessary for me to sign the Contested Case Application. I consulted with, and obtained the approval of Noelani Joy, Rachael Kamakana and Judy Caparida to proceed. This was necessary because all four of us are affected. Noelani Joy is a Homesteader who relies on Molokai Irrigation System (MIS) water from Waikolu watershed. Rachael Kamakana is a Kalamaula Homesteader who one day should be served by the MIS. Judy Caparida remains on the DHHL waiting list for her Homestead. I live on Molokai, so my safe drinking water is at risk if the aquifer is degraded by over-pumping. Also, living in Wailau, I know streams in that valley are at risk if the pumping is allowed to proceed without better information about the potential negative effects of significant drawdowns. If island residents are only offered “monitoring” of the devastation at Waikolu, then there truly is no citizen input to what is reasonable and beneficial in their estimation.

I read something in a book by Thor Heyerdahl about progress. It’s so close to what I believe, and the situation we face today, I’d like to quote him here. He said, “It is progress when a farmer leaves his hoe and a fisherman his net to step on to an assembly line the day the cornfield is leased to industry, which needs the river as its sewer. It is progress when
cities grow bigger and fields and forests smaller... When children get a sidewalk in exchange for a meadow, when the fragrance of flowers and the view of hills and forests are replaced by air conditioning and a view across the street. It is progress when a centuries-old oak is cut down to give space for a road sign... Nothing in all the "progressive" procedure that modern man, helped by all his modern middle-men, goes through before he earns money to buy a fish or a potato will ever be as simple as pulling them out of the water or the soil. Without the farmer and the fisherman who share their crumbs with the rest of us, modern "progressive" society would collapse... the rest of us who run about with papers and screwdrivers, attempting to build a better world without a blueprint."

We cannot manage what we do not understand. We do not understand enough about Hawai‘i stream ecosystems (including "available" water for withdrawal) to make a reasonable determination of what should or should not be permitted to be taken from the Waikolu watershed.

My request is not to stop all the pumping, to dismantle all the diversions... it is a plea to take the time to do this right. Department of Agriculture, Department of Water and Land Development have never before been willing to share data, share initial assumptions, share management authority. So long as their permits are not automatically approved, they must stay at the table and cooperate. The Commission has the authority to bring everyone to the table and keep them there. This worked exceptionally well for the Molokai Working Group on Water; I believe a CWRM-convened Waikolu Stream Team will work to develop the best plan possible for Waikolu Stream.

Thank you so much for your patience and assistance.

Sincerely,

Sarah E. Sykes

P.O. Box 370 Kaunakakai, Hawai‘i 96748 (808) 553-3831
APPLICATION TO BE A PARTY IN A CONTESTED CASE HEARING 
BEFORE THE COMMISSION ON WATER RESOURCE MANAGEMENT 

NOTE: THIS PETITION IS TO BE FILED IN PERSON OR MAILED AND POSTMARKED WITHIN 
10 DAYS OF PUBLIC HEARING OR COMMISSION MEETING AT WHICH THE REQUEST 
FOR A CONTESTED CASE HEARING IS MADE. 

IF MAILED, SEND TO: 
Commission on Water Resource Management 
P.O. Box 621 
Honolulu, Hawaii 96809 

Please provide the following information: 

1. NAME: SARAH E. SYKES 
PHONE: (808) 553-3831 
2. ADDRESS: P.O. Box 370 
Kaunakakai, Hawaii 96748 
3. ATTORNEY (IF ANY): 

4. ATTORNEY ADDRESS: 

PHONE: 

5. SUBJECT MATTER: Water Use Permit (DOA), Waikolu Groundwater Management Area, Naalehu 
6. DATE OF PUBLIC HEARING/COMMISSION MEETING: November 13, 1993 
7. LEGAL AUTHORITY: Commission on Water 
Resource Management 
8. WHAT STATUTORY OR OTHER RIGHT OF YOURS IS BEING AFFECTED? 
Right to safe drinking water in perpetuity; right to healthy 
environment; right to participate in determining what is 
reasonable and beneficial. 

8. SPECIFIC LEGAL ISSUE: whether or not DOA may continue to 

derwater Naalehu Stream in spite of constitutional 
and statutory constraints. 

9. PROVIDE YOUR TAX MAP KEY AND THE TAX MAP KEY OF THE PROPERTY
CONSIDERED IN THIS ISSUE. ARE YOU AN ADJACENT OR NEIGHBORING PROPERTY OWNER? DESCRIBE THE NATURE AND EXTENT OF YOUR INTEREST IN THIS MATTER.

6-1-1.2 — Applicant identification

Please see attached letter and background information.

10. WHAT IS YOUR SPECIFIC DISAGREEMENT REGARDING THIS ISSUE? Appropriate streamflow standards are currently being violated; contested application, if granted, would significantly degrade habitat and three other island’s safe drinking water source. Past actions by applicant indicate unwillingness to conserve a resource for good environment and good economy.

11. OUTLINE THE SPECIFIC ISSUES. Please incorporate to reference all the testimony and written information submitted by petitioner to date since the initial petition to designate Makai as a Water Management Area was submitted.

12. OUTLINE OF THE BASIC FACTS: Insufficient information available to certify to conclude safe habitat between flow standards, if permit granted. Every action on permanent instream flow standards petition received prior to contested application. System needs the water. Homeowners need the water. Without information, possibly all reasonable needs can be met.

13. WHAT RELIEF OR REMEDY DO YOU SEEK: Continue two year mandatory cooperative pumping tests study determining effects of groundwater withdrawal in earlier water use. Before water use permit granted or denied — which stream team. Please incorporate by reference all oral and written testimony by petitioner at November 12, 1993 e-mail meeting on Makai.

If there is not sufficient space to fully answer any of the items noted above, please use additional sheets of paper.

The above-named person hereby requests and petitions the Commission on Water Resource Management for a Contested Case Hearing in the matter described above.

DATED: 11-24-93

Petitioner
State of Hawai'i-DLNR
Commission on Water Resource Management
ATTN: Keith Ahue
Rae Loui
P.O. Box 621
Honolulu, Hawai'i 96809

Dear Mr. Ahue and Ms. Loui,

Thank you so much for coming to Moloka'i to listen to our concerns, to our mana o.

I would like to say that I support making a Waikolu Stream Team so we can learn how to give water to the Homesteaders and how to return water to the stream. It was so sad to see the stream dead for great lengths. This may not have to be. To care for the remaining resources allowing us to continue appropriate traditions today, to build bridges between the best of the past and the best possible future, we need Western-style data to address Western laws. To accomplish that on Molokai, where all the water is so clearly interconnected, requires careful examination of the resource, effects of pumping, effective rates of withdrawal. We need careful management, and we can only do that with more information.

The Commission on Water Resource Management holds great power to accomplish what needs to be done. This is true for Molokai as well as all the other islands in Hawai'i nei. You have the authority to bring everybody to the table. You have the authority to keep them there. Our life on Molokai is on the line. Please do this, now! We must delay no longer. We need to have at the table CWRM, DLNR (Land Management), DOFAW, DAR, DOW ALD, DOCARe, DOH, DHHL, OHA, DOA, MIS-DOA, MIS-Advisory Group, Homestead Association Reps, MPC, NPS, USFWS, COE, USGS, and EPA. All of these entities have some say in the water. They all need the same information simultaneously to make the best fact-based decisions possible. Some of them refuse to speak or work with others. This is shameful! Only CWRM holds the authority to make everyone behave appropriately. And frankly, if you put Noelani Joy in charge of the group, she'll keep them in order to work for Molokai's best interests.
To my friends and ohana on Moloka'i who are concerned about water, which is our life, knowing if God doesn’t send rain, no more water: the greatest concern right now is the 24” pipeline and saving Waikolu Stream—Maka’ala!

As I saw at Waikolu Stream, there are many pumps in place that have been taking and can take much more water until the whole stream is dead ... until Pelekunu is dead ... even possibly until Wailau dies. They’re pumping and they don’t know what they’re doing, except that they’re taking the water out of the stream. We want the Homesteaders to have water. We want the streams to have water. It is possible to protect all uses. But we need to do more homework to manage it right.

What we don’t want to see is DOA pumping out Waikolu stream and maybe sending the water down the 24” pipeline. It’s all tied together just like all the water on Moloka‘i is tied together, and it all comes as the best gift from God.

Responsibly protecting this island’s resources, so Moloka‘i can stay Moloka‘i for a few more generations, isn’t easy. We need more people doing more homework, to find the facts, to stay up-to-date with developments. Delay, confusion, anger only play into the hands of those who have the money and muscle to inappropriately develop the island’s few remaining resources.

From my own perspective as a homemaker and Grandma who stays home to take care of her grandkids, working on the problems from the outside; it’s discouraging to hear folks on the inside, folks with real resources, folks who get taxpayer support, folks with private foundation support complain about how hard it is to get information. If I can get information, anyone else on the island can probably get it in half the time with half the effort. For my part, I’m thankful just knowing that I can get up every morning to see the sun shine, hear the raindrops on my roof, and hear the childrens’ voices and have voice to thank the Lord— that’s my love for the island reflected back to bless me!

What we need now is to band together as one to protect Moloka‘i. You know no one else can do your homework for you. Maka’ala Moloka‘i and let’s get to work together.

Mahalo a nui loa! God Bless!

Judy L. Caparida

Judy L. Caparida
TO Ray Henry
DATE 4/24/43    TIME 12:45
WHILE YOU WERE OUT

M Tom Matayoshi
of Dept of Agri (Melbair)
Phone 567-6891

TELEPHONED    PLEASE CALL
CALLED TO SEE YOU   WILL CALL AGAIN
WANTS TO SEE YOU   URGENT

RETURNED YOUR CALL

Message 11/1/43 will provide more info on
1) Telemetry system 2) Main Electric
written info on power consumption
limitations.

Operator
## East Portal Wells

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## East Portal Dams, Weir & Tunnel

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## Diversion Dam Pumps

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## East Portal Flow Tunnel Entrance

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## Reservoir

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State of Hawai‘i-Department of Land and Natural Resources
Commission on Water Resource Management
Honolulu, Hawai‘i  96813

RE: Waikolu Valley-Hoolehua Water Management Area

Chairman Ahue and Commissioners,

In the interest of saving time, because I am a co-petitioner for establishing Permanent Instream Flow Standards for Waikolu Stream, please incorporate by reference that petition as part of my testimony. Also, please incorporate by reference all the letters sent to the Commission about Molokai water issues since we first submitted the petition to designate the island a Water Management Area. I would especially appreciate your review of the known hydrogeological facts, and the nature of Molokai’s one-to-one ground-surface water relationship relative to north shore’s gaining streams.

I support both the National Park Service position in response to this application; and the Molokai Water Working Group recommendations relative to conservation as the first source for additional water supplies, and first seeking water in the sectors of proposed use.

I also support Noelani Joy’s recommendation to run a minimum two-year test on Waikolu Stream. Please defer action on that part of the application requesting water use permits for wells #4, #5 and #6 until the test results are in, and mitigation measures have been tested as well. Please require close monitoring of all ecosystem effects of withdrawal on flows for wells #22, #23, #24, so immediate mitigative measures can be applied if necessary. (However, if the test study group reaches consensus about which wells to test when, please give them authority to turn on even wells #4, or #5, or #6 for test purposes as necessary.) And please, to make certain the user-community as well as the community-at-large is granted easy and timely access to the data generated, have the suggested test study group report directly and regularly to the Molokai Working Group on Water, as well as to the Molokai Planning Commission. May I suggest consulting with prior identified responsible state and federal agencies as (con’d.)

P.O. Box 370   Kaunakakai, Hawai‘i  96748   (808) 553-3831
well as the USGS and COE in the interest of developing the best test possible. Perhaps the SCS River Basin Study might be expanded to serve as the research umbrella for all testing. May I finally suggest that Noelani Joy be put in charge of keeping all involved working together, since she is a member of the Molokai Planning Commission, the Molokai Working Group on Water, and the Molokai Irrigation System User Advisory Group. She is also a co-petitioner for establishing Permanent Instream Flow Standards for Molokai north shore streams, including Waikolu Stream.

The Permanent Instream Flow Standards petition for Waikolu Stream remains temporarily, cooperatively, on hold. Soon, the Commission's Stream Protection and Management Plan will be adopted. After that, the Molokai streams petitions must move forward. If we can remain patient in protecting the resource, certainly the non-Homesteader MIS users might be reasonably asked to remain patient while a real test is implemented. This statement of cooperation is not a waiver of any claims regarding the timeliness of appropriate action on the pending petitions.

We know the Homesteaders need the water. We know the land and the life of the land need the water. Their mutual dependence is not mutually exclusive. But, to make the best management decision requires data that doesn't exist today. Please defer the decision on additional withdrawals, and grant the application for existing use conditional upon installation and monitoring of mitigative measures, as well as cooperative experimental data generation... a realistic cooperative effort.

We may make mistakes in our stewardship of the land and her waters, but we have the capacity to learn from our mistakes and never make them again. This is an opportunity to finally learn enough about Hawaii's few remaining streams to lay the groundwork for real management decision-making models within two years.

If you do not accept this opportunity to do it right on Molokai, then I request an administrative contested case hearing on the matter of DOA's requested withdrawals at Waikolu Stream.

Thank you for the opportunity to speak with you about this matter on Molokai.
PETITION TO AMEND INTERIM INSTREAM FLOW STANDARD

I. PETITIONER

Name/s Rachael Kamakana, Noela J. Joy, Judy Caparida, Sarah Sykes
Address Moilikai
Contact Person Any of the above
Telephone 553-5363, 557-5370, 667-6550, 553-3601 respectively

II. PROJECT

Project title Not applicable; this is a petition to the
Commission to amend the interim instream flow
Standards for Waikolo Stream and to
initiate the surveys, inventories, and other
investigations necessary to establish (Permanent)
instream Flow Standards

Project location Not applicable; Petition is to amend the interim
instream Flow Standards for Waikolo Stream and its tributaries

Stream(s) affected Waikolo

Tax Map Key(s) Not applicable

Landowner(s) United States (U.S. Corps, State of Hawaii)

State land use district Conservation

County Zoning Conservation
3. EXISTING INSTREAM AND OFFSTREAM WATER USES

Drinking water, irrigation water; critical habitat threatened species
DOWALD-DOA-MIS Pumps, Diversions

4. STREAMFLOW

USGS stream gaging station 16405100, 16405300, 16405500,
16408000

5. PROJECT IMPACT

Not applicable

6. FACTUAL BACKGROUND

From DLNR's "Resource," Volume III, Number 1, February 1992, "All the
native freshwater species can be preserved if habitat is protected and a
vigorous effort is made to understand the relationships between these
species and their supporting ecosystems. Such understanding is
prerequisite to management. With a good information base, and
decision-makers who give highest priority to the perpetuation of the
native biological resources, the survival of these species along with their
natural ecosystems should be assured."

Please incorporate, by reference, the May 13, 1992 DLNR-CWRM
amendments to the Hawai'i Stream Assessment-Molokai streams, relative
to Waikolu stream.

The state doesn't know how much water is in the stream today.
Threats to the stream flow are imminent due to potential agricultural
development. Before permitting away the rest of the water, before
committing funds to projects designed to carry away the water, necessary
studies must be done.

7. LEGAL BACKGROUND

Section 174C-71 of the State Water Code requires the Commission to "establish and administer a statewide instream use protection program." Section 174C-71(1) requires the Commission to "establish instream Flow Standards on a stream-by-stream basis whenever necessary to protect the public interest in the waters of the State," and Section 174C-71(4) requires the Commission to "establish an instream flow program to protect, enhance, and reestablish, where practicable, beneficial instream uses of water. The commission shall conduct investigations and collect instream flow data including fishing, wildlife, aesthetic, recreational, water quality, and ecological information and basic streamflow characteristics necessary for determining instream flow requirements."

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Based upon additional information or a compelling public need, any person may petition the Commission on Water Resource Management to
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Additional and significant information about the value of Waikolu stream has become available to the Commission and is reflected in the Commission’s May 13, 1992 DLNR-CWRM amendments to the Hawai’i Stream Assessment-Molokai streams. Also, state pumps and diversions have de-watered Waikolu stream on test, and threaten to do so when in full operation.

Also, in light of the Commission’s acceptance that Molokai water resources are inter-connected in one aquifer, and that ground-surface water interactions are basically linked in a one-to-one relationship, it is clear to Petitioners that significant threats to the streamflow exist for Waikolu stream.

There is also a compelling public need to amend the interim Instream Flow Standard for Waikolu stream and to initiate the studies, surveys, inventories and other investigations necessary to establish Permanent Instream Flow Standards. As set forth above, Waikolu stream is an ecologically and culturally significant stream.

Therefore, we submit this Petition to the Commission to amend the interim Instream Flow Standard for Waikolu Stream and to initiate the studies, surveys, inventories and other investigations necessary to establish Permanent Instream Flow Standards.

(signed and submitted, July 15, 1992)
My name is Baron Okimoto. I am here today representing the Molokai Farm Bureau as its president. We wish to express our firm support for the application of the Department of Agriculture. Our support is based on the fact that Waikolu is the only water source area for the Molokai Irrigation System and is absolutely essential to the continuation of agriculture on Molokai. Agriculture provides at least 300 jobs on Molokai, both for employees and independent family operators. A modest multiplier suggests another 100 jobs are indirectly created. We estimate this to be at least half of the private sector employment on the island. Without the continued use of the Molokai Irrigation System as it was designed, these jobs will be lost and farmers will be forced to curtail or end operations.

The number one recommendation of the Molokai Community Plan calls to "maintain agriculture as the primary economic activity." Diversified agriculture is the only private economic sector on Molokai that has exhibited consistent growth during the last decade. Failure to grant the requested diversion will end that growth and in fact severely reverse it.

Farmers recognize the need to preserve and maintain the ecosystem of the valley. However, we do believe the very existence of the species in question, in all parts of the stream, after some 23 years of pumping indicates that the diversion is not significantly harmful. We will support any monitoring agreement that is reached between the Department of Agriculture and the Department of Aquatic Resources.

The current management methods are based on a sophisticated system of telemetric control of pumping. This system allows pumping at the highest amounts when stream flows are at their highest not lowest. If this system can be consistency followed, the reservoir can be filled during the wet months of the year, eliminating the chance of stream dewatering during the dry months. The application for the additional wells is to enhance this capability to pump heavily during the rainy season.

In summary, we would like to repeat our request that the commission act favorably on the application of the department of agriculture. We feel this is in the best interests of the people of Molokai, and hope the commission will feel the same.
November 17, 1993

The Honorable Keith W. Ahue, Chairperson
Commission on Water Resource Management
Department of Land and Natural Resources
P. O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Ahue,

Waikolu Water Use Permit
Department of Agriculture

Thank you for the opportunity to provide testimony on the water use permit application for Waikolu wells. The Department of Hawaiian Home Lands strongly supports DoA's request for groundwater from the Waikolu wells to support continued operation of the Moloka'i Irrigation System (MIS).

It is our understanding that the requested use of existing and new wells will both assure reliable supply to the irrigation system and promote responsible stream management. By rotating the operation of only two wells at a time, the MIS will continue to provide for demands upon the system, while supplementing stream flows and allowing longer recharge of each groundwater compartment.

The MIS is vital to the future of homestead agriculture on this island. Constructed in the mid-1960's at a cost of $7.5 million, including a federal loan obtained through the Small Reclamation Projects Act, the maximum delivery capacity is nearly 7 Mgd. The current system-wide daily demand is about 3.8 MGD, of which 1.3 MGD is derived from groundwater sources pumped from the system's existing wells.

Two-thirds of the delivery capacity is reserved for use by our Hawaiian homestead lessees. The system currently provides irrigation water to about 145 homesteaders in the Hoolehua plain, and we are hopeful that the system can be extended to also provide service to Kalamaula and Palaau. The Department is committed to assuring its lessees the amounts that are necessary.
We share the concerns of the Division of Aquatic Resources and the National Park Service regarding habitat protection, and while the recent combination of drought and loss of electrical service have resulted in unusual pumping requirements, it is our understanding that normal operations will actually improve the ability to maintain normal streamflows. We note also that the Department of Agriculture plans a sort of fish ladder for endangered species, and will supplement stream flows from its wells as part of a stream management program. We are confident that they will continue to work with DAR and the U.S. Fish and Wildlife Service to meet these environmental concerns.

The Department of Hawaiian Home Lands urges your approval of the requested permits.

Warmest aloha,

Hoaliiku L. Drake, Chairman
Hawaiian Homes Commission

HLD:BH/ci 1639.20
NOTICE OF PUBLIC HEARING
for
WATER USE PERMITS APPLICATIONS
KAWEKA AND WAIKOLU GROUND WATER MANAGEMENT AREAS, MOLOKAI

COMMISSION ON WATER RESOURCE MANAGEMENT

The Commission on Water Resource Management will be holding a public hearing to gather testimony regarding the following applications for water use permit in the Kawela and Waikolu Ground Water Management Areas of Molokai. In accordance with Department of Land and Natural Resources Administrative Rules 13-171, objections filed by persons having standing to file an objection require that a public hearing be held before the Commission may proceed to approve or reject the permit applications. Call 587-0225 or 1-800-468-4644 for more information on the water use permit applications. The public is encouraged to attend and provide testimony.

DATE: November 17, 1993
TIME: 6:00-10:00 p.m.
PLACE: MITCHELL PAUOLE CENTER, MOLOKAI

Well #4 (Well No. 0855-06)
Well #5 (Well No. 0855-05)
Well #6 (Well No. 0855-04)
Well #22 (Well No. 0855-01)
Well #23 (Well No. 0855-02)
Well #24 (Well No. 0855-03)

Applicant: State Department of Agriculture
Agricultural Resource Management Division
P.O. Box 205
Hoolehua, HI 96813

Date Completed Application Received: June 8, 1993
Aquifer: Waikolu System, Northeast Sector, Molokai
Well Sources: WELL# 4, #5, #6, #22, #23, and #24, Well Nos. 0855-06, -05, -04, -01, -02, and -03, at Waikolu Valley, at Tax Map Key: 6-1-1:2
Quantity Requested: 3,360,000 gallons per day.
Existing Water Use: Agricultural irrigation needs of Molokai
Irrigation System
Place of Water Use: Hoolehua at various Tax Map Keys

Breadfruit Well (Well No. 0456-04)
Applicant: Kawela Plantation Homeowners Association
P.O. Box 698
Kaunakakai, HI 96748

Date Completed Application Received: January 21, 1993
Aquifer: Kawela System, Southeast Sector, Molokai
Well Source: Breadfruit Well, Well No. 0456-04, at Kawela, Molokai, Tax Map Key: 5-4-1:26
Quantity Requested: 250,000 gallons per day
Existing Water Use: Irrigation of 200 acres covering 81 lots & common areas
Place of Water Use: Kawela Plantation 1, Tax map Key: 5-4-14:various

DW3 (Well No. 0456-06)
DW2 (Well No. 0456-08)
DW1 (Well No. 0456-09)

Applicant: Kawela Plantation Homeowners Association
P.O. Box 698
Kaunakakai, HI 96748

Date Completed Application Received: January 21, 1993

Aquifer: Kawela System, Southeast Sector, Molokai
Well Source: DW3, DW2, DW1 Wells, Well Nos. 0456-06, 0456-08, 0456-09, at Kawela, Molokai, Tax Map Key: 5-4-14:17
Quantity Requested: 300,000 gallons per day
Existing Water Use: Domestic use for 210 agricultural units
Place of Water Use: Kawela Plantation 1,2,&3, Tax map Key: 5-4-14:various

AG #1 (Well No. 0457-04)
Applicant: Kawela Plantation Homeowners Association
P.O. Box 698
Kaunakakai, HI 96748

Date Completed Application Received: January 21, 1993

Aquifer: Kawela System, Southeast Sector, Molokai
Well Source: AG #1 Well, Well No. 0457-04, at Kawela, Molokai, Tax Map Key: 5-4-15:33
Quantity Requested: 225,000 gallons per day
Existing Water Use: Irrigation of 300 acres over 139 lots
Place of Water Use: Kawela Plantation 2 & 3, Tax map Key: 5-4-15:various

Johnson Well (Well No. 0456-01)
Applicant: R.M. Granger
P.O. Box 371
Kaunakakai, HI 96748

Date Completed Application Received: July 6, 1993

Aquifer: Kawela System, Southeast Sector, Molokai
Well Source: Johnson Well, Well No. 0456-01, near Kakahaia Pond, Molokai at Tax Map Key: 5-4-1:11
Quantity Requested: 25,000 gallons per day
Existing Water Use: Irrigation of 4 acres of pasture & corn
Place of Water Use: Near Kakahaia Pond at Tax Map Key: 5-4-1:11

Kawela-Iaea #3 (Well No. 0456-16)
Applicant: John Wm. Iaea, Sr.
P.O. Box 405
Kaunakakai, HI 96748

Date Completed Application Received: July 1, 1993

Aquifer: Kawela System, Southeast Sector, Molokai
Well Source: Kawela-Iaea #3 Well, Well No. 0456-16, at Kawela, Molokai, at Tax Map Key: 5-4-1:52
Quantity Requested: 1,000 gallons per day
Existing Water Use: Domestic supply for 3 homes and irrigation of 2 acres of flowers
**Place of Water Use:** Kawela. Molokai at Tax Map Key: 5-4-1:52

**T.T. Meyer Inc #2 (Well No. 0354-02)**

**Applicant:** T.T. Meyer, Inc.
P.O. Box 454
Kaunakakai, HI 96748

**Date Completed Application Received:** July 16, 1993

**Aquifer:** Kawela System, Southeast Sector, Molokai

**Well Source:** T.T. Meyer Inc #2 Well, Well No. 0354-02, at Kapuaokoolau, Molokai, at Tax Map Key: 5-5-1:11

**Quantity Requested:** 200,000 gallons per day.

**Existing Water Use:** Fire and dust control for 25-acre rock quarry

**Place of Water Use:** Kapuaokoolau, Molokai at Tax Map Key: 5-5-1:11

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**Henry's Well (Well No. 0354-03)**

**Applicant:** Henry R. Meyer Estate
P.O. Box 454
Kaunakakai, HI 96748

**Date Completed Application Received:** July 16, 1993

**Aquifer:** Kawela System, Southeast Sector, Molokai

**Well Source:** Henry's Well, Well No. 0354-03, at Kapuaokoolau, Molokai, at Tax Map Key: 5-5-1:28

**Quantity Requested:** 30,000 gallons per day.

**Existing Water Use:** Irrigation of 5.32 acres of coconut and mango trees

**Place of Water Use:** Kapuaokoolau, Molokai at Tax Map Key: 5-5-1:28

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**T.T. Meyer Inc #4 (Well No. 0354-04)**

**Applicant:** Wayne Meyer
P.O. Box 454
Kaunakakai, HI 96748

**Date Completed Application Received:** July 16, 1993

**Aquifer:** Kawela System, Southeast Sector, Molokai

**Well Source:** T.T. Meyer Inc #4 Well, Well No. 0354-04, at Kapuaokoolau, Molokai, at Tax Map Key: 5-5-1:12

**Quantity Requested:** 10,000 gallons per day.

**Existing Water Use:** Irrigation of 2.71 acres of heliconia

**Place of Water Use:** Kapuaokoolau, Molokai at Tax Map Key: 5-5-1:12

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**T.T. Meyer Inc #1 (Well No. 0354-05)**

**Applicant:** T.T. Meyer, Inc.
P.O. Box 156
Kaunakakai, HI 96748

**Date Completed Application Received:** July 16, 1993

**Aquifer:** Kawela System, Southeast Sector, Molokai

**Well Source:** T.T. Meyer Inc #1 Well, Well No. 0354-05, at Kapuaokoolau, Molokai, at Tax Map Key: 5-5-1:11

**Quantity Requested:** 100,000 gallons per day.

**Existing Water Use:** Irrigation of 15.5 acres of citrus and mango trees and various other vegetables
Place of Water Use: Kapuaokoolau, Molokai at Tax Map Key: 5-5-1:11

COMMISSION ON WATER RESOURCE MANAGEMENT

KEITH W. AHUE, CHAIRPERSON

Any person may testify or present information on the public hearing subject matter or agenda items. If you have a legal interest that may be adversely affected, you have a right to request an administrative contested case hearing. However, you must make the request either orally or in writing by the close of this public hearing or meeting and file a written petition for a contested case hearing within 10 days after the date of this public hearing or meeting. If you do not make such a request or fail to file a timely written petition with the Commission, the consequence is that you will be precluded from later obtaining a contested case hearing, and seeking judicial review of the adverse decision. See Chapter 13-167, Hawaii Administrative Rules of the Department of Land and Natural Resources.

Also, disabled individuals planning to attend the public hearing are asked to contact the Commission at 587-0214 to indicate if they have special needs which require accommodation.

Dated: OCT 4, 1993

TO:  Mr. Keith W. Ahue, Chairperson
     Commission on Water Resource Management

FROM:  Yukio Kitagawa, Chairperson
        Board of Agriculture

SUBJECT:  Water Use Permit, Waikolu Groundwater Management Area, Molokai

Attached is our written testimony for the November 17, 1993 public hearing. The testimony fully addresses the objections raised by all recorded objectors. Our representative will be present at the public hearing to answer questions or to give further information.

The Department of Agriculture asks that the Commission consider giving equal weight to economic benefits and values as you would to environmental benefits, that they must be balanced. All of the objections raised are based only on environmental benefits.

The Department makes one further request, that the water use permit be approved as submitted and that you take action on this permit today.

c:  Molokai Water Users Advisory Board
     Agricultural Resource Management Div.
Testimony of the Department of Agriculture
for the Water Use Permit
Waikolu Groundwater Management Area

Response to Division of Aquatic Resources (DAR) Concerns:

(1) The MIS will make allowances when operating the well pumps to restore stream flows through the dry reaches, when caused by our pumping. Our pump installation plans and specifications make provisions for a 3" bypass nipple pipe to feed pumped effluent into the stream bed (see engineering drawings marked exhibit A).

(2) The construction contract to make improvements to our diversion dam has been awarded; this project (see engineering drawings marked exhibit B) will provide a wetted channel (fish ladder) to allow immigration and emigration of the aquatic animals. This renovation has been approved by the biologist of the DAR.

(3) We are awaiting details for the monitoring program. This program was approved by and is being developed by Mr. Andy Yuen of the U. S. Fish & Wildlife Service, Mr. Bill Derrick of DAR and in consultation with Ms. Ann Brasher of the National Park Service; all are aquatic biologists familiar with Hawaiian stream conditions. The MIS is willing to provide the necessary logistic support, as our maintenance work requires visitation into Waikolu Valley on a regular basis.

(4) The MIS is not contemplating continuous pumping of all the wells simultaneously. We have programmed a pumping management scheme to allow these dike-confined compartments ample recovery periods. Our objective is to harvest the wet season flows for storage and do only water conservation pumping during dry season flows to maintain our storage reservoir at Kualapuu at operational level, which is keeping daily outflow equal to daily inflow.

Response to the Native Hawaiian Advisory Council (NHAC):

(1) A more detailed location of the wells is not available because of the remoteness of the site, and the wells are close together.
(2) Attached are the pumping capacities of each pump and the combinations (see exhibit C) as requested in your objections.

(3) The 7.4 MGD includes surface stream diversions combined in the permit requests.

(4) The only stream affected is Waikolu Stream as there are no other streams.

(5) The project wasn’t restricted by such federal law as claimed; a special loan was obtained through the Bureau of Reclamation and involved both state and federal tax funds reflecting contributions by all citizens, not only Hawaiians.

(6) There are no other legal uses within Waikolu Valley at the present time.

(7) All of these items will be dealt with under the proposed River Basin Study by the USDA Soil Conservation Service.

(8) Lastly, NHAC states "... defers their objections if the HHL beneficiaries support the Permit." Attached is a petition from the Hoolehua homesteaders and their testimony today, which indicates full and unconditional support for the water use permit. Further, the Molokai Working Group in its report under Section IV (A) (2) specifically recommends that MIS existing water use is continued and is an essential part of their plan to meet the anticipated water requirements in the 5-10 year period.

Response to the National Park Service (NPS) objections:

(1) The enabling legislation which created this National Park deals only with the leprosy settlement proper. Records in the archives indicate the Kalaupapa leprosy colony was confined to the Kalawao Peninsula. Therefore, we question why the National Park Service is stretching its jurisdiction to a region not directly connected with the leprosy colony.
(2) The NPS is present at the invitation of the State of Hawaii, and should there be objections, a more reasonable approach would be for NPS to represent their objections through a state agency. Further, the two state agencies which have jurisdiction over the national park lands have explicitly reserved any management matters over Waikolu water and its water rights from the purview of the NPS (see attached Cooperative Agreement No. CA 8896-9-8004 and the lease with DHHL marked as exhibits D and E).

(3) In relation to their objections on the adverse effect on the aquatic stream life, the MIS is working with the U. S. Fish and Wildlife Service and the DAR to address the detrimental effects on aquatic animals. NPS, in attempting to develop their own program, hired mainland consultants unfamiliar with Hawaii’s hydrogeology and climatic conditions. This unfamiliarity resulted in distorted data and conclusions such that the study methodology is not fully acceptable by the scientific community and lacks credibility. We already have the solutions to these concerns and are preparing to put them into action.

(4) The NPS indicates that they will reestablish Native Hawaiian culture and religion, but a check with OHA and DHHL shows no such proposal registered. Further, records indicate that Waikolu Valley, due to its remoteness and inaccessibility, did not support any native population, so we question the NPS claim to appurtenant water rights.

(5) We are bothered by the instream flow standard objection when, in fact, standards have not been established. We would like to state that existing irrigation use, which preceded the Water Code by 23 years, and agriculture should have equal protection rights to unrecorded instream use rights. The diversions and wells precede any instream use standards.

(6) We contend that the application is proper and in order, after having worked with the Water Commission staff to develop the application data. Among other items, we question NPS’ understanding of the interrelationship between hydrogeology and surface hydrology. Had they checked with us, we could have explained that Waikolu Valley or any Hawaiian stream is influenced by the volcanic
regime such that the valley’s groundwater is the result of dikes which are also the source of surface streams. In pumping the individual dike compartments, this will indirectly affect the entire yield within the valley’s surface and groundwaters.

(7) In summary, we are at a loss as to why NPS would support a permit denial. Without this permit, MIS may not be able to adequately service the future irrigation needs it was intended to. We have had little discussion with NPS to resolve differences and, more importantly, to understand what options and alternatives they propose to mitigate this issue.

Closing arguments in support of the water use permit:

(1) The MIS requests the approval of the water use permit without any changes in the quantities requested. Basically, the three existing wells have been in operation for over twenty years without any adverse environmental impacts; and one of the wells - #22, which is located within the tunnel itself - does not influence surface flows as far as we can determine and, as such, should not be subjected to the objections raised.

(2) All of the objections raised are the same claims made when the MIS was under the jurisdiction of DLNR and are in the process of being mitigated during the CDUA permit process. The fish ladder, the dewatering of streambed replenishment during pumping, and the monitoring requirements are the result of the biologists’ recommendations. The actual implementation of these mitigation measures is either included in construction drawings which are awarded, or, in the case of monitoring program, are awaiting the baseline data development.

(3) The MIS has the capability to manage the pumping through a newly installed telemetry and supervisory control system. We are in the process of developing a water source management plan, which will control dewatering of the Waikolu water by minimizing the withdrawal. The basic objective is to capture and store winter or high rainfall period flows, which is the 7.48 MGD requested, into our 1.4
billion gallon Kualapuu Reservoir and to pump the dike compartment wells (Wells 4, 5, 23 and 24) when surface diversions cannot maintain the daily usage outflow, which is 3.84 MGD, during summer or low rainfall periods. Another reason we are forced into this management plan is that Maui Electric has indicated that they will not be able to supply our electric power needs to operate all six pumps. This means that we need to program our pumping schedule to adapt to the power that can be supplied by Maui Electric, and as of now it would be highly unlikely that we could operate more than two pumps at a time over a sustained period during the low demand period. We also are developing an educational program to make water use conservation an important tool to preserve our water source. Presently, the MIS does maintain a plan to maximize the available water source through low water restriction notices, water usage monitoring, leak detection with rapid response to correct, encouraging efficient irrigation methods, keeping water conveyance devices (such as meters, reducers, valves, etc.) in good working condition with periodic maintenance, and minimizing evaporation from our reservoir surface by attempting to reduce wind exposure.

(4) In closing I need to emphasize the importance of this permit, as it is the major source of irrigation water to the major farming region of Molokai. Should the Commission diminish or reduce the requested water quantity, then there will be more frequent SHUT DOWNS of the system during dry weather. Without the assurance of water for agriculture, the industry in all likelihood will not be able to expand much more than what it is today. I want to make it very clear that: (a) we will never intentionally dewater the stream; (b) now with the telemetry control system, we can monitor and manage our pumping for a balanced flow regime throughout the watershed; and (c) we are aware of the importance of this water source to our mission and would never intentionally cause it to deteriorate or be destroyed, but would do our utmost to preserve it for the benefit of Molokai’s economy.
Thank you for the opportunity of allowing me to respond to those objections and to make clear our position in support of the water use permit for the MIS. I will be available at the public hearing for any questions.

Respectfully submitted,


PAUL T. MATSUO
Administrator-Chief Engineer
Agricultural Resource Management Division

IRRA:1466

Note: Exhibits were delivered to Commission staff due to bulk.
The applicant maintains that the construction of a water connection such as an artificial stream bed with rocks for the endemic stream fauna to cling to is the most efficient method of providing alternative continuous stream flow with minimum loss of water into the ground. The Division of Aquatic Resources suggests that the artificial water connection may remedy the current situation, in that it will facilitate the movement of endemic stream fauna to the cooler waters at the upper reaches of the stream.

As pointed out by the Office of Environmental Quality Control in their comments on the subject CDUA, data from exploratory wells is needed to determine the impacts of production wells. The subject CDUA is for such exploratory test wells. Should the test wells prove satisfactory, a new Conservation District Use Application and an Environmental Impact Statement would be required for development of the wells. Many of the concerns raised regarding well development will be more appropriately addressed at that time.

The applicant has represented that Waikolu Stream will be carefully monitored during test pumping to avoid impacting the populations of endangered endemic species such as the o'opu alamo'o as well as other native Hawaiian aquatic macrofauna. Additionally, the applicant proposes to provide a water connection over the dry portion of the stream. Such a device would provide a continuous connection to the ocean for stream macrofauna. It would be monitored for its efficacy and to ensure that no detrimental effects to the environment result.

The applicant is proposing to use appropriate mitigating measures to ensure that negative impact to archaeological sites and aquatic resources will be minimized. The proposed test drilling is necessary to gather data on the suitability of developing wells which will benefit farmers on the Molokai Irrigation System. The proposed project is not inconsistent with the objective of the Resource subzone. Therefore, staff recommends as follows:

RECOMMENDATION:

Staff recommends that the Board approve CDUA MO-12/30/86-1988 for exploratory well drilling in three sites on TMK: 6-1-01: 2, Waikolu Valley, Molokai, subject to the following conditions:

1. The applicant shall comply with all applicable statutes, ordinances, rules and regulations of the Federal, State and County governments, and applicable parts of Section 13-2-21, Administrative Rules, as amended;

2. The applicant, its successors and assigns, shall indemnify and hold the State of Hawaii harmless from and against any loss, liability, claim or demand for property damage, personal injury and death arising out of any act or omission of the applicant, its successors, assigns, officers, employees, contractors and agents under this permit or relating to or connected with the granting of this permit.
3. Since this approval is for use of conservation lands only, the applicant shall obtain appropriate authorization through the Division of Land Management, State Department of Land and Natural Resources for the occupancy of State lands;

4. If any unanticipated sites or remains of historic or prehistoric interest (such as shell, bone or charcoal deposits, human burials, rock or coral alignments, paving, or walls) are encountered during construction, the applicant shall stop work and contact the Historic Preservation Office at 548-7460 or 548-6408 immediately;

5. The applicant shall comply with all applicable Public Health Regulations;

6. A fire contingency plan, acceptable to the Division of Forestry and Wildlife, Department of Land and Natural Resources, shall be implemented during and after construction;

7. Any construction, alteration, moving, demolition and repair of any building or other improvement on lands within the Conservation District, authorized by the Board, shall be subject to the building and grading codes of the respective counties in which the lands are located; provided that prior to the commencement of any construction, alteration, or repair of any building or other improvement, four (4) copies each of the final location map, plans, and specifications shall be submitted to the Chairperson, or his authorized representative, for approval of which three (3) copies will be returned;

8. Any work or construction to be done on the land shall be initiated within one (1) year of the approval of such use, and all work and construction must be completed within three (3) years of the approval of such use. Failure to comply with this condition shall render this application null and void;

9. The applicant shall flag the terraces near Well Site #2 with a 30-foot buffer zone to avoid inadvertent damage to archaeological sites as a result of construction. The applicant shall also flag the retaining wall in the vicinity of Well Site #3 and inform the construction crew of its existence;

10. The applicant shall provide a water connection to facilitate movement of stream macrofauna over the dry portion of the stream in consultation with the Division of Aquatic Resources and the U.S. Fish and Wildlife Service;

11. The applicant shall monitor the wells during and after test pumping to avoid negative impact upon Waikolu Stream and the native Hawaiian macrofauna which inhabit the stream;
12. If monitoring indicates that the streamflow is negatively impacted by the test drilling, the applicant shall cease pumping at once;

13. Should the test wells prove successful, the applicant shall submit a new Conservation District Use Application and an Environmental Impact Statement for development of the wells;

14. If the wells prove unsatisfactory, the applicant shall seal them properly so as not to cause any detrimental effects to the ground water resources of the area; and

15. Other terms and conditions as prescribed by the Chairperson.

Respectfully submitted,

GAIL N. HARADA
Staff Planner

Attachments

Approved for Submittal:

WILLIAM W. PATY, Chairperson
Board of Land and Natural Resources
FACSIMILE TRANSMITTAL PAGE

Please deliver the following pages to:

Name:  Daniel Hughes
Company:  V  W  NPS
From:  Paul Hardy
Date:  1/31/83  Time:  2:52p

Message:
I am responding to your comments

Total number of pages (Including Transmittal Page):  6

If you do not receive all of the pages legibly, please call back: (808) 587-0274

Sending Facsimile Number: (808) 587-0219
Receiving Facsimile Number:  (808) 223-0245

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STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
P. O. BOX 212
HONOLULU, HAWAII 96829

FACSIMILE TRANSMITTAL PAGE

Please deliver the following pages to:

Name: DAVID MARTIN
Company: Emery
From: Tony Haery
Date: 11/14/95
Time: 2:40p

Message: Dear (Redacted) to your comments

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Company: U.S. Nat. Park Serv.
From: Roy Hardy
Date: 11/5/93 Time: 8:40 A
Message: Public Notice for DOA Permit

Total number of pages (including Transmittal Page): 5

If you do not receive all of the pages legibly, please call back: (808) 587-0274

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AGENDA
FOR THE MEETING OF THE
COMMISSION ON WATER RESOURCE MANAGEMENT

DATE: November 17, 1993
TIME: 1:30 p.m.
PLACE: Mitchell Paulede Center
Conference Room
Kaunakakai, Molokai, Hawaii

1. Minutes of the October 13 and October 27, 1993 meetings

2. Amendment to Chapter 14-171 Hawaii Administrative Rules (HAR), Adding a New
Section 13-171-61, Department of Hawaiian Home Lands Reservation for Kualapuu,
Molokai

3. Deferal of Water Use Permit Applications, Molokai Ground Water Management Areas
   Applicants:
   Wilma Kanaka Grumbech, Well Nos. 0352-17, 0456-01 & 18 to 20
   Kailua Ranch, Well No. 0546-02
   Zella Duvachelle, Well No. 0448-08

4. Hale Mahalo Application for a Water Use Permit, Home Pumehana Well (Well No.
   0501-06), Kamehameha Ground Water Management Area, Molokai

5. Water Use Permit Applications, Manewalut Ground Water Management Area, Molokai
   Applicants:
   Hawaiian Research Ltd., Well No. 0603-01
   Maui Electric Co., Ltd., Molokai Division, Well No. 0603-07
   Maui Electric Co., Ltd., Molokai Division, Well Nos. 0603-06, 0604-03 to 05
   Molokai Ranch, Ltd., Well No. 0706-02

TRANSMISSION REPORT

THIS DOCUMENT (REDUCED SAMPLE ABOVE)
WAS SENT

** COUNT **
# 2

*** SEND ***

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TOTAL 0:01'24"  2
XEROX TELECOPIER 7020
November 8, 1993

TO: Mr. Keith W. Ahue, Chairperson
    Commission on Water Resource Management

FROM: Yukio Kitagawa, Chairperson
      Board of Agriculture

SUBJECT: Water Use Permit, Waikolu Groundwater Management Area, Molokai

Attached is our written testimony for the November 17, 1993 public hearing. The testimony fully addresses the objections raised by all recorded objectors. Our representative will be present at the public hearing to answer questions or to give further information.

The Department of Agriculture asks that the Commission consider giving equal weight to economic benefits and values as you would to environmental benefits, that they must be balanced. All of the objections raised are based only on environmental benefits.

The Department makes one further request, that the water use permit be approved as submitted and that you take action on this permit today.

C: Molokai Water Users Advisory Board
   Agricultural Resource Management Div.
Testimony of the Department of Agriculture for the Water Use Permit Waikolu Groundwater Management Area

Response to Division of Aquatic Resources (DAR) Concerns:

(1) The MIS will make allowances when operating the well pumps to restore stream flows through the dry reaches, when caused by our pumping. Our pump installation plans and specifications make provisions for a 3" bypass nipple pipe to feed pumped effluent into the stream bed (see engineering drawings marked exhibit A).

(2) The construction contract to make improvements to our diversion dam has been awarded; this project (see engineering drawings marked exhibit B) will provide a wetted channel (fish ladder) to allow immigration and emigration of the aquatic animals. This renovation has been approved by the biologist of the DAR.

(3) We are awaiting details for the monitoring program. This program was approved by and is being developed by Mr. Andy Yuen of the U. S. Fish & Wildlife Service, Mr. Bill Derrick of DAR and in consultation with Ms. Ann Brasher of the National Park Service; all are aquatic biologists familiar with Hawaiian stream conditions. The MIS is willing to provide the necessary logistic support, as our maintenance work requires visitation into Waikolu Valley on a regular basis.

(4) The MIS is not contemplating continuous pumping of all the wells simultaneously. We have programmed a pumping management scheme to allow these dike-confined compartments ample recovery periods. Our objective is to harvest the wet season flows for storage and do only water conservation pumping during dry season flows to maintain our storage reservoir at Kualapuu at operational level, which is keeping daily outflow equal to daily inflow.

Response to the Native Hawaiian Advisory Council (NHAC):

(1) A more detailed location of the wells is not available because of the remoteness of the site, and the wells are close together.
(2) Attached are the pumping capacities of each pump and the combinations (see exhibit C) as requested in your objections.

(3) The 7.4 MGD includes surface stream diversions combined in the permit requests.

(4) The only stream affected is Waikolu Stream as there are no other streams.

(5) The project wasn't restricted by such federal law as claimed; a special loan was obtained through the Bureau of Reclamation and involved both state and federal tax funds reflecting contributions by all citizens, not only Hawaiians.

(6) There are no other legal uses within Waikolu Valley at the present time.

(7) All of these items will be dealt with under the proposed River Basin Study by the USDA Soil Conservation Service.

(8) Lastly, NHAC states "... defers their objections if the HHL beneficiaries support the Permit." Attached is a petition from the Hoolehua homesteaders and their testimony today, which indicates full and unconditional support for the water use permit. Further, the Molokai Working Group in its report under Section IV (A) (2) specifically recommends that MIS existing water use is continued and is an essential part of their plan to meet the anticipated water requirements in the 5-10 year period.

Response to the National Park Service (NPS) objections:

(1) The enabling legislation which created this National Park deals only with the leprosy settlement proper. Records in the archives indicate the Kalaupapa leprosy colony was confined to the Kalawao Peninsula. Therefore, we question why the National Park Service is stretching its jurisdiction to a region not directly connected with the leprosy colony.
Testimony of Department of Agriculture
Water Use Permit, Waikolu Groundwater Management Area
Page 3

(2) The NPS is present at the invitation of the State of Hawaii, and should there be objections, a more reasonable approach would be for NPS to represent their objections through a state agency. Further, the two state agencies which have jurisdiction over the national park lands have explicitly reserved any management matters over Waikolu water and its water rights from the purview of the NPS (see attached Cooperative Agreement No. CA 8896-9-8004 and the lease with DHHL marked as exhibits D and E).

(3) In relation to their objections on the adverse effect on the aquatic stream life, the MIS is working with the U. S. Fish and Wildlife Service and the DAR to address the detrimental effects on aquatic animals. NPS, in attempting to develop their own program, hired mainland consultants unfamiliar with Hawaii’s hydrogeology and climatic conditions. This unfamiliarity resulted in distorted data and conclusions such that the study methodology is not fully acceptable by the scientific community and lacks credibility. We already have the solutions to these concerns and are preparing to put them into action.

(4) The NPS indicates that they will reestablish Native Hawaiian culture and religion, but a check with OHA and DHHL shows no such proposal registered. Further, records indicate that Waikolu Valley, due to its remoteness and inaccessibility, did not support any native population, so we question the NPS claim to appurtenant water rights.

(5) We are bothered by the instream flow standard objection when, in fact, standards have not been established. We would like to state that existing irrigation use, which preceded the Water Code by 23 years, and agriculture should have equal protection rights to unrecorded instream use rights. The diversions and wells precede any instream use standards.

(6) We contend that the application is proper and in order, after having worked with the Water Commission staff to develop the application data. Among other items, we question NPS’ understanding of the interrelationship between hydrogeology and surface hydrology. Had they checked with us, we could have explained that Waikolu Valley or any Hawaiian stream is influenced by the volcanic
Testimony of Department of Agriculture
Water Use Permit, Waikolu Groundwater Management Area
Page 4

regime such that the valley's groundwater is the result of dikes which are also the source of surface streams. In pumping the individual dike compartments, this will indirectly affect the entire yield within the valley's surface and groundwaters.

(7) In summary, we are at a loss as to why NPS would support a permit denial. Without this permit, MIS may not be able to adequately service the future irrigation needs it was intended to. We have had little discussion with NPS to resolve differences and, more importantly, to understand what options and alternatives they propose to mitigate this issue.

Closing arguments in support of the water use permit:

(1) The MIS requests the approval of the water use permit without any changes in the quantities requested. Basically, the three existing wells have been in operation for over twenty years without any adverse environmental impacts; and one of the wells - #22, which is located within the tunnel itself - does not influence surface flows as far as we can determine and, as such, should not be subjected to the objections raised.

(2) All of the objections raised are the same claims made when the MIS was under the jurisdiction of DLNR and are in the process of being mitigated during the CDUA permit process. The fish ladder, the dewatering of streambed replenishment during pumping, and the monitoring requirements are the result of the biologists' recommendations. The actual implementation of these mitigation measures is either included in construction drawings which are awarded, or, in the case of monitoring program, are awaiting the baseline data development.

(3) The MIS has the capability to manage the pumping through a newly installed telemetry and supervisory control system. We are in the process of developing a water source management plan, which will control dewatering of the Waikolu water by minimizing the withdrawal. The basic objective is to capture and store winter or high rainfall period flows, which is the 7.48 MGD requested, into our 1.4
billion gallon Kualapuu Reservoir and to pump the dike compartment wells (Wells 4, 5, 23 and 24) when surface diversions cannot maintain the daily usage outflow, which is 3.84 MGD, during summer or low rainfall periods.

Another reason we are forced into this management plan is that Maui Electric has indicated that they will not be able to supply our electric power needs to operate all six pumps. This means that we need to program our pumping schedule to adapt to the power that can be supplied by Maui Electric, and as of now it would be highly unlikely that we could operate more than two pumps at a time over a sustained period during the low demand period. We also are developing an educational program to make water use conservation an important tool to preserve our water source. Presently, the MIS does maintain a plan to maximize the available water source through low water restriction notices, water usage monitoring, leak detection with rapid response to correct, encouraging efficient irrigation methods, keeping water conveyance devices (such as meters, reducers, valves, etc.) in good working condition with periodic maintenance, and minimizing evaporation from our reservoir surface by attempting to reduce wind exposure.

(4) In closing I need to emphasize the importance of this permit, as it is the major source of irrigation water to the major farming region of Molokai. Should the Commission diminish or reduce the requested water quantity, then there will be more frequent SHUT DOWNS of the system during dry weather. Without the assurance of water for agriculture, the industry in all likelihood will not be able to expand much more than what it is today. I want to make it very clear that: (a) we will never intentionally dewater the stream; (b) now with the telemetry control system, we can monitor and manage our pumping for a balanced flow regime throughout the watershed; and (c) we are aware of the importance of this water source to our mission and would never intentionally cause it to deteriorate or be destroyed, but would do our utmost to preserve it for the benefit of Molokai's economy.
Thank you for the opportunity of allowing me to respond to those objections and to make clear our position in support of the water use permit for the MIS. I will be available at the public hearing for any questions.

Respectfully submitted,

[Signature]

PAUL T. MATSUO
Administrator-Chief Engineer
Agricultural Resource Management Division

IRRA:1466
We hereby certify that this is a true copy of the original file as Land Court Document No. __________ and/or recorded in the Bureau of Conveyances as Document No. __________ on November 19, 1992, at 1:45 p.m.

TITLED GUARANTY OF HAWAII, INCORPORATED

By: [Signature]

After Recordation Return by: Mail (x) Pickup () To:
National Park Service, Western Region
Division of Land Resources
600 Harrison Street, Suite 600
San Francisco, California 94107-1372

STATE OF HAWAII

DEPARTMENT OF HAWAIIAN HOME LANDS

GENERAL LEASE NO. 231

between

STATE OF HAWAII

DEPARTMENT OF HAWAIIAN HOME LANDS

and

THE UNITED STATES OF AMERICA

DEPARTMENT OF THE INTERIOR

NATIONAL PARK SERVICE

Covering

HAWAIIAN HOME LANDS

Situate at

Kalaupapa, County of Kalawao, Molokai

Tax Map Key No. 6-1-01:01

COPY (see pg 5)

"EXHIBIT E"
LESSOR relating to any accrued back rentals due from the use of the demised premises.

   a. Any future appraisal conducted for the purpose of a land exchange authorized by Section 104 of Public Law 96-565, shall be based on the demised premises being vacant and available for development to its highest and best use, without regard to the provisions of Public Law 96-565, as amended.
   b. If there is no longer a patient residing at said premises, the fair market rental shall be reopened and redetermined based on the demised premises being vacant and available for development to its highest and best use, without regard to the provisions of Public Law 96-565, as amended.
   c. The parties understand and agree that if funds are not appropriated by the date lease rental is due, any outstanding balance owed the LESSOR shall accrue interest at the rate allowed by federal law, which interest will be payable when authorized by Congress.

ARTICLE ONE

RESERVING UNTO THE LESSOR THE FOLLOWING:

1. Minerals and waters.
   a. All minerals as hereinafter defined, in, on, or under the demised premises, and the right, on its own behalf or through persons authorized by it, to prospect for, mine and remove such minerals and to occupy and use so much of the surface of the ground as may be required for all purposes reasonably extending to the mining and removal of such minerals by any means whatsoever, including strip mining. "Minerals," as used herein, shall mean any or all oil, gas, coal, phosphate, sodium, sulphur, iron, titanium, gold, silver, bauxite, bauxitic clay, diaspore, boehmite, laterite, gibbsite, alumina, all ores of
aluminum and, without limitation thereon, all other minerals substances and ore deposits, whether solid, gaseous or liquid, including all geothermal resources, in, on, or under the land; provided, that "minerals" shall not include sand, gravel, rock, or other material suitable for use and when used in road construction in furtherance of the LESSEE's permitted activities on the demised premises and not for sale to others.

b. All surface waters, ground waters, and water systems appurtenant to the demised land and the right on its own behalf or through persons authorized by it, to capture, divert, or impound the same and to occupy and use so much of the demised premises as may be required in the exercise of this right reserved.

c. As a condition precedent to the exercise by the LESSOR of any rights reserved in this paragraph 1, just compensation shall be paid to the LESSEE for any of the LESSEE's improvements taken which amount is to be determined in the manner set forth in paragraph 3, and, if only a portion of the land leased is withdrawn, the rental will be reduced in proportion to the rental value of the land withdrawn.

2. Prehistoric and historic remains. All prehistoric and historic remains found on the demised premises.

3. Withdrawal. Pursuant to Section 204(a)(2) of the Hawaiian Homes Commission Act, 1920, as amended, the LESSOR shall have the right to withdraw from the operation of this lease all or any portion of the demised land for the purposes of the Hawaiian Homes Commission Act. The LESSEE shall not be entitled to any compensation for improvements, if any, already erected on the lands hereby demised. The LESSEE shall be entitled to compensation for those improvements hereafter made by the LESSEE which have been approved by the LESSOR, in accordance with Article Two, Paragraph 7, titled Improvements, of this agreement on any land withdrawn, in an amount equal to the proportionate value of the LESSEE'S improvements so withdrawn in the proportion that it bears to the unexpired term of the lease; provided, that the LESSEE may, in the alternative,
from amounts otherwise due under this lease or other consideration, the full amount of such commission, brokerage, percentage, or contingent fee.

9. Benefit. No member of Congress or Resident Commission shall be admitted to any share or part of this lease, or to any benefit to arise therefrom. Nothing, however, herein contained, shall be construed to extend to any incorporated company if the lease be for the general benefit of such corporation or company.

IN WITNESS WHEREOF, the parties hereto have caused these presents to be executed as of the day and year first above written.

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS

By

Hosailka L. Drake, Chairman
Hawaiian Homes Commission

LESSEE

UNITED STATES OF AMERICA
DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

By
Edward R. Haberlin, Chief
Division of Land Resources
Western Region

LESSEE
COOPERATIVE AGREEMENT NO: CA 8896-9-8004

COOPERATIVE AGREEMENT
BETWEEN
NATIONAL PARK SERVICE
AND
STATE OF HAWAII
BOARD OF LAND AND NATURAL RESOURCES

TITLE: PRESERVATION OF NATURAL AND CULTURAL RESOURCES, KALAUPAPA

(see pg 3)

"EXHIBIT D"
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3. That annual progress reports regarding the work of the Service at the Park will be provided the Board.

4. That nothing in this Agreement shall be done in violation of specific provisions of State laws, administrative rules or regulations of the Board.

5. That subject to applicable approvals of the State of Hawaii Director of Health, the Board and the public shall have the right of access at reasonable times to public portions of the property for interpretive and other program management purposes.

C. It Is Mutually Understood and Agreed:

1. That the Service and the Board shall consider jointly, at such places and at such intervals as may be agreed upon by both parties hereto, subjects of mutual interest or concern relating to the operation, preservation, and protection of the Park.

2. That no changes or alterations shall be made in the property or in the use of the property which is the subject of the Agreement without mutual agreement of the Service and the Board.

3. That nothing in this agreement shall be interpreted to convey or impair the Board's jurisdiction over fishing or other management of streams, and stream and near-shore resources and waters, including diversions of Waikolu Valley waters. Further that all discussions, actions, or activities related to water and aquatic resources within the park are beyond the purview of this Cooperative Agreement.

4. That so long as the resident patients remain at Kalaupapa, the Service and the Board, in cooperation with the State Department of Health, will assist each other in protecting their current lifestyle, rights, and individual privacy.

5. That the two existing Memorandums of Understanding between the Service and the Board regarding wayside exhibits in Palau State Park executed in March 1985 and for mutual aid in fire control executed in August 1985 are hereby reaffirmed without change.

ARTICLE III. TERM OF AGREEMENT

This agreement shall become effective upon the date of final signature and, in accordance with the requirements of Section 105(b)(2) of the Act, shall remain in effect for a period of 20 years and may be extended and amended by mutual agreement at any time. Upon expiration the agreement shall be reviewed to determine if it should be renewed, modified, or terminated.

ARTICLE IV. KEY OFFICIALS

1. The key official for this agreement on behalf of the Service is: Director, Pacific Area, 300 Ala Moana Boulevard, Box 50165, Honolulu, Hawaii 96850, who shall act in the Service's behalf as Government Technical Representative.

2. The key official for this agreement on behalf of the Board is: Chairperson of the Board, P. O. Box 621, Honolulu, Hawaii 96809.
ARTICLE V. AWARD (NON-FINANCIAL)

1. The Service shall furnish personnel, facilities, supplies, materials, and services as delineated in Article II, Statement of Work, subject to the availability of appropriations.

2. This is a non-financial agreement and nothing contained herein authorizes the Board to incur any costs.

3. Nothing herein shall be construed as obligating either the Service or the Board to expend or involve either party in any contract or other obligation for the future in excess of appropriations authorized by law and administratively allocated for the work.

ARTICLE VI. PRIOR APPROVAL

Both parties agree to secure the necessary licenses, permits, and approvals before undertaking any regulated activities, including but not limited to the following:

a. Conservation District Use Applications for any new, change in existing, or expansion of land use within the Conservation District in accordance with Chapter 183-41 Hawaii Revised Statutes, as amended, and Title 13, Chapter 2 - Administrative Rules of the Department of Land and Natural Resources.

b. Well Drilling or Modification Permits.

c. Construction or installation of any capital improvements.

d. Licenses and special permits for the hunting or otherwise controlling animals doing damage in accordance with Title 13, Chapter 123.

e. Special use permits to conduct activities otherwise prohibited within the Puu Alii Natural Area Reserve in accordance with Title 13, Chapter 209.

f. Scientific collecting permits, on a project-by-project basis, to engage in collecting or research activities which would otherwise be unlawful.

ARTICLE VII. REPORTS

Other than the progress reports described in Article II, there are no reports required in connection with this agreement.

All correspondence and/or copies of all written notices between the Service and the Board shall be sent to the following addresses:

National Park Service
Pacific Area Office
300 Ala Moana Boulevard
Suite 6305, Box 50165
Honolulu, Hawaii 96850

Attention: Government Technical Representative
ARTICLE VIII. PROPERTY UTILIZATION AND DISPOSITION

No property is being furnished as part of this agreement; therefore, this Article is not applicable.

ARTICLE IX. TERMINATION PRIOR TO NATURAL EXPIRATION

This agreement may be terminated by either party with 60 days' notice to the other. The Service may unilaterally terminate the agreement in accordance with Circulars A-102/110 (see attached General Provisions, Part 14).

IN WITNESS HEREOF, the parties hereto have signed their names and executed this agreement.

Cooperative Agreement No: CA 8896-9-8004

To continue for 20 years from effective date below.

TITLE: Preservation of Natural and Cultural Resources, Kalaupapa
To: Rae Loui, Deputy Director  
Commission on Water Resource Management  

From: Manabu Tagomori, Manager-Chief Engineer  

Subject: Department of Agriculture, Agricultural Resource Management Division  
Water Use Permit Application - Waikolu Ground Water Management Area  
Waikolu, Molokai  

As requested, attached are the pumpage records for Wells #22, 23, 24 for the period between September 1984 to December 1993. There are no records available prior to that period as well as the operating efficiencies of the pumps. The lengthy shut-down of the pumps at various times may have been caused by either pump or electrical failures. Unfortunately, the data shown is limited but is the best that we and the Department of Agriculture are able to locate on record.  

Should you have any questions, please contact Edward Lau at ext. 7-0227.  

kc  
Attach. (charts & disk.)  

c. P. Matsuo - DOA (w/charts)  
T. Matayoshi - DOA (Molokai) (w/charts)
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TO Roy

DATE 11/4 TIME 2:15 P.M.

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Message

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of time. Means that the pump was
down or such as color problems.
November 3, 1993

Ms. Rae M. Loui, Deputy Director
Commission on Water Resource Management
Department of Land and Natural Resources
1151 Punchbowl Street
Room 227
Honolulu, HI 96813

Re: National Park Service Position in Regard to Existing and Proposed Water Diversions by the State of Hawaii, Department of Agriculture within Kalaupapa National Historical Park

Dear Ms. Loui:

As a follow up to the recent meetings held this past October by your office concerning the existing and proposed water diversions, and fish ladder proposals on Waikolu Stream, the National Park Service (NPS) would like to provide you with written documentation outlining its position on these topics (enclosed). The NPS appreciates the opportunity to attend and provide input to these discussions.

If you have any questions concerning this document, please contact Jeff Hughes of my staff at (303) 225-3527.

Sincerely,

Owen R. Williams
Chief, Water Rights Branch

cc: (all w/enclosure)
PAR – Director
KALA – Thompson
The National Park Service (NPS) wishes to provide the State of Hawaii, Commission on Water Resource Management with its position concerning the present and future proposed water diversions by the Molokai Irrigation System, Department of Agriculture (Department). The present (and future proposed) diversions are located on Waikolu Stream, Molokai, within the boundaries of Kalaupapa National Historical Park (Kalaupapa NHP).

Background

The mission of the NPS may be paraphrased from 16 U.S.C. 1, (39 Stat. 535) as conserving scenery, natural and historic objects, and wildlife, and providing for enjoyment of the same in such a manner and by such means as will leave them unimpaired for the enjoyment of future generations. Kalaupapa NHP was created December 22, 1980, by Public Law 96-565 (94 Stat. 3322), "In order to provide for the preservation of the unique nationally and internationally significant cultural, historic, educational, and scenic resources of the Kalaupapa settlement...". Congress declared that the primary purposes for creating the park include "to preserve and protect the Kalaupapa settlement for the education and inspiration of present and future generations" and to train the patients and Native Hawaiians "in management and interpretation of the settlement's cultural, historical, educational, and scenic resources". The NPS will not be able to fulfill its mission and the purposes for which Kalaupapa NHP was created will not be met if the water and water-related resources in Kalaupapa NHP are diminished or impaired as a result of the appropriation proposed by the Department's Application For Water Use Permit (Application).

While the land upon which the existing and proposed diversions are located is within the Kalaupapa NHP boundary, it is not currently owned by the U.S. Government. The land is leased to the NPS through agreements with the Hawaii Department of Health. However, it is anticipated that the NPS will obtain ownership of this land within the foreseeable future, and in preparation for this transfer, the NPS is striving to manage and preserve the natural and cultural resources for the people of the State of Hawaii and the United States as if the land were in Federal ownership.
Kalaupapa NHP is rich in both natural and cultural resources. Cultural resources in Waikolu Valley include many examples of taro growing along the Stream. Structures such as loi (terraces), auwai (irrigation ditch), house sites and religious structures are common in the valley. The exact number of these structures is unknown because a complete archeological survey has not been completed for the area (the March 1990, Kalaupapa NHP Resource Management Plan does call for an archeological survey to be conducted in Waikolu Valley). The NPS plans to create interpretive programs depicting life and the native food crops associated with the establishment of Kalaupapa. There may be appurtenant water rights along with traditional and customary rights associated with these uses.

Aquatic species found in Waikolu Stream within Kalaupapa NHP include, but are not limited to:

  - 'o'opu alamo'o (Lentipies concolor)
  - 'o'opu nakea (Awaous stamineus)
  - 'o'opu nopili (Sicyopterus stimpsoni)
  - 'o'opu naniha (Stenogobius genivittatus)
  - 'o'opu akupa (Eleotris sandwicensis)
  - 'opae kala 'ole (Atyoida bisulcata)
  - hihiwai (Neritina granosa)

('A petition has been submitted to the U.S. Fish and Wildlife Service (September 28, 1989) to list 'o'opu alamo'o as a threatened species on Molokai.)

Other natural resources such as vegetation and bird life may be dependent on flows within Waikolu Stream, but research has not yet been initiated to make those determinations.

Basis for NPS Objection

Our objections to the diversions are stated in the NPS document entitled "OBJECTION BY THE NATIONAL PARK SERVICE TO THE APPLICATION FOR WATER USE PERMIT BY THE STATE OF HAWAI'I, DEPARTMENT OF AGRICULTURE, AGRICULTURAL RESOURCE MANAGEMENT DIVISION TO DIVERT GROUND WATER FROM WAIKOLU STREAM, MOLOKAI" (Objection), submitted to the Hawaii Commission on Water Resource Management (Commission) on August 26, 1993. These objections are briefly summarized below:

1 - The public interest would not be served if water and water related resources in the nationally and internationally important Kalaupapa NHP are diminished or impaired as a result of the diversion proposed by this Application.

2 - The appropriation proposed by this Application may adversely affect aquatic life within Waikolu Stream, including 'o'opu.
alamo'o, which has been proposed for listing as a threatened species by the U.S. Fish and Wildlife Service.

3 - The appropriation proposed by this Application will affect Native Hawaiian water rights when Native vegetation along with customs and religious ceremonies are reestablished in Waikolu Valley.

4 - The appropriation proposed by this Application would violate the interim instream flow standards for Molokai streams, as adopted by the Commission on June 15, 1988.

5 - The Application is defective.

The NPS learned, after submitting the Objection to the Department's Application, that the total amount of water applied for will be greater than the estimated sustainable yield. In the Water Resource Protection Plan (1992), published by the Commission on Water Resource Management, the estimated sustainable yield from the Waikolu Aquifer is 5 million gallons a day (mgd) of high level water. The Department is applying for 7.488 mgd, or 2.488 mgd over the State's estimated sustainable yield. This overdraft of water will almost certainly result in a decrease in surface water flow in Waikolu Stream and a detrimental effect upon those attributes which the NPS is trying to protect.

Current Studies

The NPS is currently conducting studies designed to determine the impacts of the present diversions on the aquatic resources dependant on streamflow in Waikolu Stream. Population surveys and habitat use data for the above-mentioned aquatic species are being collected along with stream discharge data to form the baseline database from which conclusions will be developed. These studies were only recently initiated, and it may be several years before definitive answers will be available.

NPS Position

At present, the NPS lacks the necessary data to show injury from present levels of diversion. As on-going research provides us with additional information, the NPS will re-evaluate this position. Even without research results, the NPS cannot condone drying portions of Waikolu Stream by diversion during the drier portions of the year.

In regard to proposed Fish ladders in Waikolu Stream, while the NPS supports the objective to be served, their effectiveness is uncertain based on the available research. While the NPS supports construction and testing of a fish ladder in Waikolu Stream, an increase in the amount of water diverted by the Department during this testing could only aggravate an already difficult situation.
Further increases in diversion should not occur until such time as scientifically sound assessments of impact are at hand.

Conclusion

The NPS is opposed to any further appropriations of water within the Waikolu aquifer system until substantial scientific evidence can show that the diversions proposed will not affect the water-related resources of Kalaupapa NHP.
DATE 3 Nov 1993

TO
NAME Roy Hardy
CITY, STATE Honolulu, HI
OFFICE PHONE (808) 587-0244
FAX NUMBER (808) 587-0219

FROM
NAME Jeff Hughes

GROUP Commission on Water Res. Mgmt.
MAILCODE

GROUP Water Rights Branch
VERIFICATION

TOTAL NUMBER OF PAGES (INCLUDING COVER SHEET) 5

SPECIAL INSTRUCTIONS
Roy, as we discussed, here is a Fax of
the NPS position on diversions = Fish letters
in Waikolu Stream. We are overnight mailing
the original to Rae too.

Jeff (303) 225-3527

Receipt Verified By ___________________________ Date _______ Time _______
NATIONAL PARK SERVICE

Position in regard to Existing and Future
Water Diversions by the State of Hawaii,
Department of Agriculture
Within Kalaupapa National Historical Park

November 3, 1993

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The Honorable Keith W. Ahue  
Chairperson  
Commission on Water Resource Management  
Department of Land and Natural Resources  
P. O. Box 621  
Honolulu, Hawaii 96809  

Dear Mr. Ahue:  

Withdrawal of Objections  

The Department of Hawaiian Home Lands has been in a position to raise objections to various applications for water use permits, particularly in Windward O'ahu, on the basis that water reservations were yet required to meet statutory obligations to Hawaiian home lands.  

Please be advised that as the proposed water reservations in O'ahu and Moloka'i water management areas are finalized, our objections for this reason are thereby withdrawn.  

Warmest aloha,  

Hoaliku L. Drake, Chairman  
Hawaiian Homes Commission  

HLD:BH:ci/1608L.77
Memorandum to:
Mrs. Hoaliku L. Drake
Dr. John C. Lewin
Mr. Clayton H.W. Hee
Mr. Goro Hokama
Mr. Byron S. Walters

Page 2 RE: WELL NOS. 0855-01 through -06

Response: Contact person: ELLEN KRAFTSOW, SR. PLANNERPhone: 243-7835
DEPT. OF WATER SUPPLY, COUNTY OF MAUI

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

Signed: ____________________________
DAVID R. CRADDICK
DIRECTOR OF WATER SUPPLY

Date: 9/23/93
I very much appreciate your interest in our islands’ water affairs.

Hope this article is of service. P.S. don’t hesitate to call me at 533-9845.

aloha!

(2/1/01)
COMMISSION ON WATER RESOURCE MANAGEMENT

FROM: [Signature]

DATE: 9/21

FILE IN: [Redacted]

TO: G. Matsumoto
    E. Sakoda
    Y. Shiroma
    E. Hirano
    D. Higa
    G. Bauer
    R. Hardy

REQUEST:

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

FOR YOUR:

- Approval
- Signature
- Information

[Redacted]
Ground Water Diversion from Waikolu

by Peter Thompson

The National Park Service (NPS) objects to the APPLICATION FOR WATER USE PERMIT by the State of Hawai‘i, Dept. of Agriculture, Agricultural Resources Management Division, to divert ground water from Waikolu Stream within Kalaupapa National Historical Park (NHP).

The following is a brief review of NPS objections. A more complete version has been prepared and presented to the proper authorities. It is also available for those who wish copies. But, in summary, our objects to the proposed applications are:

1. The public interest would not be served if water and water related resources in the nationally and internationally important Kalaupapa NHP are diminished or impaired as a result of the diversion proposed by this application.

2. The appropriation proposed by this Application may adversely affect aquatic life within Waikolu Stream, including 'o'opu alamo'o, which has been proposed for listing as a threatened species by the U. S. Fish and Wildlife Service.

3. The appropriation proposed by this Application will affect Native Hawai‘ian water rights when Native vegetation along with customs and religious ceremonies are reestablished in Waikolu Valley.

4. The appropriation proposed by this Application would violate the interim instream flow standards for Moloka‘i streams, as adopted by the Commission on June 15, 1988.

5. The Application is defective.

Therefore, the NPS requests that the Commission deny this Application.
CONVENTION CENTER COMPROMISE REACHED

HONOLULU (AP) - The deadlock between the House and Senate on building a state convention center was broken Wednesday, but doubt remains on which of two sites will be used - the old Aloha Motors property or the Ala Wai golf course.

House and Senate leaders came up with a compromise bill that gives the state administration 60 days to negotiate the purchase of the entire 9.7 acre Aloha Motors site at a price that would not put the total convention center project cost over $350 million. If a binding purchase agreement is not reached in that time, according to the bill, the convention center would be built on 16 state-owned acres at the Ewa end of the city's Ala Wai Golf Course. That's a move that Mayor Frank Fasi has vowed to said: "I think it's irrelevant, because there's only going to be one world class center and that's the one we're going to build."

Under the bill, the $350 million in bonds to pay for the convention center would be paid off with revenues from increasing the state's hotel room tax from 5 percent to 6 percent. Waihee, Rep. Milton Holt and Sen. Joseph Souki said Sukamoto, who heads Sukamoto Holdings, was not a part of the House-Senate negotiations and probably won't like the results.

After Waihee told reporters it would be very, very premature" to say what the state expects to pay for the Aloha Motors property, he looked aghast while Souki volunteered: "Roughly the price..."
August 30, 1993

The Honorable Keith W. Ahue, Chairperson
Commission on Water Resource Management
Department of Land and Natural Resources
P. O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Ahue:

Water Use Permits

Thank you for the opportunity to respond to these applications for the following water use permits:

O'ahu
Malaekahana-Campbell (3957-01 thru 07, 3956-01)
Laie-White (3855-05)
Laie-BYU (3855-06 thru 08, 3956-03)

Molokai
Waikolu-Dept Ag (0855-01 thru 06).
Ualapue-County (0449-01)

O'ahu
The Windward O'ahu wells are all pre-existing, and we ask only that the requested pumpage be compared with existing pumpage to determine whether use is expected to increase.

Molokai
The Waikolu source for the Molokai Irrigation System is primarily for service to Hawaiian home lands, and we favor their approval. Three wells are existing, but three are new; the impact of the new wells is not fully understood.

Our primary concern is that the groundwater not be overpumped to the detriment of stream flows. The application indicates that normally low summer flows would be interrupted (the stream would be dewatered during those periods), and we object to this as a matter of policy, preferring to focus on conservation, leak prevention, adequate maintenance, and adequate storage of higher winter flows. We request that permits be conditioned
accordingly, and that pumpage and streamflows be carefully monitored for further information and understanding of the aquifer characteristics.

We have no objections to continued County use of the Ualapue Shaft.

Warmest aloha,

Hoaliku L. Drake, Chairman
Hawaiian Homes Commission
Wilma Noelani Joy  
P. O. Box 355  
Hoolehua, HI 96729  

September 15, 1993

State of Hawaii  
Dept. of Land & Natural Resources  
Commission on Water Resource Management  
Honolulu, Hawaii

RE: State of Hawaii, Department of Agriculture  
Application for a Water Use Permit,  
Waikolu Ground Management Area, Molokai

Chairman Ahue and Commissioners,

Mahalo for the opportunity the address this water issue regarding Molokai on Molokai.

I am Wilma Noelani Joy farming my Hoolehua Hawaiian Homestead lot #70 since 1976 utilizing the Molokai Irrigation System. I am currently cropping 26 acres and began the land clearing process to expand my farm about 5 acres. In the future I will be increasing acreage to fully crop my 40 acres agriculture parcel which I live on. My farm Irrigation water needs is entirely serviced by the Molokai Irrigation System (M.I.S.).

As a Hoolehua Hawaiian Homestead farmer, I support the Dept. of Agriculture (D.O.A.) water use application for existing uses. because:

1. M.I.S. serves the public need for irrigation water to sustain established agriculture businesses, like my farm.

2. State of Hawaii, D.O.A. has the right to utilize the water under the State Owned lands managed for the M.I.S. (Correlative Use Doctrine)

3. State of Hawaii, D.O.A. has appurtenant water rights to the Waikolu stream running through lands they manage for the M.I.S.

4. Under H.R.S. 168-4 (Preference) extent prior rights to two-thirds of the developed water for the M.I.S. in Waikolu to Hawaiian Homes Commission and lessees of Hawaiian Homes Commission (as myself) upon need. I need the existing M.I.S. to continue functioning as I am totally dependent on the Waikolu waters to irrigate my Homestead farm.
As a member of the Molokai Water Working Group I supported recommendations for the Northeast sector, which includes Waikolu Valley. The following recommendations supports D.O.A.-M.I.S.

Existing use:

"Existing uses (NPS, DOA, DHHL, DOH, etc.) should continue if they are consistent with the State Water Code."

"Utilization of existing M.I.S. capacity should be done cautiously with current monitoring. Development beyond the existing water systems in the Northeast Sector should not be allowed, unless assessments indicate more water can be withdrawn without further impacts to the natural ecosystems."

I acknowledge the concerns of dewaterment below the lower diversion. I support monitoring of the Waikolu stream. This will take commitment from both National Park Service (NPS) and D.O.A. to end the speculation on whether pumping of the wells do or do not cause dewaterment. There are too many factors involved for and against. I request we take this opportunity and find out if there is a ground and surface water relationship in Waikolu Valley, document the evidence and deal with the issue. I request a minimum 2 year commitment from NPS and D.O.A. to make a determination, document the evidence, mitigate the issue and report the results to the Water Commission.

There are Molokai people watching the M.I.S. and how we take care of Waikolu valley. They highly value the remaining untouched valleys on the Northshore of Molokai and will protect its pristine natural ecosystem. They are watching to see if we kill the Waikolu stream for agriculture economics or if we manage for sustainable water use for all. In the future, we seek to utilize some of the waters of the other valleys they value. D.O.A.-M.I.S. track record regarding Waikolu will determine whether these Molokai people extend an invitation or a petition to stop M.I.S.

Thank you for your time and consideration.

Sincerely,

Wilma Noelani Joy
1993 September 15

TESTIMONY TO THE STATE OF HAWAII COMMISSION ON WATER RESOURCE MANAGEMENT

ITEM 3 Sea Life Park Wells  

Background

The submittal mistakenly states that "no specific objections were filed." In fact, NHAC filed specific written objections to the application on September 3, 1993 (copy attached), focusing on issues of permit consolidation, wastewater, and water licensing.

Analysis & Issues

The submittal again mistakenly states that "no specific objections to this application have been submitted to the Commission."

Recommendation:

No action should be taken until applicant and the Commission respond to the specific objections filed by NHAC.

The recommendation should also include permitting of Well A as a back-up source.

NHAC would like to see the Commission suggest to BLNR and Land Management Division that water licenses are required for the proposed type of water use, since such uses have quantifiable economic value that can be shared with the State.

Public Notice

The submittal mistakenly states that "Written comments and objections to the proposed permit were to be submitted to the Commission by September 2, 1993." The public notice requires that persons "Send written objections by September 3, 1993 ..."

Objections/Comments

This section of the submittal omits NHAC's specific objections sent to the Commission on September 3, 1993.
ITEM 5  Wahikuli Irrigation Well  §440-01

Well Location

The proposed well seems very close to an unlabelled intermittent stream. Is there any possible connection between streamflow and aquifer dynamics in this area?

Analysis:

In non-designated areas, pump installation permitting is the one of the few controls available to the Commission for preventing harm to the resource from occurring. Issuance of a pump installation permit prior to pump testing seems to be a dangerous precedent which limits the Commission's options for proactive water management.

Water Availability.

What is existing use from the Honokowai System?

RECOMMENDATION:

If the Commission decides to issue the pump installation permit prior to pump testing under the proposed conditions, condition 2. should be amended to require the matter to be brought back to the entire Commission for decisionmaking if the pump test results reveal any potential problems with the 200 gpm capacity pump that would suggest installation of a smaller pump to better protect the resource.

ITEM 6  Kalaeloa Wells  §605-10-12

Analysis:

The submittal fails to mention if construction of the new wells has been completed and to analyze any pump test results. It seems that in this case the water use permit should not be amended until these activities are completed.

If the three new wells are to "... take the place of the existing six wells for operational efficiency," will the old wells be abandoned or maintained for system back-up? If they are not going to be maintained, they should be deleted from the amended water use permit and abandoned in accordance with Water Code requirements.
ITEM 7 Hawaiian Research Dug Wells 0501-04, 0601-01

Analysis & Issues

The submittal states that "... additional adverse impacts on other local wells, streams, and the Kamililoa aquifer system are not anticipated." Does this imply that identifiable adverse impacts already exist? If so, what are they? What baseline data exist to support the implication that six years of existing use leads to a conclusion that additional adverse impacts are not anticipated?

If "... data were only provided for the seven-month period from November 30, 1991 through June 30, 1992," does this mean that data were recorded for other periods but were not provided by the applicant? If so, these data should be obtained and incorporated in the analysis before recommendations for decisionmaking are submitted.

RECOMMENDATION

NHAC concurs with the recommendation to defer action until reservation of water for Hawaiian Home Lands is set by rule. we also suggest that action be further deferred until bulk allocation to the Maui Department of Water Supply is set by the Commission.

WATER USE PERMIT DETAILED INFORMATION

Nearby Surrounding Wells and Other Registered Ground Water Use

Identification, assessment, and evaluation of nearby surrounding streams, springs, seeps, pond, and other registered surface water use should also be required at this level of review.

ITEM 8 Kawela Ground Water Management Area 0352-10, 0456-17, 0456-04...

1. David W. Curtis

The presence of six wells immediately downgradient of the applicant's source which may be affected and the present lack of objections to the application emphasizes the need for the Commission to provide direct notice of proposed actions in designated water management areas to those who have already declared or are otherwise known to have interests that may be affected. If the Commission can readily identify these six wells, it can certainly mail notice of the permit applications directly to their owners and operators.

3. Kawela Plantation

Owners and operators of other downgradient wells should be served direct notice of the permit application and objections filed to date.
4. John Wm. Iaea, Jr.

Owners and operators of the wells immediately downgradient of the applicant's source which may be affected should be served direct notice of the permit application and be afforded additional opportunity to file their objections.

ITEM 9 Kualapuu Water Management Area 0801-01, 02, 059-01

NHAC would like the record to reflect DHHL's continuing and increasing reliance upon the principle that their right of first call will be effectuated with a sense of immediacy. In addition to constitutional and statutory language DHHL's reliance may also rest in large part upon statements of Deputy Attorney General Tam that reflect both recognition of the primacy of DHHL's water rights and the attendant potential State liability to other private parties who may be required to cut back should exercise of DHHL's first call adversely affect them.

ITEM 10 Manawainui Ground Water Management Area 0403-04, 0445-01, 0403 076-02

Oral testimony may be presented.

ITEM 11 Ualapue Ground Water Management Area 0352-12, 0445-01, 0449-01

Analysis & Issues

1 & 2. The ongoing establishment of existing uses in an aquifer system should not of itself be a deterrent to restoring currently unused water sources to their previous uses. What "more definite plan for use" does the Commission propose beyond the statement that agricultural irrigation will take place? Without the permit, the applicant is prevented from showing his ability to implement the proposed plan. Perhaps a better solution is to issue an interim permit pending resolution of other allocations issues and applicant's demonstration of his ability to actually use the requested allocation.

3. The submittal fails to mention the specific objections to this permit application filed by the NHAC. We understand that Maui DWS is currently preparing a response to our objections, and ask that the Commission defer action on this item until both the objections and response are available to the Commissioners.

ITEM 13 Department of Agriculture Waikolu Wells 0555-01 04

Analysis & Issues

The submittal should also note that specific objections to the application were sent on time by NHAC (copy attached), further
supporting the staff's recommendation that public hearings be initiated prior to decisionmaking.

Mahalo,

David L. Martin

David L. Martin, Water Claims Manager

Att.
MINUTES
FOR THE MEETING OF THE
COMMISSION ON WATER RESOURCE MANAGEMENT

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

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

The following were in attendance:

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

EXCUSED: Mr. J. Douglas Ing

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

COUNSEL: Mr. William Tam

OTHERS:
Dan Kuhn Tom Hill
Wilma Grambusch Judy Caparida
Mike Foulkes Ellen Kraftsow
Edwin Miranda Steve Kaiser
Paul Matsuo Wilma Joy
Robert Granger Peter Eichhorn
Charley Ice Collette Machado
Gene Ferguson Tom Nance
Rick Ten Cate Tom DeCourcey
Duane Cranney Elizabeth Johnson
June Kapuni-Dearson George Denison
Joseph Wampler Peter Thompson
Daniel Bennet Kip Dunbar
Kelii Mawae David Martin
Neal Wu

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

ITEM 1 MINUTES OF THE SEPTEMBER 1, 1993 MEETING

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

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

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

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

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

Unanimously approved as submitted (Lewin/Cox).

ITEM 4  APPOINTMENT OF HEARINGS MASTERS

Unanimously approved (Lewin/Nakata).

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

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

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

Unanimously approved (Cox/Nakata).

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

Unanimously approved (Nakata/Cox).

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

Unanimously approved (Nakata/Lewin).
ITEM 8

DAVID W. CURTIS, R.M. GRANGER, KAWEKA PLANTATION HOMEOWNERS ASSOCIATION, JOHN UAEA, SR., AND MAUI DEPARTMENT OF WATER SUPPLY APPLICATIONS FOR WATER USE PERMITS, KAWEKA GROUND WATER MANAGEMENT AREA, MOLOKAI

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

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

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

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

ITEM 9

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

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

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

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

1. Unanimously approved (Nakata/Cox).

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

ITEM 10

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

Mrs. Wilma Grambusch stated her concerns in regards to the wetland areas that may be affected by the applicant's request.
Mr. Ice (DHHL) said the first of the four wells appear to be an existing use, therefore they have no objections. The other three wells appear to be new uses and are upgradient of Hawaiian Home lands. Withdrawals could affect salinity for future uses on Hawaiian Home lands. DHHL recommends monitoring the salinity of water and conditioning any future use upon the means of future uses on Hawaiian Homes lands.

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

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

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

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

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

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

**ITEM 11**

JOHN N. URAUCHI, ELLEN M. OSBORNE, AND MAUI DEPARTMENT OF WATER SUPPLY APPLICATIONS FOR WATER USE PERMITS, UIALAPUE GROUND WATER MANAGEMENT AREA, MOLOKAI

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

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

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

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

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

3. Ms. Ellen Kraftsow of the Maui Department of Water Supply requested that the water use be amended to 185,000 gpd instead of the stated 171,000 gpd.
Chairperson and Members  
Commission on Water Resource Management  
July 28, 1993

Ms. Grambusch was concerned that 1) the County of Maui needs to be more precise on the amount of water they need and 2) questioned if the County was conforming to the safe drinking water act.

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

The following actions were taken on the above three applications:

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

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

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

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

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

Unanimously approved for deferral (Lewin/Nakata).

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

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

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

**ITEM 14  OTHER BUSINESS**

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

Ms. Loui said a briefing would be scheduled at a later date.
2. Dr. Lewin asked for the following items to be brought up for future action:
   
   a. The Water Quality Plan - the Code Review Commission and the Commission should meet to review the recommended actions relating to overlapping enforcement and adding additional enforcement to certain areas of the Water Code so water quality work can be carried out more effectively.

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

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

Respectfully submitted,

[Signature]

SHARON S. KOKUBUN
Secretary

**APPROVED AS SUBMITTED:**

[Signature]

RAE M. LOUI, Deputy Director
MIS Ground Water Pumpage
Wells 22, 23, 24

- Grandfathered Diversions
- IIFS Established

MWG Ground Water Est. = 1.13 mgd

- Monthly
- 12-MAV
MIS Ground & Surface Diversions
Annual Averages

Interim Instream Flow Standards Established
Grandfathered Diversions

MWG Ground Water Est. = 1.13 mgd

Total = Sur + Ground
Ground water only

*NOTE: LONG-TERM AVE FLOW OF WAIKOLI STREAM ~ 8.815 mgd
(BASED ON 26 YEARS OF DATA FROM WEST PORTAL AND 30 YEARS OF USGS GAGE STATION 10555)
Chairperson and Members
Commission on Water Resource Management
State of Hawaii
Honolulu, Hawaii

Gentlemen:

Application for a Water Use Permit
Waikolu Ground Water Management Area, Molokai

Applicant: (Well Nos. 0855-01 to 06)
State of Hawaii
Dept. of Agriculture
Agriculture Resource Management Division
P.O. Box 205
Hoolehua, HI 96829

Landowner: Same

Background

There is only one applicant in the Waikolu Aquifer System; the State Dept. of Agriculture. The applicant submitted a completed water use permit application to the Commission on March 19, 1993. Specific information regarding the source, use, notification, objections, and field investigation(s) are described in Attachment A and the attached exhibits.

Analysis & Issues

These existing sources use potable water from the Waikolu Aquifer System for agricultural irrigation needs of the Molokai Irrigation System (MIS). The water is diverted through a five (5) mile transmission tunnel to the 1.4 billion gallon Kualapuu Reservoir (Exhibit 1B). This reservoir services approximately 2000 acres of truck crops via 200 service connections in the Hoolehua area. This request is to continue a ground water use that has been in existence for about twenty-three (23) years.

The first issue regarding this application is the quantity of new vs. existing portions of the applicant's request. The applicant is requesting 3.360 million gallons per day (mgd) of water from DOA's six wells in the Waikolu Valley. Of this request, the applicant has verbally stated that approximately 1.5 to 2.0 mgd is existing use from Wells #22 to #25 (Well Nos. 0855-01 to 03) from the total average flow through the tunnel of 2.5 to 3 mgd, which includes surface water diversions. Each well does have a meter but their pumpage is estimated using pumping time and pump capacity. Of the total diverted water use, approximately one-half of the water is used on Hawaiian Home Lands and one-half on land owned by Molokai Ranch and the State Agricultural Park. The remainder of the ground water request, 1.360 to 1.860 mgd, would constitute a new use from the new wells, Wells 4 to 6 (Well Nos. 0855-04 to 06). The Final Report of the Molokai Working Group estimated the existing use of ground water from the MIS to be 1.13 mgd. Finally, the 1992 Draft of the Molokai Water Use and Development Plan estimated the total withdrawals from the MIS system to be 8.5 mgd but did not differentiate between surface and ground water portions. Finally, the estimated ground water use from the monthly reports for the three pumping wells is 1.031 mgd.
The second issue surrounding this application is the competition between the impact of the existing and future ground water use on the Waikolu Stream and the Dept. of Hawaiian Home Lands agricultural needs through the MIS. Both the National Park Service (NPS) and the Division of Aquatic Resources (DAR) have objected and commented that the impacts to the Waikolu Stream have been significant enough to reevaluate the continuance of the existing diversion let alone any future ground water uses from the valley. However, the Final Report of the Molokai Working Group made a recommendation that existing uses from this aquifer should continue if it is consistent with the State Water Code. This recommendation does not help to rectify the competing issues which are both consistent in the Code and, as such, does not provide any further guidance to the Commission for this application.

Given the competition between the need to protect stream flow and supply the DHHL agricultural demands and the fact that objections have been submitted by the NPS and DAR, staff feels a public hearing is warranted.

RECOMMENDATION

That the Commission defer action on the application to allow staff to initiate public hearing proceedings for this application. The tentative date for this public hearing is November 10, 1993. In the meantime, the applicant shall be allowed to continue pumping the existing sources as needed.

Respectfully submitted,

RAE M. LOUI
Deputy Director

APPROVED FOR SUBMITTAL:

KEITH W. AHUE, Chairperson

- agreement I.C. 3 NPS shall not impede stream flow of water.
- Agreement for future, DHHL will receive from DNR, MODER.
- DHHL has plans and space for DNR modification. MODER is now in place to continue. NPS agreed to monitoring request of these entities.
- NPS objection will be covered by Prussman study.
- DHHL agreement will be covered by petition.
- NPS agreement will be covered by agreement.

N/A: KEHOA is not represented by NPS. RED was same as the water.

N/A: No contact with the petitioner. Keahuokai is needed up to MIS only for emergency purposes. Only 50% of community is relied on MIS/KEHOA/KEHUKA.

Mattie Kahi - 179 lot. 7/6 issue - only Hawaiian should get.
**WATER USE PERMIT DETAILED INFORMATION**

### Source Information

**AQUIFER:** Waikolu System, Northeast Sector, Molokai
- **Sustainable Yield:** *5 mgd
- **Existing Water Use Permits:** 0 mgd
- **Available Allocation:** *5 mgd
- **Total of other pending allocations:** 0 mgd

*Note: Molokai Working Group findings II C. says developable yield for this portion of the island is 0 mgd.*

### WELL:

**Waikolu Tunnel #22 Well (Well No. 0855-01)**
- **Location:** Waikolu Valley, Molokai, TMK:6-1-1:2
- **Year Drilled:** 1961
- **Casing Diameter:** 12 in.
- **Elevations (msl = 0 ft.)**
  - **Water Level:** 988 ft.
  - **Ground:** 992 ft.
  - **Bottom of Solid Casing:** 988 ft.
  - **Bottom of Perforated:** 696 ft.
  - **Bottom of Open Hole:** 592 ft.
- **Total Depth:** 400 ft.
- **Grouted Annulus Depth:** NA ft.

### WELL:

**Waikolu #23 Well (Well No. 0855-02)**
- **Location:** Waikolu Valley, Molokai, TMK:6-1-1:2
- **Year Drilled:** 1961
- **Casing Diameter:** 12 in.
- **Elevations (msl = 0 ft.)**
  - **Water Level:** 866.5 ft.
  - **Ground:** 904 ft.
  - **Bottom of Solid Casing:** 804 ft.
  - **Bottom of Perforated:** 604 ft.
  - **Bottom of Open Hole:** 604 ft.
- **Total Depth:** 300 ft.
- **Grouted Annulus Depth:** NA ft.

### WELL:

**Waikolu #24 Well (Well No. 0855-03)**
- **Location:** Waikolu Valley, Molokai, TMK:6-1-1:2
- **Year Drilled:** 1961
- **Casing Diameter:** 12 in.
- **Elevations (msl = 0 ft.)**
  - **Water Level:** 947 ft.
  - **Ground:** 965 ft.
  - **Bottom of Solid Casing:** 865 ft.
  - **Bottom of Perforated:** 665 ft.
  - **Bottom of Open Hole:** 665 ft.
- **Total Depth:** 300 ft.
- **Grouted Annulus Depth:** NA ft.

**ATTACHMENT A**
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<thead>
<tr>
<th></th>
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<tbody>
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<td></td>
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<tr>
<td>Year Drilled:</td>
<td>1988</td>
<td></td>
<td></td>
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<tr>
<td>Casing Diameter:</td>
<td>14 in.</td>
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<tr>
<td><strong>Elevations (msl= 0 ft.)</strong></td>
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<td></td>
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<tr>
<td>Water Level:</td>
<td>NA ft.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ground:</td>
<td>NA ft.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bottom of Solid Casing:</td>
<td>NA ft.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bottom of Perforated:</td>
<td>NA ft.</td>
<td></td>
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<tr>
<td>Bottom of Open Hole:</td>
<td>NA ft.</td>
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<td>Total Depth:</td>
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<tr>
<td>Year Drilled:</td>
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<tr>
<td>Casing Diameter:</td>
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<tr>
<td><strong>Elevations (msl= 0 ft.)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water Level:</td>
<td>NA ft.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ground:</td>
<td>NA ft.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bottom of Solid Casing:</td>
<td>NA ft.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bottom of Perforated:</td>
<td>NA ft.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bottom of Open Hole:</td>
<td>NA ft.</td>
<td></td>
<td></td>
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<tr>
<td>Total Depth:</td>
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<td>Year Drilled:</td>
<td>1988</td>
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<td>Casing Diameter:</td>
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<tr>
<td><strong>Elevations (msl= 0 ft.)</strong></td>
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<td></td>
</tr>
<tr>
<td>Water Level:</td>
<td>NA ft.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ground:</td>
<td>NA ft.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bottom of Solid Casing:</td>
<td>NA ft.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bottom of Perforated:</td>
<td>NA ft.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bottom of Open Hole:</td>
<td>NA ft.</td>
<td></td>
<td></td>
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<tr>
<td>Total Depth:</td>
<td>202 ft.</td>
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<tr>
<td>Grouted Annulus Depth:</td>
<td>15 ft.</td>
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</table>
Use Information

Quantity Requested: 3,360,000 gallons per day.
Existing Type of Water Use: Agricultural irrigation needs for MIS System
Place of Water Use: Total area in Hoolehua at TMK: 5-2-0:0

*Reported Water Usage: 1.031 gpd
Nearby Similar Water Usage: None gpd
Waikolu Aquifer System
Current 12-Month Moving Average Withdrawal: 1.031 gpd (21% of SY)

*Note: Total for Well Nos. 0855-01 to 03

Nearby Surrounding Wells and Other Registered Ground Water Use

There are no other wells within a mile of these wells (see Exhibit 1). The 1992 Draft of the Molokai Water Use and Development Plan did not estimate the existing withdrawals from the Waikolu Aquifer System. The Final Report of the Molokai Working Group Estimated the total actual use from the Waikolu Aquifer System to be 1.13 mgd.

Public Notice

In accordance with HAR §13-171-17, a public notice was published in the Star-Bulletin on August 8 & 13, 1993 and copies of the notice were sent to the Mayor's office and the Board of Water Supply. Additional notice copies were sent to the County Council and Department of Water Supply. Copies of the completed application were sent to the Department of Health, Department of Hawaiian Home Lands, Office of Hawaiian Affairs, Aquatic Resources & Historic Preservation Divisions of the Department of Land and Natural Resources, and other interested parties for comments. Written comments and objections to the proposed permit were to be submitted to the Commission by August 27, 1993.

ATTACHMENT A
Objections

The public notice specifies that an objector meet the following requirements: (1) state property or other interest in the matter; (2) set forth questions of procedure, fact, law, or policy, to which objections are taken; (3) state all grounds for objections to the proposed permits, (4) provide a copy of the objection letter(s) to the applicant, and (5) submit objections meeting the previous requirements to the Commission by August 27, 1993.

To the best of staff's knowledge there are no objectors who have property interest within the Waikolu Aquifer System or who will be directly and immediately affected by the proposed water use. However, there Kalaupapa National Park, located in the Kahanui Aquifer System, used to take water from Waikolu Stream and are objecting to the application and the Division of Aquatic Resources. All objections and/or comments to the application are summarized as follows:

<table>
<thead>
<tr>
<th>Objector</th>
<th>Objection</th>
</tr>
</thead>
<tbody>
<tr>
<td>NHAC</td>
<td>General process of water use permit applications. No specific objections to this application.</td>
</tr>
<tr>
<td>National Park Service</td>
<td>See Attachment B</td>
</tr>
<tr>
<td>Division of Aquatic Resources</td>
<td>See Attachment C</td>
</tr>
</tbody>
</table>

Briefs in Support

Responses to objections, or briefs in support, regarding the application are required to be filed with the Commission ten (10) days after an objection is filed and, presumably, copies are served to the applicant. The deadline given to the applicant for the submittal of any briefs was September 13, 1993. Any briefs in support filed with the Commission by this date shall be incorporated with this submittal.

Field Investigation

The water source and existing use was investigated on September 23, 1992. The investigation(s) verified the applicants request for water use permit.
August 23, 1993

Keith W. Ahue, Chairperson
Commission on Water Resource Management
State of Hawaii
P. O. Box 621
Honolulu, HI 96809

Dear Sir,

The commission will sometime soon hear an Application For Water Use from the State Department of Agriculture, Moloka'i Irrigation System. Their request is to activate wells 4, 5, 6, 22, 23, and 24 and withdraw an additional 3.360 mgd from Waikolu. According to various documents M.I.S. withdraws 4.5 to 5 mgd now.

We believe that groundwater removal will destroy aquarian and riparian systems which we are bound by law to protect. We believe that the planned withdrawal will likely "dewater" Waikolu.

Please notify me of the hearing dates for the use permit application.

Yours truly,

(SGD) Peter Thompson
Peter Thompson
Superintendent
Re: Objection to APPLICATION FOR WATER USE PERMIT by the State of Hawaii, Department of Agriculture, Agricultural Resource Management Division, for Ground Water Withdrawals in Waikolu Valley, Molokai

Dear Ms. Loui:

The National Park Service objects to the granting of the above-mentioned application (copy enclosed). The reasons for the objection are explained in the enclosed document.

Please inform me as to the next step for the National Park Service to follow. If you have any questions concerning this objection, please contact me or Jeff Hughes at (303) 225-3505 or (303) 225-3527 respectively.

Sincerely,

Owen R. Williams
Chief, Water Rights Branch

Enclosures

cc: (all w/enclosures)
PAAR - Harry
KALA - Superintendent
WR - Kolipinski
OBJECTION BY THE NATIONAL PARK SERVICE TO THE APPLICATION FOR WATER USE PERMIT BY THE STATE OF HAWAII, DEPARTMENT OF AGRICULTURE, AGRICULTURAL RESOURCE MANAGEMENT DIVISION TO DIVERT GROUND WATER FROM WAIKOLU STREAM, MOLOKAI

The National Park Service (NPS) objects to the APPLICATION FOR WATER USE PERMIT (Application) by the State of Hawaii, Department of Agriculture, Agricultural Resource Management Division (Department), to divert ground water from Waikolu Stream, Molokai, within Kalaupapa National Historical Park (Kalaupapa NHP). The notice for this Application appeared in the August, 1993, Water Resource BULLETIN issued by the Commission on Water Resource Management (Commission). The NPS requests the Commission to deny this Application for the following reasons:

The mission of the NPS may be paraphrased from 16 U.S.C. 1, (39 Stat. 535) as conserving scenery, natural and historic objects, and wildlife, and providing for enjoyment of the same in such a manner and by such means as will leave them unimpaired for the enjoyment of future generations. The public interest will not be served if water and water-related resources in the nationally and internationally important Kalaupapa NHP are diminished or impaired as a result of the appropriation proposed by this application.

Kalaupapa NHP was created December 22, 1980, by Public Law 96-565 (94 stat. 3322), "In order to provide for the preservation of the unique nationally and internationally significant cultural, historic, educational, and scenic resources of the Kalaupapa settlement...". Congress declared that the primary purposes for creating the park include "to preserve and protect the Kalaupapa settlement for the education and inspiration of present and future generations" and to train the patients and Native Hawaiians "in management and interpretation of the settlement's cultural, historical, educational, and scenic resources". These purposes will not be met if the water and water-related resources in Kalaupapa NHP are diminished or impaired as a result of the appropriation proposed by this Application.

The Department is presently operating a system of wells and surface water diversions within Kalaupapa NHP on Waikolu Stream. The Application by the Department is for ground water diversions for existing and new wells for agricultural irrigation uses. The present diversions greatly reduce flows in Waikolu Stream, especially during the drier summer months. At times, the stream bed is dry in sections from a point upstream of the upper surface water diversion to just below the pumphouse due to the diversions. The proposed diversions can only further decrease the amount of water flowing in the stream and possibly increase the length of the stream's dry portions, and possibly increase the duration of dewatering. The decrease in surface water flows adversely affect...
the scenic, aquatic and historical (interpretive) resources within the Kalaupapa NHP. Decreasing the flows is not in the public interest.

As stated above, the altered stream flows will have detrimental effects on the aquatic species found in Waikolu Stream. Presently, the NPS is conducting studies to determine the impacts of the diversions on selected aquatic species within the stream. Aquatic macrofauna found in Waikolu Stream within Kalaupapa NHP include, but are not limited to:

- 'o'opu alamo'o (Lentipes concolor)
- 'o'opu nakea (Awaous stamineus)
- 'o'opu nopili (Sicyopterus stimpsoni)
- 'o'opu akupa (Eleotris sandwicensis)
- 'opae kala 'ole (Atyoida bisulcata)
- 'opae 'oeha'a (Macrobrachium grandimanus)
- hiihiwi (Neritina granosa)

(A petition has been submitted to the U. S. Fish and Wildlife Service (September 28, 1989) to list 'o'opu alamo'o as a threatened species on Molokai.)

The NPS plans to reestablish native food crops and other plants important to Native Hawaiian culture and religion in Waikolu Valley. There will be appurtenant water rights along with traditional and customary rights associated with these uses as described in Chapter 174C-101 of the State Water Code. These Native Hawaiian Water Rights will be impaired as a result of the appropriation proposed by this Application.

An interim instream flow standard (adopted by the Commission on June 15, 1988) was established for all streams on Molokai, including Waikolu Stream, for "...that amount of water flowing in each stream on the effective date of this standard, and as that flow may naturally vary throughout the year and from year to year without further amounts of water being diverted offstream through new or expanded diversions, and under the stream conditions existing on the effective date of the standard, ...".

The definition of "Instream flow standard" from the Hawaii revised Statutes (Chapter 13-169-2) is "...a quantity or flow of water or depth of water which is required to be present at a specific location in a stream system at certain specified times of the year to protect aquatic life, wildlife, recreational, aesthetic, scenic, and other beneficial instream uses". The definition of "Instream use" from the same chapter lists several beneficial instream uses including: "Maintenance of aquatic life and wildlife habitats; Outdoor recreational activities; Maintenance of ecosystems such as estuaries, wetlands, and stream vegetation; Aesthetic values such as waterfalls and scenic waterways; (and) The protection of..."
While the surface water diversions and three wells existed before this interim standard, ground water pumped from the three new wells in accordance with this Application would violate the purpose for which the interim standard was set. The Department admits this on the Application in response to question 15(b), where it claimed that the interim instream flow standards would be affected "during the summer when rainfall is less".

The application submitted by the Department is defective. For the response to question number 8, "QUANTITY OF WATER REQUESTED:", the Department answered "3,360,000 gallons per day (or 20 hours per day". In response to Question 15 "(a) Impact on Sustainable yield (?)":, the Department answered "7,488,000 GPD". The answer to question 15(a) is over twice the amount claimed in response to question 8. The Application should be returned to the Department to clarify this important point.

In summary, the NPS objects to the proposed applications on the grounds that:

1 - The public interest would not be served if water and water related resources in the nationally and internationally important Kalaupapa NHP are diminished or impaired as a result of the diversion proposed by this Application.

2 - The appropriation proposed by this Application may adversely affect aquatic life within Waikolu Stream, including 'o'opu alamo'o, which has been proposed for listing as a threatened species by the U.S. Fish and Wildlife Service.

3 - The appropriation proposed by this Application will affect Native Hawaiian water rights when Native vegetation along with customs and religious ceremonies are reestablished in Waikolu Valley.

4 - The appropriation proposed by this Application would violate the interim instream flow standards for Molokai streams, as adopted by the Commission on June 15, 1988.

5 - The Application is defective.

Therefore, the NPS requests that the Commission deny this Application.
State of Hawaii
Department of Land and Natural Resources
DIVISION OF AQUATIC RESOURCES

August 19, 1993

MEMORANDUM

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

FROM: Henry Sakuda, Administrator
Division of Aquatic Resources

SUBJECT: Comments on water use permit application for the State Department of Agriculture, Agriculture Resource Management Division for Well Nos. 0855-01, 0855-02, 0855-03, 0855-04, and 0855-06 the the Waikolu Ground Water Management Area, Molokai

The application is for three existing wells and three new wells adjacent to the Waikolu Stream on north Molokai within the boundaries of the Kalaupapa National Historical Site. Approximately 3,360,000 gallons of dike-confined water will be pumped per day and transferred to the Hoolehua area for irrigation use. The application characterizes the water quality as non-potable, but it seems likely that the source is actually potable. It was noted that the wells would reduce stream flows during dry periods.

The Waikolu Stream should rate as among the most pristine in Hawaii. It drains a large native forest watershed and flows through the Kalaupapa National Historical Site. The State of Hawaii has retained water rights to the stream and diverts water to the dry south side of the island for irrigation use. Wells have also been drilled adjacent to the stream below the upper diversion to add ground water to the irrigation distribution system. The combination of diversion and dewatering attributable to ground water pumping has dried the middle reach of the stream, between the upper diversion at approximately 1,100 feet in elevation and a lower diversion at 730 feet.

Waikolu Stream supports large populations of all the native fishes and macroinvertebrates. Prior to the alterations which created the dewatered section of the stream, all of the native inland fish species and macroinvertebrates were abundant to the upper end of the stream. After the alterations, this diversity and abundance stopped at the point of dewatering. Only one of the gobies, Lentipes concolor, subsequently made it to the higher reaches through the dry section, migrating rapidly during periodic freshets, but its numbers were considerably reduced and its size frequency distribution was compressed towards the larger size range, reflecting diminished recruitment.

Additional pumps will probably worsen the situation. However, the Department of Agriculture recently stated a commitment to restore flows through the dry reach adequate to provide continuous habitat suitable for both occupation and migration by native aquatic species.

ATTACHMENT C
This commitment needs to become a condition of the permit, if the application is approved. Included with the condition should be a plan for defining how this flow restoration can be achieved.

In addition, DLNR's Division of Water and Land Development has completed a plan for modification of the upper diversion weir to improve the chances for successful immigration and emigration of native amphidromous species. At present the weir not only presents a barrier but actually represents a trap for these organisms. Completion of this modification should also be a condition of any approved permit.

We also believe that a long term biological monitoring program should be established for this stream to define the effectiveness of the mitigation measures recommended above and to determine whether additional steps, including modification of the mitigative flow regime, are needed. The Division of Aquatic Resources has data that can be applied to a baseline definition, and the National Park Service is presently engaged in studies of Waikolu Stream that can be applied to design the monitoring program once those studies are complete. It is possible that the Division of Aquatic Resources could conduct the monitoring program with logistic support from the Department of Agriculture.

We would prefer to see all diversions and pumps removed from Waikolu, given the biological value of the area, but recognize that agricultural demands have become dependent on this source of irrigation water. Nevertheless, serious attention should be given to the imposition of mitigation measures that can at least partially assure the perpetuation of the stream's suitability as habitat for native aquatic species.
Figure 1. Location of Monitor and Control Sites Within the Molokai Irrigation System
Counsel for Kalamaula Homestead Association, an Unincorporated Association, Mrs. Wilma Grambusch, President

September 13, 1993

Commission on Water Use Management
Mr. Keith A'hu'u, Chairperson
P.O. Box 521
Honolulu, Hi 968020

Re: Matters raised at Meetings on Molokai, September 15th, 1:30 at Mitchell Pauoli Center and at 6:00 at Molokai High School

I. Request for Deferral of Several Matters scheduled for 1:30 until 6:00

On behalf of the Kalamaula Homestead Association, I wish to request deferral of decision-making on items 7-13 of the agenda for the Meeting of COWRM scheduled for 1:30 on September 15. Unfortunately, many of the members of the association, including myself, acting as counsel for the association have work commitments which prevent us from attending the 1:30 meeting. We request that you keep open the record on these items, defer decision making and allow us to testify at the 6:00 meeting. The Kalamaula Homestead Association, asserts that it has appropriate standing on all of these issues as its lands are sufficiently proximate to the applicants proposed use such that the association has an adequate property interest. The Association relies on the language of the HHCA, particularly section 221, which strongly states that the waters of Molokai, shall be first used to place homesteaders on the land.

II. Specific Objections to Applications:

0352-10, 0454-19, 0496-04 ... 0496-16, 0457-01

a. Item 8 -- application of Curtis, et al, Kawela Plantation Homeowners Association. The Kalamaula Homeowners Association objects to the application of David Curtis et al on numerous grounds:

1. The applicant’s use will interfere with the 3(c)
standard water use permit conditions) and 3(g) "existing legal right" to the use of water by members of the Kalamaula Homestead Association. The rights of Homesteaders are defined by both congressional and state law and the barrier to homesteading has been the inability to obtain water. The rights of the association extend island-wide and thus all uses other than those for homesteading are subordinate to the rights of homesteaders not able to live on their lands due to failure to supply water. The strength of this right is obvious, since it is repeated a number of times in different parts of the standard water use permit conditions, particularly in 9(g) and section 6. Any issuance of a water use permit on Molokai should be deferred until the public hearing on the proposed rule. Chronologically, only after the rule preserving waters is finalized, including the scope of aquifers which are affected, can water permits be issued on Molokai.

2. Request for 'Contested Case Proceeding:' In the event that the Commission sees fit to proceed with the issuance of a water permit for the applicants in item 8, the Kalamaula Homestead Associations exercises its rights under Chapter 91 in seeking a contested case proceeding. The request for such a hearing requires the Commission to defer decision making.

b. Item 94 - 0801-01 , 0812-01

a. Request of DHHL for Water Use Permits. Kalamaula Homestead Association requests that this matter be consolidated with the proposed "rule" to be heard at 6:00 P.M. The reservation of amount sought by DHHL coheres with the amount proposed by the Molokai Working Group. Kalamaula Homestead Association asserts that the rights to water of Hawaiian Homesteaders is not subservient to the rulemaking authority of COWRM and that the amounts set forth are grossly inadequate to meet the needs of the Kalamaula Homestead Association and its future plans. Objector Kalamaula Homestead Association protests the arrangements made by DHHL for sharing water with the Department of Water Supply and the complete failure of DHHL to act as a fiduciary representative of the native Hawaiian beneficiaries. The limitation stated on page 3 limiting the issuance of interim permits, which is to be temporary until the reservations are set by rule, is a limitation that should be placed on all permits on Molokai. Under the original version of the Hawaiian Homes Commission Act, all waters, for domestic use, or agricultural use, were to be first used for the benefit of Homesteaders.

b. The Kalamaula Homestead Association asserts that COWRM has no legal authority to issue interim permit subject to conditions that are based on federal restrictions.

c. In addition, the Kalamaula Homestead Association asserts that the Supremacy Clause of the United States Constitution nullifies the right of COWRM to set limitations on water use of
Item 10: Kalamaula Homestead Association, acting on behalf of Mr. Harry Aki, and other residents of Mauna Loa town, objects to applicant Molokai Ranch's request, and "objects" to the staff recommendation as to nos. 2 and 3, on the grounds that Molokai Ranch, under equitable doctrines of law, is acting with "unclean hands" in that it has failed to comply with the federal Safe Drinking Water Act in its delivery of water to Mauna Loa Town. Until this violation of federal standards is rectified, the applicant should not receive further sources of water.

Item 13: Kalamaula Homestead Association objects to applicants proposal and agrees with the staff recommendation for a deferred public hearing on November 10. Objector asserts that the original purposes and terms of the Waikolu source have been violated to the benefit of the County and the detriment of Objector. Objector wishes to have the ability to prove its case at a later date.

Item 14: Objector, Kalamaula Homestead Association, opposes the staff recommendation on the grounds that the permit should be issued only after all needs of the native Hawaiian beneficiaries have been met! Moreover, it does not make any sense to grant such a permit prior to the full hearing and final determination of the rule to be heard on the reservation of homestead waters.
In conclusion, Objector seeks a consolidation of the 1:30 agenda with the 6:00 rule making agenda and finds that the attempt to proceed with permitting without a final rule as to reserved waters violates the intent of the state legislature. Objector thus reserves its right to seek judicial review, by way of a contested case proceeding, or otherwise as to all permits issued prior to finalizing the issues as to the rule reserving waters for Homesteaders.

DATED: September 13, 1993, Honolulu, Hawaii

Yours,

Williamson B.C. Chang
Counsel for Objector, Kalamaualua
Homestead Assn. Professor of Law,
University of Hawaii
Mr. Thomas Matayoshi  
State of Hawaii  
Department of Agriculture  
Agricultural Resource Management Division  
P.O. BOX 205  
Hoolehua, HI 96829  

Dear Mr. Matayoshi:

Notice of Objection(s) to Your Water Use Permit Application  
Waikolu Ground Water Management Area, Molokai  

We have received an additional objections to your pending water use permit application for the Waikolu Valley MIS Wells (Well Nos. 0855-01 to 06) by the August 27, 1993 deadline for filing. This letter serves as your notice of this additional objections to your application(s) as required by Rule §13-171-17(c).

For your information, HAR §13-171-18(c) states that:

"Within ten working days after the filing of an objection with the Commission, any party may file with the Commission a brief in support of the proposed permit. Such party shall serve copies of the brief in support upon the objecting party."

As such, we request that any briefs in support be filed with us and copies sent to the objector(s) by September 14, 1993 to meet the provisions of HAR §13-171-18(c).

Additionally, we have attached another copy of the first objection we sent you so that Mr. Paul Matsuo will have a copy of both for his information.

If you have any questions, please contact Roy Hardy at 587-0274 or Lenore Nakama at 587-0218.

Sincerely,

RAE M. LOUI  
Deputy Director
United States Department of the Interior  
NATIONAL PARK SERVICE  
Kalaupapa National Historical Park  
Kalaupapa, Hawaii 96742

August 23, 1993

Keith W. Ahue, Chairperson  
Commission on Water Resource Management  
State of Hawaii  
P. O. Box 621  
Honolulu, HI 96809  

Dear Sir,

The commission will sometime soon hear an Application For Water Use from the State Department of Agriculture, Moloka'i Irrigation System. Their request is to activate wells 4, 5, 6, 22, 23, and 24 and withdraw an additional 3.360 mgd from Waikolu. According to various documents M.I.S. withdraws 4.5 to 5 mgd now.

We believe that groundwater removal will destroy aquarian and riparian systems which we are bound by law to protect. We believe that the planned withdrawal will likely "dewater" Waikolu.

Please notify me of the hearing dates for the use permit application.

Yours truly,

(SGD) Peter Thompson  
Peter Thompson  
Superintendent
Ms. Rae M. Loui  
Deputy Director  
Commission on Water Resource Management  
Department of Land and Natural Resources  
P.O. Box 621  
Honolulu, HI 96809

Re: Objection to APPLICATION FOR WATER USE PERMIT by the State of Hawaii, Department of Agriculture, Agricultural Resource Management Division, for Ground Water Withdrawals in Waikolu Valley, Molokai

Dear Ms. Loui:

The National Park Service objects to the granting of the above-mentioned application (copy enclosed). The reasons for the objection are explained in the enclosed document.

Please inform me as to the next step for the National Park Service to follow. If you have any questions concerning this objection, please contact me or Jeff Hughes at (303) 225-3505 or (303) 225-3527 respectively.

Sincerely,

Owen R. Williams  
Chief, Water Rights Branch

Enclosures

cc: (all w/enclosures)  
PAAR - Harry  
KALA - Superintendent  
WR - Kolipinski
The National Park Service (NPS) objects to the APPLICATION FOR WATER USE PERMIT (Application) by the State of Hawaii, Department of Agriculture, Agricultural Resource Management Division (Department), to divert ground water from Waikolu Stream, Molokai, within Kalaupapa National Historical Park (Kalaupapa NHP). The notice for this Application appeared in the August, 1993, Water Resource BULLETIN, issued by the Commission on Water Resource Management (Commission). The NPS requests the Commission to deny this Application for the following reasons:

The mission of the NPS may be paraphrased from 16 U.S.C. 1, (39 Stat. 535) as conserving scenery, natural and historic objects, and wildlife, and providing for enjoyment of the same in such a manner and by such means as will leave them unimpaired for the enjoyment of future generations. The public interest will not be served if water and water-related resources in the nationally and internationally important Kalaupapa NHP are diminished or impaired as a result of the appropriation proposed by this application.

Kalaupapa NHP was created December 22, 1980, by Public Law 96-565 (94 Stat. 3322), "In order to provide for the preservation of the unique nationally and internationally significant cultural, historic, educational, and scenic resources of the Kalaupapa settlement...". Congress declared that the primary purposes for creating the park include "to preserve and protect the Kalaupapa settlement for the education and inspiration of present and future generations" and to train the patients and Native Hawaiians "in management and interpretation of the settlement's cultural, historical, educational, and scenic resources". These purposes will not be met if the water and water-related resources in Kalaupapa NHP are diminished or impaired as a result of the appropriation proposed by this Application.

The Department is presently operating a system of wells and surface water diversions within Kalaupapa NHP on Waikolu Stream. The Application by the Department is for ground water diversions for existing and new wells for agricultural irrigation uses. The present diversions greatly reduce flows in Waikolu Stream, especially during the drier summer months. At times, the stream bed is dry in sections from a point upstream of the upper surface water diversion to just below the pumphouse due to the diversions. The proposed diversions can only further decrease the amount of water flowing in the stream and possibly increase the length of the stream's dry portions, and possibly increase the duration of dewatering. The decrease in surface water flows adversely affect
the scenic, aquatic and historical (interpretive) resources within the Kalaupapa NHP. Decreasing the flows is not in the public interest.

As stated above, the altered stream flows will have detrimental effects on the aquatic species found in Waikolu Stream. Presently, the NPS is conducting studies to determine the impacts of the diversions on selected aquatic species within the stream. Aquatic macrofauna found in Waikolu Stream within Kalaupapa NHP include, but are not limited to:

'o'opu alamo'o (Lentipes concolor)
'o'opu nakea (Awaous stamineus)
'o'opu nopili (Sicyopterus stimpsoni)
'o'opu akupa (Eleotris sandwicensis)
'opae kala 'ole (Atyoida bisulcata)
'opae 'oeha'a (Macrobrachium grandimanus)
hihiwai (Neritina granosa)

(A petition has been submitted to the U.S. Fish and Wildlife Service (September 28, 1989) to list 'o'opu alamo'o as a threatened species on Molokai.)

The NPS plans to reestablish native food crops and other plants important to Native Hawaiian culture and religion in Waikolu Valley. There will be appurtenant water rights along with traditional and customary rights associated with these uses as described in Chapter 174C-101 of the State Water Code. These Native Hawaiian Water Rights will be impaired as a result of the appropriation proposed by this Application.

An interim instream flow standard (adopted by the Commission on June 15, 1988) was established for all streams on Molokai, including Waikolu Stream, for "...that amount of water flowing in each stream on the effective date of this standard, and as that flow may naturally vary throughout the year and from year to year without further amounts of water being diverted offstream through new or expanded diversions, and under the stream conditions existing on the effective date of the standard,...".

The definition of "Instream flow standard" from the Hawaii revised Statutes (Chapter 13-169-2) is "...a quantity or flow of water or depth of water which is required to be present at a specific location in a stream system at certain specified times of the year to protect aquatic life, wildlife, recreational, aesthetic, scenic, and other beneficial instream uses". The definition of "Instream use" from the same chapter lists several beneficial instream uses including:"Maintenance of aquatic life and wildlife habitats; Outdoor recreational activities; Maintenance of ecosystems such as estuaries, wetlands, and stream vegetation; Aesthetic values such as waterfalls and scenic waterways; (and) The protection of
traditional and customary Hawaiian rights".

While the surface water diversions and three wells existed before this interim standard, ground water pumped from the three new wells in accordance with this Application would violate the purpose for which the interim standard was set. The Department admits this on the Application in response to question 15(b), where it claimed that the interim instream flow standards would be affected "during the summer when rainfall is less".

The application submitted by the Department is defective. For the response to question number 8, "QUANTITY OF WATER REQUESTED:", the Department answered "3,360,000 gallons per day (or 20 hours per day". In response to Question 15 "(a) Impact on Sustainable yield (?)":", the Department answered "7,488,000 GPD". The answer to question 15(a) is over twice the amount claimed in response to question 8. The Application should be returned to the Department to clarify this important point.

In summary, the NPS objects to the proposed applications on the grounds that:

1 - The public interest would not be served if water and water related resources in the nationally and internationally important Kalaupapa NHP are diminished or impaired as a result of the diversion proposed by this Application.

2 - The appropriation proposed by this Application may adversely affect aquatic life within Waikolu Stream, including 'o'opu alamo'o, which has been proposed for listing as a threatened species by the U.S. Fish and Wildlife Service.

3 - The appropriation proposed by this Application will affect Native Hawaiian water rights when Native vegetation along with customs and religious ceremonies are reestablished in Waikolu Valley.

4 - The appropriation proposed by this Application would violate the interim instream flow standards for Molokai streams, as adopted by the Commission on June 15, 1988.

5 - The Application is defective.

Therefore, the NPS requests that the Commission deny this Application.
FAX TRANSMITTAL

DATE: 9-10-93

TO: Ray Hardy

FROM: Tom Handy

STATE OF HAWAII
DEPARTMENT OF AGRICULTURE
Division of Agricultural Resource Management
Molokai Irrigation System
P. O. Box 208
Houlouma, HI 96720-0208

SUBJECT: Objection to Water Use Permit

REMARKS: FOR Wm 0949-01

Total number of pages (including this page): 6

If you do not receive the total number of pages noted above and/or have problems with our transmission, please contact the sender at (808) 567-6150.
1993 August 30

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

OBJECTIONS TO AND COMMENTS ON WATER USE PERMIT APPLICATIONS
(Public notice of July 27, 1993/Comments due August 30, 1993)

GENERAL OBJECTIONS

We reiterate our general objections to current COWRM water use permit application processing and decisionmaking practices as previously submitted on numerous occasions (10/12/92, 10/21/92, 12/1/92, 6/22/93, & 7/6/93).

We also have specific comments on and objections to several of the applications listed in this notice, particularly those of Maui Department of Water Supply, State Department of Agriculture, Island Water Co., Inc., and Campbell Estate. In each case NHAAC represents water source registrants, water use declarants, water use permit applicants, and others with property interest in land within the hydrologic unit of the source of water supply who would be directly and immediately affected by the proposed water use.

Because of the complexity, importance, and late arrival of some of these applications to our office, we are requesting an extended review period (as provided on your memorandum) to September 3, 1993, when we will submit all objections and comments for both this set of applications and those whose objections due date is September 3.

Thank you for your consideration of this request.

David L. Martin

David L. Martin, Water Claims Manager
1993 September 3

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

OBJECTIONS TO AND COMMENTS ON WATER USE PERMIT APPLICATIONS
/Public notice of July 27, 1993/Comments due August 30, 1993
/Extension to September 3, 1993 requested on August 30, 1993/

GENERAL OBJECTIONS

We reiterate our general objections to current COWRM water use permit application processing and decisionmaking practices as previously submitted on numerous occasions (10/12/92, 10/21/92, 12/1/92, 6/22/93, & 7/8/93).

SPECIFIC OBJECTIONS

NHAC represents water source registrants, water use declarants, water use permit applicants, and others with property interest in land within the hydrologic units of the sources of water supply who would be directly and immediately affected by the proposed water uses.

1. Ualapue Shaft 0449-0:

14.(c) Hawaiian Home Lands uses affected

In its final report dated July 1993, the Molokai Working Group recommends that "... DHHL's demonstrable needs which are currently tied to lands at Hoolehua and Kalamaula through 2010, be reserved first."

Since reservations of water to Hawaiian Home Lands have not yet been accomplished, this application should be deferred until that time. Additionally, mechanisms for bulk allocation of water to the Maui Department of Water Supply, similar to those being developed for O'ahu, should be implemented, rather than processing each individual County source under separate water use permit applications.

14.(d) The Molokai Working Group recommends that "Other rights which may exist pertaining to Hawaiians not residing on DHHL lands must also be honored" (Final Report page 6).
The proximity of the Ualapue shaft to shoreline fishponds and Loipunawai raises questions of its impacts upon groundwater flows which nourish these resources. Permitted use of the shaft should be restricted to avoid affecting subsurface flows required to maintain the productivity of nearby fishponds, Loipunawai, and nearshore ecosystems, and to honor the rights of Native Hawaiians to utilize these resources for traditional and customary practices.

2. Waikolu Wells 0655-01 to -06

The combined application for existing and proposed sources is confusing and requires further explanation before objections and comments can be completed. Specific items requiring clarification include:

4. SOURCE LOCATION

While wells 01-03 can be located using existing groundwater indices, new wells 04-06 cannot be located except within a 270' elevational range. In order to assess potential restrictions on use, more detailed locations for the new wells are required.

8. QUANTITY OF WATER REQUESTED

What is the quantity requested from each individual source? From the existing sources combined? From the new sources combined?

15.(a) Impact on sustainable yield

The entry of "7,488,000 GPD" on this line requires further explanation.

15.(b) Permanent or Interim Instream Flow Standards affected

Applicant should specify which sources affect which streams. Permitted use should be restricted to end and avoid any such effects.

15.(c) Hawaiian Home Lands uses affected

Operation of the Molokai Irrigation system was originally intended to be solely for the benefit of Molokai Hawaiian Home Lands. Subsequent State legislation which allowed 1/3 of the system capacity to be used for other purposes violates the spirit and intent of the original enacting federal legislation. Thus use of existing and new sources by the Department of Agriculture affects Hawaiian Home Lands uses, and permitted use should be restricted to avoid any such effects.
15. (d) Other existing legal uses affected

When instream flow standards are affected, other legal uses of streams are also affected. Permitted use should be restricted to end and avoid any such effects.

16. REMARKS, EXPLANATIONS

The Molokai Working Group recommends:

III.E. . . . all additional water supply should first be sought in the sector for which it shall be used.

III.P. . . . new water supplies should be sought first through conservation.

IV.A.1. The development of new water resources from the undeveloped portions of the Northeast Sector should be held in reserve to maintain the 19 mgd developable yield.

IV.A.3. Development beyond the existing water systems in the Northeast Sector should not be allowed, unless assessments indicate more water can be withdrawn without further impacts to the natural ecosystems.

NHAC believes that applicant's request for proposed new source does not follow the Molokai Working Group recommendations and thus should not be permitted. However, we defer our objections to those of Molokai Hawaiian Home Lands beneficiaries and of the Molokai Working Group.

3. Laie Water Co., Inc. Wells 3855-06 to 08 & 3956-03
Polynesian Cultural Center Lagoon Well 3855-09

NHAC supports the objections filed by Hui Malama 'Aina 'O'La'ie on August 30, 1993.

4. Campbell Estate Well 3957-01

3. (a) EXISTING SOURCE NAME AND STATE NUMBER

The Public Notice only covers Well 01, while the completed application is for a battery of wells also including Well 02 and 04 to 06. It seems that the Commission must republish this notice with the complete information and allow additional time for objection and comment.

8. QUANTITY OF WATER REQUESTED

13. TOTAL ACRES PROPOSED FOR IRRIGATION AND TYPE OF CROP

One million gpd for 80 acres of various unspecified crops works out to 12,500 gpd. Without greater specification of the proposed crops, it is impossible to compare proposed use with Water Plan
guidelines and to determine if the proposed use is reasonable and beneficial.

Mahalo

David L. Martin, Water Claims Manager

pc: Maui Department of Water Supply
    State Department of Agriculture
    R.E. White, Jr.
    Laie Water Co, Inc.
    Polynesian Cultural Center
    Campbell Estate
Mr. Thomas Matayoshi
State of Hawaii
Dept. of Agriculture
Agriculture Resource Management Division
P.O. Box 205
Hoolehua, HI 96829

Dear Mr. Matayoshi:

Commission Submittal for Your Water Use Permit
Waikolu Ground Water Management Area, Molokai

The Commission on Water Resource Management will be acting on your water use permit application for your WELL #22 Well (Well No. 0855-01) at its September 15, 1993 meeting at 9:00 a.m. p.m. at the Mitchell Pauoli Center.

A copy of the submittal for action on your water use application is enclosed for your information and review. You may wish to attend the meeting in case the Commissioners have questions regarding your application. Otherwise, we will notify you of the Commission's decision soon thereafter.

If you have any questions, please contact Roy Hardy at 587-0274.

Sincerely,

RAE M. LOUI
Deputy Director

RH:fc
Attach.
The Honorable Keith W. Ahue  
State of Hawaii  
Department of Land and Natural Resources  
Commission of Water Resource Management  
P.O. Box 621  
Honolulu, Hawaii 96809  
Attn: Mr. Manabu Tagomori, Deputy

Dear Mr. Ahue:

We have received the following water permit applications. Thank you for the opportunity to review these applications:

<table>
<thead>
<tr>
<th>Applicant Name</th>
<th>Area</th>
<th>Water Mgt. Amount Requested (gpd)</th>
<th>Tax Map</th>
<th>Well Number</th>
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<tbody>
<tr>
<td>Est. Campbell</td>
<td>Koolauloa</td>
<td>100,000</td>
<td>5-2-06:06</td>
<td>3957-07</td>
</tr>
<tr>
<td>Est. Campbell</td>
<td>Koolauloa</td>
<td>1,000,000</td>
<td>5-2-06:18</td>
<td>3957-01</td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
<td>3957-02</td>
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<td>3957-04</td>
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<td></td>
<td>3957-06</td>
</tr>
<tr>
<td>Est. Campbell</td>
<td>Koolauloa</td>
<td>100,000</td>
<td>5-6-01:01</td>
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</tr>
<tr>
<td>Est. Campbell</td>
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<td>2,000,000</td>
<td>5-5-06:18</td>
<td>3957-03</td>
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<td>R.E. White, Jr.</td>
<td>Koolauloa</td>
<td>87,140</td>
<td>5-5-01:21</td>
<td>3855-05</td>
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<tr>
<td>Laie Water Co.</td>
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<td>5-5-06:05</td>
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<td>5-5-08:58</td>
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<td>1,080,000</td>
<td>Various</td>
<td>0449-01</td>
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<tr>
<td>Agric. Res.</td>
<td>Hoolehua</td>
<td>3,360,000</td>
<td>Various</td>
<td>0855-01</td>
</tr>
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<td></td>
<td>0855-06</td>
</tr>
</tbody>
</table>
Our records indicate that wells Nos. 0449-01 and 0855-01 through 0855-06 are on ceded land. We have no objections in granting water permits to the Maui Department of Water Supply and the Agricultural Resource Management Division providing that: (i) DHHL's priority for water usage is met, and (ii) water needs of Kuleana users are fully guaranteed.

We have continuing concern over the increasing use of the Koolauloa aquifer system to meet increasing demands for water in windward Oahu. We must caution that water is a commodity in short supply and the granting of water permits for large developments may jeopardize current or future water demands of small landholders.

Sincerely yours,

Clayton H. H. Hee
Chairperson
Office of Hawaiian Affairs

LM:sk
Mr. Thomas Matayoshi  
State of Hawaii  
Department of Agriculture  
Agriculture Resource Management Division  
P.O. Box 205  
Hoolehua, HI 96813

Dear Mr. Matayoshi:

Notice of Objection(s) to Your Water Use Permit Application  
Waikolu Ground Water Management Area, Molokai

We have received the attached objection(s) to your pending water use permit application(s) for the Waikolu Valley MIS Wells (Well Nos. 0855-01 to 06) by the August 27, 1993 deadline for filing. This letter serves as your notice of objection(s) to your application(s) as required by Rule §13-171-17(c).

For your information, HAR §13-171-18(c) states that:

"Within ten working days after the filing of an objection with the Commission, any party may file with the Commission a brief in support of the proposed permit. Such party shall serve copies of the brief in support upon the objecting party."

As such, we request that any briefs in support be filed with us and copies sent to the objector(s) by September 13, 1993 to meet the provisions of HAR §13-171-18(c).

If you have any questions, please contact Roy Hardy at 587-0274 or Lenore Nakama at 587-0218.

Sincerely,

RAE M. LOUI  
Deputy Director

RH:fc  
Attach.
MEMORANDUM

TO: Aquatic Resources
Forestry and Wildlife
Historic Preservation
Land Management
Natural Area Reserve System
Office of Conservation and Environmental Affairs
State Parks
Water and Land Development
Other Interested Parties

FROM: Rae M. Loui, Deputy Director

SUBJECT: Request for Comments
Water Use Permit Application
Waikolu Ground Water Management Area, Molokai

Transmitted for your review and comment is a copy of a water use permit application for the State Department of Agriculture, Agricultural Resource Management Division for Well Nos. 0855-01 through -06. Public notice of this application will be published in the Honolulu Star Bulletin issues of August 6, 1993 and August 13, 1993.

We would appreciate your review of the attached application and please return this form by August 30, 1993.

If you have any questions regarding this application, please contact Roy Hardy at 587-0274 or Lenore Nakama at 587-0218.

Response: Contact person: Steve Tagawa

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

Signed: OCEN

Date: 8/31/93
1993 August 30

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

OBJECTIONS TO AND COMMENTS ON WATER USE PERMIT APPLICATIONS
(Public notice of July 27, 1993/Comments due August 30, 1993)

GENERAL OBJECTIONS

We reiterate our general objections to current COWRM water use permit application processing and decisionmaking practices as previously submitted on numerous occasions [10/12/92, 10/21/92, 12/1/92, 6/22/93, & 7/8/93].

We also have specific comments on and objections to several of the applications listed in this notice, particularly those of Maui Department of Water Supply, State Department of Agriculture, L&L Water Co., Inc., and Campbell Estate. In each case NHAC represents water source registrants, water use declarants, water use permit applicants, and others with property interest in land within the hydrologic unit of the source of water supply who would be directly and immediately affected by the proposed water use.

Because of the complexity, importance, and late arrival of some of these applications to our office, we are requesting an extended review period (as provided on your memorandum) to September 3, 1993, when we will submit all objections and comments for both this set of applications and those whose objections due date is September 3.

Thank you for your consideration of this request.

David L. Martin, Water Claims Manager
MEMORANDUM

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

FROM: Don Hibbard, Administrator

SUBJECT: Historic Preservation Review of the Water Use Permit for the State Department of Agriculture, Agricultural Resource Management Division for Well Nos. 0855-01 through -06
Waikolu, Molokai
TMK: 6-1-01: 02

August 30, 1993

LOG NO: 9129
DOC NO: 93-08AG43

We believe that this application for a water use permit for these wells will have "no effect" on historic sites. These wells are existing facilities and any historic sites that may have been present would have been destroyed.

Please contact Annie Griffin at 587-0013 if you have any questions.

AG:111
United States Department of the Interior

IN Reply Refer To:

L54(479)
KALA/Water Rights

Ms. Rae M. Loui
Deputy Director
Commission on Water Resource Management
Department of Land and Natural Resources
P.O. Box 621
Honolulu, HI 96809

August 26, 1993

Re: Objection to APPLICATION FOR WATER USE PERMIT by the State of Hawaii, Department of Agriculture, Agricultural Resource Management Division, for Ground Water Withdrawals in Waikolu Valley, Molokai

Dear Ms. Loui:

The National Park Service objects to the granting of the above-mentioned application (copy enclosed). The reasons for the objection are explained in the enclosed document.

Please inform me as to the next step for the National Park Service to follow. If you have any questions concerning this objection, please contact me or Jeff Hughes at (303) 225-3505 or (303) 225-3527 respectively.

Sincerely,

Owen R. Williams
Chief, Water Rights Branch

Enclosures

cc: (all w/enclosures)
PAAR - Harry
KALA - Superintendent
WR - Kolipinski
OBJECTION BY THE NATIONAL PARK SERVICE
TO THE APPLICATION FOR WATER USE PERMIT BY
THE STATE OF HAWAII, DEPARTMENT OF AGRICULTURE,
AGRICULTURAL RESOURCE MANAGEMENT DIVISION
TO DIVERT GROUND WATER FROM WAIKOLU STREAM, MOLOKAI

The National Park Service (NPS) objects to the APPLICATION FOR WATER USE PERMIT (Application) by the State of Hawaii, Department of Agriculture, Agricultural Resource Management Division (Department), to divert ground water from Waikolu Stream, Molokai, within Kalaupapa National Historical Park (Kalaupapa NHP). The notice for this Application appeared in the August, 1993, Water Resource BULLETIN, issued by the Commission on Water Resource Management (Commission). The NPS requests the Commission to deny this Application for the following reasons:

The mission of the NPS may be paraphrased from 16 U.S.C. 1, (39 Stat. 535) as conserving scenery, natural and historic objects, and wildlife, and providing for enjoyment of the same in such a manner and by such means as will leave them unimpaired for the enjoyment of future generations. The public interest will not be served if water and water-related resources in the nationally and internationally important Kalaupapa NHP are diminished or impaired as a result of the appropriation proposed by this application.

Kalaupapa NHP was created December 22, 1980, by Public Law 96-565 (94 Stat. 3322), "In order to provide for the preservation of the unique nationally and internationally significant cultural, historic, educational, and scenic resources of the Kalaupapa settlement...". Congress declared that the primary purposes for creating the park include "to preserve and protect the Kalaupapa settlement for the education and inspiration of present and future generations" and to train the patients and Native Hawaiians "in management and interpretation of the settlement's cultural, historical, educational, and scenic resources". These purposes will not be met if the water and water-related resources in Kalaupapa NHP are diminished or impaired as a result of the appropriation proposed by this application.

The Department is presently operating a system of wells and surface water diversions within Kalaupapa NHP on Waikolu Stream. The Application by the Department is for ground water diversions for existing and new wells for agricultural irrigation uses. The present diversions greatly reduce flows in Waikolu Stream, especially during the drier summer months. At times, the stream bed is dry in sections from a point upstream of the upper surface water diversion to just below the pumphouse due to the diversions. The proposed diversions can only further decrease the amount of water flowing in the stream and possibly increase the length of the stream's dry portions, and possibly increase the duration of dewatering. The decrease in surface water flows adversely affect
the scenic, aquatic and historical (interpretive) resources within the Kalaupapa NHP. Decreasing the flows is not in the public interest.

As stated above, the altered stream flows will have detrimental effects on the aquatic species found in Waikolu Stream. Presently, the NPS is conducting studies to determine the impacts of the diversions on selected aquatic species within the stream. Aquatic macrofauna found in Waikolu Stream within Kalaupapa NHP include, but are not limited to:

- 'o'opu alamo'o (*Lentipes concolor*)
- 'o'opu nakea (*Awaous stamineus*)
- 'o'opu nopili (*Sicyopterus stimpsoni*)
- 'o'opu akupa (*Eleotris sandwicensis*)
- 'opae kala 'ole (*Atyoida bisulcata*)
- 'opae 'oeha'a (*Macrobrachium grandimanus*)
- hiihiwai (*Neritina granosa*)

('A petition has been submitted to the U.S. Fish and Wildlife Service (September 28, 1989) to list 'o'opu alamo'o as a threatened species on Molokai.)

The NPS plans to reestablish native food crops and other plants important to Native Hawaiian culture and religion in Waikolu Valley. There will be appurtenant water rights along with traditional and customary rights associated with these uses as described in Chapter 174C-101 of the State Water Code. These Native Hawaiian Water Rights will be impaired as a result of the appropriation proposed by this Application.

An interim instream flow standard (adopted by the Commission on June 15, 1988) was established for all streams on Molokai, including Waikolu Stream, for "...that amount of water flowing in each stream on the effective date of this standard, and as that flow may naturally vary throughout the year and from year to year without further amounts of water being diverted offstream through new or expanded diversions, and under the stream conditions existing on the effective date of the standard,...".

The definition of "Instream flow standard" from the Hawaii revised Statutes (Chapter 13-169-2) is "...a quantity or flow of water or depth of water which is required to be present at a specific location in a stream system at certain specified times of the year to protect aquatic life, wildlife, recreational, aesthetic, scenic, and other beneficial instream uses". The definition of "Instream use" from the same chapter lists several beneficial instream uses including:"Maintenance of aquatic life and wildlife habitats; Outdoor recreational activities; Maintenance of ecosystems such as estuaries, wetlands, and stream vegetation; Aesthetic values such as waterfalls and scenic waterways; (and) The protection of
traditional and customary Hawaiian rights".

While the surface water diversions and three wells existed before this interim standard, ground water pumped from the three new wells in accordance with this Application would violate the purpose for which the interim standard was set. The Department admits this on the Application in response to question 15(b), where it claimed that the interim instream flow standards would be affected "during the summer when rainfall is less".

The application submitted by the Department is defective. For the response to question number 8, "QUANTITY OF WATER REQUESTED:", the Department answered "3,360,000 gallons per day (or 20 hours per day)". In response to Question 15 "(a) Impact on Sustainable yield (?):", the Department answered "7,488,000 GPD". The answer to question 15(a) is over twice the amount claimed in response to question 8. The Application should be returned to the Department to clarify this important point.

In summary, the NPS objects to the proposed applications on the grounds that:

1 - The public interest would not be served if water and water related resources in the nationally and internationally important Kalaupapa NHP are diminished or impaired as a result of the diversion proposed by this Application.

2 - The appropriation proposed by this Application may adversely affect aquatic life within Waikolu Stream, including 'o'opu alamo'o, which has been proposed for listing as a threatened species by the U.S. Fish and Wildlife Service.

3 - The appropriation proposed by this Application will affect Native Hawaiian water rights when Native vegetation along with customs and religious ceremonies are reestablished in Waikolu Valley.

4 - The appropriation proposed by this Application would violate the interim instream flow standards for Molokai streams, as adopted by the Commission on June 15, 1988.

5 - The Application is defective.

Therefore, the NPS requests that the Commission deny this Application.
DATE 26 Aug 1993

TO
NAME Ms. Rae M. Loui
CITY, STATE Honolulu, HI
OFFICE PHONE (808) 587-0214
FAX NUMBER (808) 587-0219

FROM
NAME Jeff Hughes

TOTAL NUMBER OF PAGES (INCLUDING COVER SHEET) 8

SPECIAL INSTRUCTIONS
The hard copy is being overnight mailed and should be there tomorrow. If you have any questions, please call me at (303) 225-3528.

Jeff

Receipt Verified By ___________________________ Date __________ Time __________
United States Department of the Interior

NATIONAL PARK SERVICE
Water Resources Division
1201 Omal Ridge Drive, Suite 250
Fort Collins, Colorado 80525
August 26, 1993

L54(479)
KALA/Water Rights

Ms. Rae M. Loui
Deputy Director
Commission on Water Resource Management
Department of Land and Natural Resources
P.O. Box 621
Honolulu, HI 96809

Re: Objection to APPLICATION FOR WATER USE PERMIT by the State of Hawaii, Department of Agriculture, Agricultural Resource Management Division, for Ground Water Withdrawals in Waikolu Valley, Molokai

Dear Ms. Loui,

The National Park Service objects to the granting of the above-mentioned application (copy enclosed). The reasons for the objection are explained in the enclosed document.

Please inform me as to the next step for the National Park Service to follow. If you have any questions concerning this objection, please contact me or Jeff Hughes at (303) 225-3505 or (303) 225-3527 respectively.

Sincerely,

Owen R. Williams
Chief, Water Rights Branch

Enclosures

cc: (all w/enclosures)
PAAR - Harry
KALA - Superintendent
WR - Kolipinski
OBJECTION BY THE NATIONAL PARK SERVICE
TO THE APPLICATION FOR WATER USE PERMIT BY
THE STATE OF HAWAII, DEPARTMENT OF AGRICULTURE,
AGRICULTURAL RESOURCE MANAGEMENT DIVISION
TO DIVERT GROUND WATER FROM WAIKOLOU STREAM, MOLOKAI

The National Park Service (NPS) objects to the APPLICATION FOR WATER USE PERMIT (Application) by the State of Hawaii, Department of Agriculture, Agricultural Resource Management Division (Department), to divert ground water from Waikolu Stream, Molokai, within Kalaupapa National Historical Park (Kalaupapa NHP). The notice for this Application appeared in the August, 1993, Water Resource BULLETIN, issued by the Commission on Water Resource Management (Commission). The NPS requests the Commission to deny this Application for the following reasons:

The mission of the NPS may be paraphrased from 16 U.S.C. 1, (39 Stat. 535) as conserving scenery, natural and historic objects, and wildlife, and providing for enjoyment of the same in such a manner and by such means as will leave them unimpaired for the enjoyment of future generations. The public interest will not be served if water and water-related resources in the nationally and internationally important Kalaupapa NHP are diminished or impaired as a result of the appropriation proposed by this application.

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Page 1 of 3
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'o'opu nakea (Awaous stamineus)
'o'opu nopili (Sicyopterus stipsoni)
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hiiwi (Meritina granosa)

('A petition has been submitted to the U.S. Fish and Wildlife Service (September 28, 1989) to list 'o'opu alamo'o as a threatened species on Molokai.)

The NPS plans to reestablish native food crops and other plants important to Native Hawaiian culture and religion in Waikolu Valley. There will be appurtenant water rights along with traditional and customary rights associated with these uses as described in Chapter 174C-101 of the State Water Code. These Native Hawaiian Water Rights will be impaired as a result of the appropriation proposed by this Application.

An interim instream flow standard (adopted by the Commission on June 15, 1988) was established for all streams on Molokai, including Waikolu Stream, for "...that amount of water flowing in each stream on the effective date of this standard, and as that flow may naturally vary throughout the year and from year to year without further amounts of water being diverted offstream through new or expanded diversions, and under the stream conditions existing on the effective date of the standard,...".

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5 - The Application is defective.

Therefore, the NPS requests that the Commission deny this Application.
State of Hawaii
COMMISSION ON WATER RESOURCE MANAGEMENT
Department of Land and Natural Resources

APPLICATION FOR WATER USE PERMIT

☐ Ground Water  ☐ Surface Water

Purpose of Applications: ☐ To develop new water resources ☐ To augment existing water resources

1. (a) APPLICANT: STATE OF HAWAII
   Dept. of Agriculture
   Firm/Name: Agricultural Resource Management Division
   Contact Person: Thomas Matsubara (808-587-6899)
   Address: PO Box 205, Honolulu, HI 96829
   (b) LANDOWNER: STATE OF HAWAII
   Firm/Name: NAME
   Contact Person: Ph
   Address: 

2. WATER MANAGEMENT AREA: WAIKOLU VALLEY-BOOHEADU
   ISLAND: MOLOKAI

3. (a) EXISTING SOURCE NAME AND STATE NUMBER: WELL #22, #23, #24
   (b) PROPOSED (NEW) SOURCE NAME: WELL #4, #5, #6

4. SOURCE LOCATION: Address 730' AND 1,000' ELEVATION
   (Attach a USGS map, scale 1:2000, and a property tax map showing source location referenced to established property boundaries.)

5. SOURCE TYPE (check one):  ☐ Stream  ☐ Basin  ☐ Oke-confined  ☐ Parched  ☐ Caprock

6. METHOD OF TAKING WATER (check one):  ☐ Artesian Flow  ☐ Well & Pump  ☐ Diverted Surface Flow  ☐ Other (explain)

7. LOCATION OF PROPOSED WATER USE: (If possible, show on same maps as source location. Otherwise, attach similar maps)
   (a) Address: Total area in Hoolehua
   (b) Land Use District (check one):  ☐ Urban  ☐ Agriculture  ☐ Conservation  ☐ Rural
   (c) County Zoning (describe): 

8. QUANTITY OF WATER REQUESTED: 3,360,000 gallons per day (or 20 hours per day)

9. METHOD OF MEASUREMENT:  ☐ Flowmeter  ☐ Open-pipe  ☐ weir  ☐ Office  ☐ Other (explain)

10. QUALITY OF WATER REQUESTED:  ☐ Fresh  ☐ Brackish  ☐ Salt  ☐ Potable  ☐ Non-Potable

11. PROPOSED USE:  ☐ Municipal (including homes, stores, etc.)  ☐ Domestic (individual, noncommercial, etc.)  ☐ Irrigation
    ☐ Industrial  ☐ Military  ☐ Other (explain)

12. NUMBER AND TYPE OF UNITS TO BE SERVED (explain): 203 meter customers

13. TOTAL ACRES PROPOSED FOR IRRIGATION AND TYPE OF CROP: see attached map
    (acres) (crop)

14. PROPOSED TIME OF WATER WITHDRAWAL OR DIVERSION: Agricultural Irrigation
    (indicate hours of operation)

15. APPLICANT MUST BRIEFLY DESCRIBE FOLLOWING POTENTIAL RESTRICTIONS ON USE:
    (a) Impact on Sustainable yield (?): 7,488,000 GPD
    (b) Permanent or Interim
       Instream Flow Standards affected (?): NO & YES
    (c) Hawaiian Home Land uses affected (?): NO
    (d) Other existing legal uses affected (?): NO
    (e) Other:

16. REMARKS, EXPLANATIONS: 815 (b) Yes during the summer when rainfall is less

(If more space is needed, continue on back side)
### State of Hawaii, Dept. of Agriculture

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<tr>
<th>Applicant (print)</th>
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<td>MAR 14, 1993</td>
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For Official Use Only:

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Notice Dates:

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NOTE: Signing below indicates that the applicant understands that, if a water use permit is granted by the Commission on Water Resources Management, a permit is subject to prior existing permitted uses, changes in sustainable yields and instream flow standards, reserved uses as defined by the Commission, and Hawaiian Homelands future uses. In addition, applicant understands that, upon permit approval, a water shortage plan must be submitted to the Commission. requires one.
ISLAND OF MOLOKAI

NORTH

SCALE IN MILES

ILIO POINT

MAUNA LOA

KALAUPAPA

KUALAPUU

KAUNAKAKAI

HALAWA

PUKOO

KAMALO

SERVICE
2,902 Ac.

SOURCE
OF
WATER
DIVISION OF LAND MANAGEMENT
Division of Land and Natural Resources
54 South High St., 1st Floor E. Mr. 101
Wailuku, Maui, HI 96793
FAX No. (808) 243-5006
Phone No. (808) 243-5352

FAX'd TO:
Date: 8-26-93
To: OCEA
Organization: DLNR
FAX Number: 587-0390
Phone Number: 587-0388

FAX'd FROM:
FROM: Alan Takumaga
No. of Pages FAX'd (+ cover): 3
Original to be mailed: Yes □ No □

SPECIAL MESSAGE TO RECIPIENT:
MEMORANDUM

TO: Aquatic Resources
   Forestry and Wildlife
   Historic Preservation
   Land Management - Maui;
   Natural Area Reserve System
   Office of Conservation and Environmental Affairs
   State Parks
   Water and Land Development
   Other Interested Parties

FROM: Rae M. Loui, Deputy Director

SUBJECT: Request for Comments
   Water Use Permit Application
   Waikolu Ground Water Management Area, Molokai

Transmitted for your review and comment is a copy of a water use permit application for the State Department of Agriculture, Agricultural Resource Management Division for Well Nos. 0855-01 through -06. Public notice of this application will be published in the Honolulu Star Bulletin issues of August 6, 1993 and August 13, 1993.

We would appreciate your review of the attached application and please return this form by August 30, 1993.

If you have any questions regarding this application, please contact Roy Hardy at 587-0274 or Lenore Nakama at 587-0218.

LN:ko
Attachment(s)

Response: Contact person: ____________________________ Phone: ____________

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

Signed: ____________________________ Date: 09/26/93
MEMORANDUM

TO: Aquatic Resources
   Forestry and Wildlife
   Historic Preservation
   Land Management
   Natural Area Reserve System
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LN:ko
Attachment(s)

Response: Contact person: Gordon Akita Phone: 587-0227

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

Signed: ________________________ Date: 8/25/93
August 23, 1993

Keith W. Ahue, Chairperson
Commission on Water Resource Management
State of Hawaii
P. O. Box 621
Honolulu, HI 96809

Dear Sir,

The commission will sometime soon hear an Application For Water Use from the State Department of Agriculture, Moloka'i Irrigation System. Their request is to activate wells 4, 5, 6, 22, 23, and 24 and withdraw an additional 3.360 mgd from Waikolu. According to various documents M.I.S. withdraws 4.5 to 5 mgd now.

We believe that groundwater removal will destroy aquarian and riparian systems which we are bound by law to protect. We believe that the planned withdrawal will likely "dewater" Waikolu.

Please notify me of the hearing dates for the use permit application.

Yours truly,

(SGD) Peter Thompson
Peter Thompson
Superintendent
COOPERATIVE AGREEMENT NO: CA 8896-9-8004

COOPERATIVE AGREEMENT
BETWEEN
NATIONAL PARK SERVICE
AND
STATE OF HAWAII
BOARD OF LAND AND NATURAL RESOURCES

TITLE: PRESERVATION OF NATURAL AND CULTURAL RESOURCES, KALAUPAPA
COOPERATIVE AGREEMENT NO. CA 8896-9-8004

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ARTICLE I. BACKGROUND AND OBJECTIVES

WHEREAS, Public Law 96-565 - December 22, 1980 (hereinafter known as the Act) establishes the Kalaupapa National Historical Park (hereinafter known as the Park) in the State of Hawaii and provides for the administration and management of the Park through cooperative agreements of not less than 20 years' duration which the Secretary of the Interior shall seek and may enter into to preserve, protect, maintain, construct, reconstruct, develop, improve, and interpret sites, facilities, and resources of historic, natural, architectural, and cultural significance;

WHEREAS, the United States National Park Service (hereinafter known as the Service) shall promote and regulate the use of the Federal park areas and may preserve, protect, maintain, construct, reconstruct, develop, improve, and interpret sites, facilities, and resources of historic, natural, architectural, and cultural significance in accordance with the Act;

WHEREAS, the boundaries of the Park includes, in addition to all of Kalawao County which is under the jurisdiction of the State of Hawaii Department of Health, about 50 acres of land at Nihoa, and portions of Palaau State Park which are under the management of the State of Hawaii Board of Land and Natural Resources (hereinafter known as the Board);

WHEREAS, a 1,330-acre area of Kalawao County has been established by Governor's Executive Order as the Puu Alii Natural Area Reserve and other areas of Kalawao County have been designated as forest reservations under the care and control of the Board;

WHEREAS, the Board has requested the assistance and cooperation of the Service in managing and controlling feral pigs on the Puu Alii Natural Area Reserve;

WHEREAS, the Service has a long and successful record and the expertise to control noxious feral ungulates on its lands;

WHEREAS, almost all of the Park is on the National Register of Historic Places as a National Historic Landmark and over 50 specific buildings, ruins, and sites are on the List of Classified Structures, all of which are subject to regulation under the Board's and the Service's historic preservation programs;

WHEREAS, the Act provides that as a condition precedent to the expenditures of any federal funds, a binding written cooperative agreement of at least 20 years' duration be agreed to;

WHEREAS, both parties wish to avoid unnecessary, costly, and wasteful duplication of efforts; and,

WHEREAS, the two parties to this Agreement wish to cooperate with one another for their own mutual benefit and for the general benefit of the people of the United States and future generations;

ARTICLE II. STATEMENT OF WORK

NOW THEREFORE, in consideration of the above premises and in the interest of the mutual advantage in attainment of common objectives, the parties hereto desire to cooperate and mutually agree as follows:
A. The Board Agrees:

1. That subject to applicable approvals of the State of Hawaii Director of Health, the Service and the public shall have the right of access at reasonable times to public portions of the property for interpretive and other program management purposes.

2. That the Board shall be liable to the United States in an amount equal to the fair market value of any capital improvements made to or placed upon its property by the Service in the event this Agreement is terminated prior to its natural expiration, or any extension thereof, by the Board, such value to be determined as of the date of such termination, or, at the election of the Service, that the Service be permitted to remove such capital improvements within a reasonable time of such termination. Upon the expiration of this Agreement, the improvements thereon shall become the property of the Board, unless the Service desires to remove such capital improvements and restore the property to its natural state within a reasonable time of such expiration.

B. The Service Agrees:

1. That it will meet with the Board or its representatives for joint planning and coordinating purposes.

2. That the items listed below are subject to agreements with the owners, permits and approvals from the Board, and the availability of funds in current and future years’ appropriations, and it will:

   a. Operate and maintain all Park facilities, including utilities, roads, trails, cemeteries, historic structures, and public grounds, except those facilities on portions of Palaau State Park within the boundaries of Kalaupapa National Historical Park which shall continue to be operated and maintained by the Board subject to Section C.5 below;

   b. Protect and preserve archeological sites, native ecosystems, threatened and endangered species, water and air quality;

   c. Conduct basic natural and cultural resource research, inventories, and studies and share the raw data and the results with the Board and other interested parties;

   d. Prepare plans on various aspects of management, operations, preservation, and interpretation and submit drafts to the Board for review and approval prior to implementation;

   e. Install and maintain interpretive devices and exhibits, animal control fences, informational signs;

   f. Manage/control visitor use and safety, fire, feral animals, selected vegetation, solid waste, and litter;

   g. Assist the Board in every way possible in the management and control of feral ungulates on the Puu Alii Natural Area Reserve and other areas of Kalaupapa National Historical Park where such animals are doing damage to native ecosystems.
3. That annual progress reports regarding the work of the Service at the Park will be provided the Board.

4. That nothing in this Agreement shall be done in violation of specific provisions of State laws, administrative rules or regulations of the Board.

5. That subject to applicable approvals of the State of Hawaii Director of Health, the Board and the public shall have the right of access at reasonable times to public portions of the property for interpretive and other program management purposes.

**It is Mutually Understood and Agreed:**

1. That the Service and the Board shall consider jointly, at such places and at such intervals as may be agreed upon by both parties hereto, subjects of mutual interest or concern relating to the operation, preservation, and protection of the Park.

2. That no changes or alterations shall be made in the property or in the use of the property which is the subject of the Agreement without mutual agreement of the Service and the Board.

3. That nothing in this agreement shall be interpreted to convey or impair the Board's jurisdiction over fishing or other management of streams, and stream and near-shore resources and waters, including diversions of Waikolu Valley waters. Further that all discussions, actions, or activities related to water and aquatic resources within the park are beyond the purview of this Cooperative Agreement.

4. That so long as the resident patients remain at Kalaupapa, the Service and the Board, in cooperation with the State Department of Health, will assist each other in protecting their current lifestyle, rights, and individual privacy.

5. That the two existing Memorandums of Understanding between the Service and the Board regarding wayside exhibits in Palaau State Park executed in March 1985 and for mutual aid in fire control executed in August 1985 are hereby reaffirmed without change.

**ARTICLE III. TERM OF AGREEMENT**

This agreement shall become effective upon the date of final signature and, in accordance with the requirements of Section 105(b)(2) of the Act, shall remain in effect for a period of 20 years and may be extended and amended by mutual agreement at any time. Upon expiration the agreement shall be reviewed to determine if it should be renewed, modified, or terminated.

**ARTICLE IV. KEY OFFICIALS**

1. The key official for this agreement on behalf of the Service is: Director, Pacific Area, 300 Ala Moana Boulevard, Box 50165, Honolulu, Hawaii 96850, who shall act in the Service's behalf as Government Technical Representative.

2. The key official for this agreement on behalf of the Board is: Chairperson of the Board, P. O. Box 621, Honolulu, Hawaii 96809.
ARTICLE V. AWARD (NON-FINANCIAL)

1. The Service shall furnish personnel, facilities, supplies, materials, and services as delineated in Article II, Statement of Work, subject to the availability of appropriations.

2. This is a non-financial agreement and nothing contained herein authorizes the Board to incur any costs.

3. Nothing herein shall be construed as obligating either the Service or the Board to expend or involve either party in any contract or other obligation for the future in excess of appropriations authorized by law and administratively allocated for the work.

ARTICLE VI. PRIOR APPROVAL

Both parties agree to secure the necessary licenses, permits, and approvals before undertaking any regulated activities, including but not limited to the following:

a. Conservation District Use Applications for any new, change in existing, or, expansion of land use within the Conservation District in accordance with Chapter 183-41 Hawaii Revised Statutes, as amended, and Title 13, Chapter 2 - Administrative Rules of the Department of Land and Natural Resources.

b. Well Drilling or Modification Permits.

c. Construction or installation of any capital improvements.

d. Licenses and special permits for the hunting or otherwise controlling animals doing damage in accordance with Title 13, Chapter 123.

e. Special use permits to conduct activities otherwise prohibited within the Puu Alii Natural Area Reserve in accordance with Title 13, Chapter 209.

f. Scientific collecting permits, on a project-by-project basis, to engage in collecting or research activities which would otherwise be unlawful.

ARTICLE VII. REPORTS

Other than the progress reports described in Article II, there are no reports required in connection with this agreement.

All correspondence and/or copies of all written notices between the Service and the Board shall be sent to the following addresses:

National Park Service  
Pacific Area Office  
300 Ala Moana Boulevard  
Suite 6305, Box 50165  
Honolulu, Hawaii 96850

Attention: Government Technical Representative
Board of Land and Natural Resources
State of Hawaii
P. O. Box 621
Honolulu, Hawaii 96809

Attention: Chairperson of the Board

ARTICLE VIII. PROPERTY UTILIZATION AND DISPOSITION
No property is being furnished as part of this agreement; therefore, this Article is not applicable.

ARTICLE IX. TERMINATION PRIOR TO NATURAL EXPIRATION
This agreement may be terminated by either party with 60 days' notice to the other. The Service may unilaterally terminate the agreement in accordance with Circulars A-102/110 (see attached General Provisions, Part 14).

IN WITNESS HEREOF, the parties hereto have signed their names and executed this agreement.

Cooperative Agreement No: CA 8896-9-8004
To continue for 20 years from effective date below.

TITLE: Preservation of Natural and Cultural Resources, Kalaupapa

STATE OF HAWAII
BOARD OF LAND AND NATURAL RESOURCES
NAME: ________________
TITLE: ________________
DATE: ________________

NATIONAL PARK SERVICE
NAME: ________________
TITLE: ________________
DATE: ________________

APPROVED AS TO FORM
 Дмитриев
Deputy Attorney General, State of Hawaii

July 27, 1989
MEMORANDUM

TO: ADMINISTRATOR
    ASST ADMIN.
    DEV BR.
    PLAN BR.
    RES MGT BR.
    PROJ CONTROL
    SW REC PLAN.
    CLERICAL STAFF
    ADMIN ASST.
    ARCHAEOLOGISTS

FOR: CIRCULATE/POST
    COMMENTS & REQ
    DRAFT REPLY
    FILE
    FOLLOW UP
    INFO
    PUSH (DUE ___)
    S/ME
    SEND COPY TO ___

FROM: Rae M. Loui, Deputy Director

SUBJECT: Request for Comments
          Water Use Permit Application
          Waikolu Ground Water Management Area, Molokai

Transmitted for your review and comment is a copy of a water use permit application for the State Department of Agriculture, Agricultural Resource Management Division for Well Nos. 0855-01 through -06. Public notice of this application will be published in the Honolulu Star Bulletin issues of August 6, 1993 and August 13, 1993.

We would appreciate your review of the attached application and please return this form by August 30, 1993.

If you have any questions regarding this application, please contact Roy Harada at 587-0274 or Lenore Nakama at 587-0218.

LN:ko
Attachment(s)

Response: Contact person:  Phone: 587-0290

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

Signed:  Date: 8/12/93
TRANSMISSION REPORT

THIS DOCUMENT (REDUCED SAMPLE ABOVE) WAS SENT

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XEROX TELECOPIER 7020
MEMORANDUM

TO: Aquatic Resources
Forestry and Wildlife
Historic Preservation
Land Management
Natural Area Reserve System
Office of Conservation and Environmental Affairs
State Parks
Water and Land Development
Other Interested Parties

FROM: Rae M. Loui, Deputy Director

SUBJECT: Request for Comments
Water Use Permit Application
Waikolu Ground Water Management Area, Molokai

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We would appreciate your review of the attached application and please return this form by August 30, 1993.

If you have any questions regarding this application, please contact Roy Hardy at 587-0274 or Lenore Nakama at 587-0218.

LN:ko
Attachment(s)

Response: Contact person: ___________________________ Phone: ________

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

Signed: ___________ Date: ________________

Phone: ________
Mr. Thomas Matayoshi  
State Department of Agriculture  
Agricultural Resource Management Division  
P.O. Box 205  
Hoolehua, HI 96813

Dear Mr. Matayoshi:

Enclosed is a copy of the public notice for your water use permit application for Well Nos. 0855-01 through -06 which will be published in the Honolulu Star Bulletin issues of August 6, 1993 and August 13, 1993.

Please be aware that there may be objections to your application. If objections are made, the objector is required to file such objections with the Commission and is also required to send you a copy of the objections.

You, or any other party, may respond to objections by filing a brief in support of your application with the Commission within ten (10) days of the filing of an objection. You, or the other party, must also send a copy of the response to the objector.

If you have any questions, please contact Roy Hardy at 587-0274 or Lenore Nakama at 587-0218.

Sincerely,

RAE M. LOUI  
Deputy Director
MEMORANDUM

TO: Aquatic Resources
    Forestry and Wildlife
    Historic Preservation
    Land Management
    Natural Area Reserve System
    Office of Conservation and Environmental Affairs
    State Parks
    Water and Land Development
    Other Interested Parties

FROM: Rae M. Loui, Deputy Director

SUBJECT: Request for Comments
         Water Use Permit Application
         Waikolu Ground Water Management Area, Molokai

Transmitted for your review and comment is a copy of a water use permit application for the State Department of Agriculture, Agricultural Resource Management Division for Well Nos. 0855-01 through -06. Public notice of this application will be published in the Honolulu Star Bulletin issues of August 6, 1993 and August 13, 1993.

We would appreciate your review of the attached application and please return this form by August 30, 1993.

If you have any questions regarding this application, please contact Roy Hardy at 587-0274 or Lenore Nakama at 587-0218.

LN:ko
Attachment(s)

Response: Contact person: ____________________________ Phone: __________

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

Signed: ____________________________________________ Date: __________
Other Interested Parties

Mr. David Craddick, Director
Department of Water Supply
County of Maui
P.O. Box 1109
Wailuku, HI 96793
Honorable Linda Crockett Lingle, Mayor  
County of Maui  
200 South High Street  
Wailuku, HI 96793

Dear Mayor Lingle:

Notice of an Application for a Water Use Permit  
Waikolu Ground Water Management Area, Molokai

In accordance with the Department of Land and Natural Resource Administrative Rules, Section 13-171-17(a), we are sending you a copy of the public notice for the water use permit application for the State Department of Agriculture, Agricultural Resource Management Division for Well Nos. 0855-01 through -06, which will be published in the Honolulu Star Bulletin.

In addition, Section 13-171-13(b) of our Administrative Rules states:

"Within sixty days after receipt of notice of a permit application, the county shall inform the commission if the proposed use is inconsistent with the county land use plans and policies."

We have attached a copy of the application for your review and would appreciate receiving your comments, within the next sixty (60) days, on whether this water use is consistent with county plans and policies.

Very truly yours,

[Signature]

KEITH W. AHUE  
DEPUTY

Enc.
MEMORANDUM

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

            Dr. John C. Lewin, M.D., Director
            Department of Health

            Mr. Clayton H. W. Hee, Chairperson
            Office of Hawaiian Affairs

            Mr. Goro Hokama, Chair
            County Council
            County of Maui

            Mr. Byron S. Walters, Chair
            Board of Water Supply
            County of Maui

FROM: Keith W. Ahue, Chairperson
     Commission on Water Resource Management

SUBJECT: Water Use Permit Application
         Waikolu Ground Water Management Area, Molokai

Transmitted for your review and comment is a copy of a water use permit application for the State Department of Agriculture, Agricultural Resource Management Division for Well Nos. 0855-01 through -06. Public notice of this application will be published in the Honolulu Star Bulletin issues of August 6, 1993 and August 13, 1993.

We would appreciate your review of the attached application and please return this form by August 30, 1993.

If you have any questions regarding this application, please contact Roy Hardy at 587-0274 or Lenore Nakama at 587-0218.

Attachment(s)
Memorandum to:
Mrs. Hoaliku L. Drake
Dr. John C. Lewin
Mr. Clayton H.W. Hee
Mr. Goro Hokama
Mr. Byron S. Walters

Page 2

Response: Contact person: ___________________________ Phone: ___________

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

Signed: ___________________________ Date: ___________
MEMORANDUM

TO: Aquatic Resources
Forestry and Wildlife
Historic Preservation
Land Management
Natural Area Reserve System
Office of Conservation and Environmental Affairs
State Parks
Water and Land Development
Other Interested Parties

FROM: Rae M. Loui, Deputy Director

SUBJECT: Request for Comments
Water Use Permit Application
Waikolu Ground Water Management Area, Molokai

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We would appreciate your review of the attached application and please return this form by August 30, 1993.

If you have any questions regarding this application, please contact Roy Hardy at 587-0274 or Lenore Nakama at 587-0218.

LN:ko
Attachment(s)

Response: Contact person: Phone:

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

Signed: Henry M. Schuler Date: 8/23/93
MEMORANDUM

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

FROM: Henry Sakuda, Administrator
Division of Aquatic Resources

SUBJECT: Comments on water use permit application for the State Department of Agriculture, Agriculture Resource Management Division for Well Nos. 0855-01, 0855-02, 0855-03, 0855-04, and 0855-06 the the Waikolu Ground Water Management Area, Molokai

The application is for three existing wells and three new wells adjacent to the Waikolu Stream on north Molokai within the boundaries of the Kaluapapa National Historical Site. Approximately 3,360,000 gallons of dike-confined water will be pumped per day and transferred to the Hoolehua area for irrigation use. The application characterizes the water quality as non-potable, but it seems likely that the source is actually potable. It was noted that the wells would reduce stream flows during dry periods.

The Waikolu Stream should rate as among the most pristine in Hawaii. It drains a large native forest watershed and flows through the Kaluapapa National Historical Site. The State of Hawaii has retained water rights to the stream and diverts water to the dry south side of the island for irrigation use. Wells have also been drilled adjacent to the stream below the upper diversion to add ground water to the irrigation distribution system. The combination of diversion and dewatering attributable to ground water pumping has dried the middle reach of the stream, between the upper diversion at approximately 1,100 feet in elevation and a lower diversion at 730 feet.

Waikolu Stream supports large populations of all the native fishes and macroinvertebrates. Prior to the alterations which created the dewatered section of the stream, all of the native inland fish species and macroinvertebrates were abundant to the upper end of the stream. After the alterations, this diversity and abundance stopped at the point of dewatering. Only one of the gobies, Lentipes concolor, subsequently made it to the higher reaches through the dry section, migrating rapidly during periodic freshets, but its numbers were considerably reduced and its size frequency distribution was compressed towards the larger size range, reflecting diminished recruitment.

Additional pumps will probably worsen the situation. However, the Department of Agriculture recently stated a commitment to restore flows through the dry reach adequate to provide continuous habitat suitable for both occupation and migration by native aquatic species.
This commitment needs to become a condition of the permit, if the application is approved. Included with the condition should be a plan for defining how this flow restoration can be achieved.

In addition, DLNR's Division of Water and Land Development has completed a plan for modification of the upper diversion weir to improve the chances for successful immigration and emigration of native amphidromous species. At present the*weir not only presents a barrier but actually represents a trap for these organisms. Completion of this modification should also be a condition of any approved permit.

We also believe that a long term biological monitoring program should be established for this stream to define the effectiveness of the mitigation measures recommended above and to determine whether additional steps, including modification of the mitigative flow regime, are needed. The Division of Aquatic Resources has data that can be applied to a baseline definition, and the National Park Service is presently engaged in studies of Waikolu Stream that can be applied to design the monitoring program once those studies are complete. It is possible that the Division of Aquatic Resources could conduct the monitoring program with logistic support from the Department of Agriculture.

We would prefer to see all diversions and pumps removed from Waikolu, given the biological value of the area, but recognize that agricultural demands have become dependent on this source of irrigation water. Nevertheless, serious attention should be given to the imposition of mitigation measures that can at least partially assure the perpetuation of the stream's suitability as habitat for native aquatic species.
PUBLIC NOTICE

Applications for Water Use Permits

Ground Water Management Areas

Applications for the following water use permits have been received and are hereby made public, in accordance with Department of Land and Natural Resources Administrative Rules 13-171, "Designation and Regulation of Water Management Areas".

Ualapue Shaft (Well No. 0449-01)
Applicant: Maui Department of Water Supply
P.O. Box 1109
Waikiki, Maui, HI 96793
Date Completed Application Received: June 9, 1993
Quantity Requested: 1,080,000 gallons per day.
Existing Water Use: Municipal for Maui Department of Water Supply Ualapue Water System
Place of Water Use: Ualapue Water System

Wells No. 0855-06, 0855-05, 0855-04, 0855-01, 0855-02, 0855-03
Applicant: State Department of Agriculture
Agricultural Resource Management Division
P.O. Box 206
Hoolau, HI 96713
Date Completed Application Received: June 8, 1993
Quantity Requested: 3,350,000 gallons per day.
Existing Water Use: Agricultural irrigation needs of Molokai Irrigation System
Place of Water Use: Hoolau at various Tax Map Keys

Kamehameha Highway at Tax Map Key: 5-5-1-21
Irrigation of 9 acres of banana trees

TRANSMISSION REPORT

THIS DOCUMENT (REDUCED SAMPLE ABOVE) WAS SENT

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XEROX TELECOPIER 7020
PUBLIC NOTICE

Applications for Water Use Permits
Ground Water Management Areas

Applications for the following water use permits have been received and are hereby made public, in accordance with Department of Land and Natural Resources Administrative Rules 13-171, "Designation and Regulation of Water Management Areas".

Ualapue Shaft (Well No. 0449-01)

Applicant: Maui Department of Water Supply
P.O. Box 1109
Wailuku, Maui, HI 96793
Date Completed Application Received: June 9, 1993
Aquifer: Ualapue System, Southeast Sector, Molokai
Well Source: Ualapue Shaft, Well No. 0449-01, at Ualapue, Molokai, Hawaii, Tax Map Key: 5-6-6:28
Quantity Requested: 1,080,000 gallons per day.
Existing Water Use: Municipal for Maui Department of Water Supply Ualapue Water System
Place of Water Use: Ualapue Water System

Well #4 (Well No. 0855-06)
Well #5 (Well No. 0855-05)
Well #6 (Well No. 0855-04)
Well #22 (Well No. 0855-01)
Well #23 (Well No. 0855-02)
Well #24 (Well No. 0855-03)
Applicant: State Department of Agriculture
Agricultural Resource Management Division
P.O. Box 205
Hoolehua, HI 96813
Date Completed Application Received: June 8, 1993
Aquifer: Waikolu System, Northeast Sector, Molokai
Well Sources: Wells #4, #5, #6, #22, #23, and #24, Well Nos. 0855-06, 05, 04, 01, 02, and 03, at Waikolu Valley, Tax Map Key: 6-1-1:2
Quantity Requested: 3,360,000 gallons per day.
Existing Water Use: Agricultural irrigation needs of Molokai Irrigation System
Place of Water Use: Hoolehua at various Tax Map Keys

White Well (Well No. 3855-05)
Applicant: R.E. White Jr.
3665 Tantalus Drive
Honolulu, HI 96822
Date Completed Application Received: June 28, 1993
Aquifer: Koolauloa System, Windward Sector, Oahu
Well Source: White Well, Well No. 3855-05, at 55-202 Kamehameha Hwy., Oahu, Tax Map Key: 5-5-1:21
Quantity Requested: 87,140 gallons per day.
Existing Water Use: Irrigation of 9 acres of banana trees
Place of Water Use: Kamehameha Highway at Tax Map Key: 0-0-0:0
(more)
Campus Well (Well No. 3855-06)
Ceramics Well (Well No. 3855-07)
Library Well (Well No. 3855-08)
Temple Well (Well No. 3956-03)
Applicant: Laie Water Co., Inc.
55-510 Kamehameha Hwy.
Laie, HI 96762
Date Completed Applications Received: June 23, 1993
Aquifer: Koolauloa System, Windward Sector, Oahu
Well Sources: Campus Well, Ceramics Well, Library Well and Temple Well, Well Nos. 3855-06, 07, 08 and 3956-03, at Brigham Young - UH Campus, Oahu, Tax Map Key: 5-5-6:various
Quantity Requested: 357,000 gallons per day.
Existing Water Use: Municipal service for over 635 residential and commercial service meter connections in Laie
Place of Water Use: Laie Municipal Water System Service Area at numerous Tax Map Keys

PCC Lagoon Well (Well No. 3855-09)
Applicant: Polynesian Cultural Center
55-370 Kamehameha Hwy
Laie, HI 96762
Date Completed Application Received: June 23, 1993
Aquifer: Koolauloa System, Windward Sector, Oahu
Well Source: PCC Lagoon Well, Well No. 3855-09, at Polynesian Cultural Center, Oahu, Tax Map Key: 5-5-6:28
Quantity Requested: 691,000 gallons per day.
Existing Water Use: Provides circulation supply for large scale water feature at Polynesian Cultural Center
Place of Water Use: 55-370 Kamehameha Highway at Tax Map Key: 5-5-6:28

Malaekahana Well (Well No. 3956-01)
Applicant: Campbell Estate
828 Fort St., Ste. 500
Honolulu, HI 96813
Date Completed Application Received: June 16, 1993
Aquifer: Koolauloa System, Windward Sector, Oahu
Well Source: Malaekahana Well, Well No. 3956-01, at Malaekahana, Oahu, Tax Map Key: 5-6-6:6
Quantity Requested: 100,000 gallons per day.
Existing Water Use: Domestic service to 31 homes and Malaekahana Park
Place of Water Use: Malaekahana Bay at Tax Map Key: 5-6-6:1

Pump 3 (Well No. 3957-01, 02 and 04 to 06)
Applicant: Campbell Estate
828 Fort St., Ste. 500
Honolulu, HI 96813
Date Completed Application Received: June 16, 1993
Aquifer: Koolauloa System, Windward Sector, Oahu
Well Source: Pump 3, Well No. 3957-01, at Kahuku, Oahu, Tax Map Key: 5-6-6:18
Quantity Requested: 1,000,000 gallons per day.
Existing Water Use: Domestic service and irrigation of 80 acres of various crops
Place of Water Use: Kahuku at Tax Map Key: 5-6-6:18

(more)
Pump 3A (Well No. 3957-03)
Applicant: Campbell Estate
828 Fort St., Ste. 500
Honolulu, HI 96813
Date Completed Application Received: June 16, 1993
Aquifer: Koolauloa System, Windward Sector, Oahu
Well Source: Pump 3A, Well No. 3957-03, at Kahuku, Oahu, Tax Map Key: 5-6-6:18
Quantity Requested: 2,000,000 gallons per day.
Existing Water Use: Aquaculture (60 acres of prawns)
Place of Water Use: Kahuku at Tax Map Key: 5-6-6:18

Pump 6 (Well No. 3957-07)
Applicant: Campbell Estate
828 Fort St., Ste. 500
Honolulu, HI 96813
Date Completed Application Received: June 17, 1993
Aquifer: Koolauloa System, Windward Sector, Oahu
Well Source: Pump 6, Well No. 3957-07, at Kahuku, Oahu, Tax Map Key: 5-6-6:6
Quantity Requested: 100,000 gallons per day.
Existing Water Use: Irrigation for 150 acres of cattle and pasture
Place of Water Use: Kahuku at Tax Map Key: 5-6-6:6

Written objections or comments on the applications for water use permits may be filed by any person who has property interest in any land within the hydrologic unit of the source of water supply, any person who will be directly and immediately affected by the proposed water use, or any other interested person. Written objections shall: (1) state property or other interest in the matter; (2) set forth questions of procedure, fact, law, or policy, to which objections are taken; and (3) state all grounds for objections to the proposed permits. Send written objections by August 30, 1993 to 1) the Commission on Water Resource Management, P.O. Box 621, Honolulu, Hawaii 96809, and 2) a copy of the objection letter(s) to the applicant at the above address.

COMMISSION ON WATER RESOURCE MANAGEMENT

[Signature]
KEITH W. AHUE
Chairperson

Dated: JUL 27 1993
PUBLIC NOTICE

Applications for Water Use Permits, Ground Water Management Areas

Publish in Honolulu Star Bulletin issues of August 6, 1993 and August 13, 1993

The State of Hawaii is an EQUAL EMPLOYMENT OPPORTUNITY and AFFIRMATIVE ACTION employer. We encourage the participation of women and minorities in all phases of employment.
and endemic damselflies *Megalagrion spp.*, that would otherwise have provided food for the fishes. The dragonfly and damselflies in effect had expanded in numbers to fill the top level predator niche that would normally have been occupied by native gobies.

Because the stream no longer supported significant native amphidromous species and was clearly degraded beyond recovery, as long as the channelized stretch remained in place, there was no substantive biological basis for objecting to the project. However, the CWWRM recognized that some form of environmental compensation was appropriate given the damage that had already occurred during the channelized phase of the project and required, as a condition of the permit, that $100,000 be allotted to a stream restoration or mitigation project.

**Waikolu Stream Restoration**

The Waikolu Stream on north Molokai rates among the most pristine in Hawaii. It drains a large native forest watershed and flows through the Kalaupapa National Historical Site. The State has retained water rights to the Stream and diverts water to the dry south side of the island for irrigation use. Wells have also been drilled adjacent to the Stream below the upper diversion to add ground water to the irrigation distribution system. The combination of diversion and dewatering attributable to ground water pumping has dried the middle reach of the subject Stream, at approximately 1,100 feet to a lower diversion at 730 feet elevation. Additional wells are planned but require issuance of a Conservation District Use Permit by the Board of Land and Natural Resources.

Waikolu Stream supports large populations of all the native fishes and macroinvertebrates. Prior to the alterations which created the dewatered section, all of the native inland fish species and macroinvertebrates were abundant to the upper end of the Stream. After the alterations, this diversity and abundance stopped at the point of dewatering. Only one of the gobies, *Lentipes concolor*, subsequently made it to the higher reaches through the dry section, but its numbers were considerably reduced and its size frequency distribution was compressed towards the larger size range, reflecting diminished recruitment.

Planning for the new wells began in the early-1980s, and options for mitigating the dewatering were examined. When the requisite Conservation District Use Application was filed, conditions were attached requiring mitigation, including construction of a fish passageway past the dry section. Engineering studies, however, indicated that construction of such a passageway was unrealistic because the extreme freshets characteristic of the area would periodically demolish it. In addition, there was no evidence that the native fishes would actually migrate through the dark pipe that was planned.

At the last meeting on the subject in 1990, it was decided that a preferable alternative would be to construct a ramp over the upper diversion weir to expedite both emigration of larvae and immigration of new recruits in addition to release of enough water through the upper diversion to maintain perennial...
pools through the dry reach to serve as refugia between freshets for immigrating organisms and hopefully reopening the upper reaches of the Stream as functional habitat for native aquatic species. Many questions remained unanswered, however, including flows that would be needed to maintain the pools, whether additional pumping would reduce any water released from the upper weir, and whether this approach would in fact prove to be successful. The project remains into limbo.

Given the recognized value of Waikolu Stream as habitat, the area was a prime candidate as a mitigation project funded by the decision relating to the Honokowai (Maui) channelization. The U.S. Army Corps of Engineers, which has done specialized studies on microflows in Hawaiian streams that would be directly applicable to the problem, was hired by the U.S. Soil Conservation Service to find an effective means of reopening the upper reach of the Stream to native aquatic species.

In April 1993, however, an unexpected reassessment of the Conservation District Use Application determined that mitigation would not satisfy environmental requirements; instead, permanent flows would have to be restored through the dry section, even if water had to be pumped from the lower to the upper diversion and released to the Stream. Because other research by the National Park Service underway in the Stream could define those flow requirements, steps were initiated to shift the mitigation project to another degraded stream. A preliminary candidate was Maui’s Iao Stream, which is channelized in the lower reaches but still supports native fishes and invertebrates in the upper reaches, albeit in smaller numbers than would be expected given the apparent quality of the habitat.

Kapunahala Stream Compensation Decision

Review comments on this subject Windward Oahu Stream are summarized in Appendix, Items 1 and 2 for January 1993. Because unpermitted construction work destroyed instream habitat and a high elevation population of native gobies, the CWRM decided that as compensation $30,000 should be applied to development of culture methods for native gobies for the environmental damage that occurred. The rationale was the possibility of raising gobies from the egg to the postlarval stage, when they are capable of reentering freshwater. Translocation of gobies from one watershed to another is also inadvisable because of the potential for accidentally introducing diseases which now may be restricted to specific watersheds.

Waikele Stream Survey

Review comments on this subject are summarized in Appendix, Item 6 for July 1992. The survey was required by the CWRM as a condition of the SCAP, and the findings were entirely unexpected. Previous limited surveys had suggested that the huge Waikele Stream system was virtually devoid of native species, presumably as a result of heavy and agricultural development in central Oahu. But joint surveys of the lower reach of the Stream by DAR biologists, who were providing instruction in survey methodologies and the consultant hired for the work found significant recruitment of the native gobies, *Awaous stamineus* and
State of Hawaii  
Department of Agriculture  
Agricultural Resource Management Division  
P.O. Box 205  
Hoolehua, HI  96729

Attention Mr. Thomas Matayoshi

Dear Mr. Matayoshi:

Application for a Water Use Permit  
Hoolehua Ground Water Management Area, Molokai

We acknowledge receipt, on June 8, 1993, of your completed water use permit application for Well #4, #5, #6 and Well #22, #23, #24 (Well Nos. 0855-06, 05, 04 and 0855-01, 02, 03, respectively).

Normally, one can expect their application to be processed within ninety (90) days from the date of receipt. However, a condition imposed by the Commission during designation proceedings is temporarily holding final action on all water use permit applications on Molokai until the end of July 1993 for review by the Molokai Task Force. This may cause your application to go beyond the normal action time limit.

We will be sending you a copy of the public notice for your application and any further information regarding the status of your application. In addition, we may need to visit and verify your proposed water source and use sites if we have not done so already under our registration program.

We also acknowledge receipt of your water use permit application for Dam #1, #2, and #3. However, at this time, the use of surface waters in the Waikolu Water Management Area does not require a permit. Please find enclosed your application form which we are returning to you for your records.

If you have any questions, please contact Roy Hardy at 587-0274.

Sincerely,

RAE M. LOUI  
Deputy Director

attachment
<table>
<thead>
<tr>
<th>Molokai Irrig. System</th>
<th>6-2-06</th>
<th>A0</th>
<th>#</th>
<th>3,000</th>
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<td></td>
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<td>&quot;</td>
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<td>&quot;</td>
<td>*</td>
<td>75</td>
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</tbody>
</table>

* The irrigation system services whole area, but certain parcels may not be taken water, due to land being followed for crop rotation purposes.

** Not determinable at this time (data not computerized).

What is the source we link this and use to?
COMMISSION ON WATER RESOURCE MANAGEMENT

FROM: [Signature]  DATE: 5/21/97  FILE IN: 

TO:  INIT: 

- G. Matsumoto
- E. Sakoda
- Y. Shiroma
- E. Hirano
- D. Higa
- G. Bauer
- R. Hardy
- R. LOUI
- S. KOKUBUN
- M. TAGOMORI
- L. NANBU

PLEASE:

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

FOR YOUR:

- Approval
- Signature
- Information

___ [C]opies?

Paul will get me billing
list for estimated use.
Have to send time table
in need from.

[Signature]

- Return Dam #1, #2, #3 (3
  water, thus no need).
- Well 17
- Well 22, 23, 24
May 11, 1993

TO: Ms. Rae M. Loui, Deputy Director
Commission on Water Resource Management
Dept. of Land and Natural Resources

SUBJECT: Notice of Ground Water Management Area Designations
Island of Molokai

This is in reply to your second notice dated April 23, 1993. We had submitted our application form on March 17, 1993 (see attached copies) directly to Mr. Hardy.

Please call me at 973-9473 if there are any further questions.

[Signature]

PAUL T. MATSUO, Administrator
Agricultural Resource Management Division
March 17, 1993

TO: Mr. Roy Hardy, Engineer
    Survey Branch
    Commission on Water Resource Management

FROM: Paul Matsuo, Administrator
      Agricultural Resource Management Division

SUBJECT: Water Use Declaration

Submitted are the Molokai Irrigation System water use declarations.

We apologize for the late submittal, but the original pump data were lost when the Division of Water and Land Development (the former owners) sent the records for microfilming. We had difficulty locating these records, as they were constructed in the early 1960's.

Attachments (3 application forms)

  c: Tom Matayoshi
APPLICATION FOR WATER USE PERMIT

Instructions: Please print in ink or type and send completed application with attachments to the Commission on Water Resource Management, P.O. Box 621, Honolulu, Hawaii 96806. Application must be accompanied by a non-refundable filing fee of $25.00 payable to the Dept. of Land and Natural Resources. The Commission may not accept incomplete applications. For assistance, call the Regulation Branch at 967-2026.

1. (a) APPLICANT: STATE OF HAWAII
   Dept. of Agriculture
   Contact Person: Thomas Matayoshi Ph: 567-6897
   Address: P.O. Box 205, Hoolehua, Molokai HI 96729

2. WATER MANAGEMENT AREA: WAIKULI VALLEY-BOOLEHUA ISLAND: MOLOKAI

3. (a) EXISTING SOURCE NAME AND STATE NUMBER: WELL #22, #23, #24
   (well or stream diversion name/number)
   (b) PROPOSED (NEW) SOURCE NAME: WELL #4, #5, #6

4. SOURCE LOCATION: Address: 730' AND 1,000' ELEVATION
   Tax Map Key: 5-1-01-2
   WAIKULI VALLEY BETWEEN
   (Attach a USGS map, scale 1"=2000', and a property tax map showing source location referenced to established property boundaries.)

5. SOURCE TYPE (check one): Stream □ Basal □ Dike-confined □ Perched □ Caprock

6. METHOD OF TAKING WATER (check one): □ Artesian Flow □ Well & Pump □ Diverted Surface Flow □ Other (explain)

7. LOCATION OF PROPOSED WATER USE: (If possible, show on same maps as source location. Otherwise, attach similar maps)
   (a) Address: Total area in Hoolehua
   Tax Map Key: 5-2-01-2
   (b) Land Use District (check one): □ Urban □ Agriculture □ Conservation □ Rural
   (c) County Zoning (describe): No.

8. QUANTITY OF WATER REQUESTED: 3,360,000 gallons per day (or 20 hours per day)

9. METHOD OF MEASUREMENT: □ Flowmeter □ Open-pipe □ Wair □ Office □ Other (explain)

10. QUALITY OF WATER REQUESTED: □ Fresh □ Brackish □ Salt □ Potable □ Non-Potable

11. PROPOSED USE: □ Municipal (including hotels, stores, etc.) □ Domestic (individual, noncommercial, etc.) □ Irrigation
    □ Industrial □ Military □ Other (explain)

12. NUMBER AND TYPE OF UNITS TO BE SERVED (explain): 203 meter customers
    Total area in Hoolehua area

13. TOTAL ACRES PROPOSED FOR IRRIGATION AND TYPE OF CROP: see attached map (acres) (crop)

14. PROPOSED TIME OF WATER WITHDRAWAL OR DIVERSION: Agricultural Irrigation
    (indicate hours of operation)

15. APPLICANT MUST BRIEFLY DESCRIBE FOLLOWING POTENTIAL RESTRICTIONS ON USE:
    (a) Impact on Sustainable yield (?): 7,488,000 GPD
    (b) Permanent or Interim Instream Flow Standards affected (?): NO & YES
    (c) Hawaiian Home Land uses affected (?): NO
    (d) Other existing legal uses affected (?): NO
    (e) Other: 

16. REMARKS, EXPLANATIONS: $15 (b) Yes during the summer when rainfall is less.

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

NOTE: Signing below indicates that the applicant understands that, if a water use permit is granted by the  Commission on Water Resource Management, it permit is subject to prior existing permitted uses, changes in sustainable yields and instream flow standards, reserved uses as defined by the Commission, and Hawaiian Home Lands future uses. In addition, applicant understands that, upon permit approval, a water shortage plan must be submitted should the Commission require one.

Signature:      Date: 03-09-93

STATE OF HAWAII, DEPT. OF AGRICULTURE
STATE OF HAWAII
Landowner:   Date: MAR 1 & 999
Signature:      

For Official Use Only: Hydrologic Unit No.: Diversion Works No.
Date Received: Date Accepted State Well No.
Notice Date: Mayor BWS Mail List Bulletin
Public: Mayor BWS Mail List Bulletin
15. REMARKS, EXPLANATIONS (cont'd):
ISLAND OF MOLOKAI
Ex. I.

Case but why don't you hang onto this doesn't seem to support AAs' From wumpus' fare. I late. on USA's California Presidio

1964.
1990 WUDP

Don't know how they got these figures

---

**ISLAND OF MOLOKAI**

**TOTAL MUNICIPAL, PRIVATE, AGRICULTURAL AND OTHER WATER SYSTEMS**

**WITHDRAWALS AND TRANSFERS**

by AQUIFER SECTORS AND SYSTEMS

**unit: MGD**

<table>
<thead>
<tr>
<th>WITHDRAWAL</th>
<th>CENTRAL</th>
<th>NORTHEAST</th>
<th>SOUTHEAST</th>
<th>WEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>HOOLEHUA</td>
<td>0.10</td>
<td>4.84</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>MAUNA MAUNI</td>
<td>1.06</td>
<td>2.70</td>
<td>0.03</td>
<td></td>
</tr>
<tr>
<td>KUALAPUU</td>
<td>1.16</td>
<td>7.54</td>
<td>0.03</td>
<td></td>
</tr>
<tr>
<td>MAUROU</td>
<td></td>
<td>4.80</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>KAUNUI</td>
<td></td>
<td>2.70</td>
<td>0.03</td>
<td></td>
</tr>
<tr>
<td>WAIKOLU</td>
<td></td>
<td>7.50</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>WAIPO'U</td>
<td></td>
<td></td>
<td>0.55</td>
<td></td>
</tr>
<tr>
<td>PELEKUNU</td>
<td></td>
<td></td>
<td>0.42</td>
<td></td>
</tr>
<tr>
<td>WAILAU</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>KALANA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>KALOLOKO</td>
<td>0.42</td>
<td>0.55</td>
<td>0.42</td>
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<td>KAMOA</td>
<td>0.40</td>
<td>0.42</td>
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<tr>
<td>KUALAPUU</td>
<td>0.40</td>
<td>0.40</td>
<td>0.40</td>
<td></td>
</tr>
<tr>
<td>WAIALUA</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>3.05</td>
<td>4.68</td>
<td>9.73</td>
<td>4.80</td>
</tr>
</tbody>
</table>

* Kualapuu aquifer withdrawal data for year 2010 incomplete.

* The above 5.3 figure for water withdrawn from the Central Aquifer Sector by the year 2010 is based on the 5 to 6 MGD estimate of the sustainable yield for the Kualapuu Aquifer by the state geologist. The figure assumes the following approximate withdrawals by the six potential large-scale users of water on Molokai: DHHL (1.50 MGD), County Department of Water Supply (1.25 MGD), Molokai Ranch (0.85 MGD), Kukui Molokai, Inc. (1.70 MGD), and Alpha U.S.A. (0.00 MGD). These estimated withdrawals are not prescribed allocations.

The major water users who are currently relying on the Kualapuu Aquifer as a source have projected water needs which significantly exceed the aquifer's estimated capacity, and it is anticipated that other sources will have to be developed. These source options have not been specifically identified, but may include the development of other aquifers, surface water sources and/or desalinization facilities.
For example, the \( R^2 \) for regression of basin area on average flow equalled 0.557; for elevation on average flow, the \( R^2 \) equalled 0.128. Deleting Gage 4080, because of its low elevation (and obvious water loss), a power regression of elevation versus flow/square mile resulted in an \( R^2 \) equal to 0.626. The relationship of elevation versus unit flow is shown on Figure 2.6. This relationship was used to estimate the following average daily streamflow at the 1,000-foot elevation in each watershed:

<table>
<thead>
<tr>
<th>Stream</th>
<th>Average Flow, mgd</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waikolu</td>
<td>4.3</td>
</tr>
<tr>
<td>Pelekunu</td>
<td>7.9</td>
</tr>
<tr>
<td>Pulena</td>
<td>9.0</td>
</tr>
<tr>
<td>Waiakeakua</td>
<td>6.5</td>
</tr>
<tr>
<td>Total</td>
<td>27.7</td>
</tr>
</tbody>
</table>

The estimated sources from the three valleys at elevation 1000 feet is 27.7 mgd. How much of that would be practicably developable is analyzed in the next section.

How Much Water can be Expected.

The engineering design of the intake and diversion must achieve the maximum of efficiency of capture and transmission in a flashy storm event. Peak instantaneous discharges are on the order of 8000 mgd. Diversion systems have limits. For example, Waikolu is rated for 15 mgd. Obviously, most of the flows will by-pass the intake and diversion elements during the height of storm events.

The analysis is made with these concerns in mind.

Methodology.

The average developable surface water is estimated following the analytical procedures and criteria described below:
1) The diversion capacity is assumed to be approximately 15 mgd, i.e., comparable to the rated capacity of the existing Waikolu Stream diversion;

2) Temporal variation in the runoff along the diversion route will permit all of the diverted water to be captured without in-line storage facilities (other than future tunnels for transmission);

3) Flow duration data (Hirashima, 1965) for three streams were used to estimate the expected value of diversion flow at the gage locations which are lower than 1,000 feet. The expected value is the sum of the products of the percent of time multiplied by the average flow for that interval summed across all flow-duration intervals. The expected value of diversion at these gages (with the 15 mgd diversion limitation) is shown below in column (2):

<table>
<thead>
<tr>
<th>Stream</th>
<th>Diversion at Gage (2)</th>
<th>Diversion 1000 ft (3)</th>
<th>DLNR B16 (4)</th>
<th>Ratio (5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waikolu</td>
<td>5.6</td>
<td>3.8</td>
<td>4.3</td>
<td>0.88</td>
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<td>Pelekunu</td>
<td>7.4</td>
<td>5.5</td>
<td>12.0</td>
<td>0.69</td>
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<tr>
<td>Pulena</td>
<td>11.5</td>
<td>4.7</td>
<td>12.4</td>
<td>0.52</td>
</tr>
<tr>
<td>Waiakeakua</td>
<td>6.5</td>
<td>3.4</td>
<td>3.3</td>
<td>0.52</td>
</tr>
<tr>
<td>Total</td>
<td>17.4</td>
<td>32.0</td>
<td></td>
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</table>

4) It is assumed that the proportion of divertable flow at the 1000-foot elevation is the same proportion at the gages. The proportion is based upon the ratios of the divertable flows divided by the average stream flow reported by DLNR (1966) for these gages.

5) The divertable flows at 1,000 feet shown above (column 3) were based upon the same ratios (column 5, above) for each watershed multiplied times the average streamflow estimated after adjusting to a common diversion elevation of 1,000 feet using the equation shown on Figure 2.4. In comparison, the values obtained by DLNR (B16, 1966) for the 1,000-foot elevation are shown above. That procedure is based upon correlating flows versus drainage area and assuming 70 percent of the flow is divertable under ideal conditions. The difference is partly due to the 15 mgd diversion limitation assumed in this method.

In summary the result here indicates that the divertable flow is on the order of 17 mgd. Note the diversion flow at 1,000 feet estimated for Waikolu Stream is 3.8 mgd. In comparison, at the Molokai Tunnel east portal, the average diversion flow
for 23 years of record has been 2.71 mgd. This is 1.6 mgd less than the 4.3 estimate (column 4), and 1.1 mgd less than the procedure used above. The differences are attributable to the efficiency of the intake.

**Intake design is critical.**

Clogged grates and screens are usual problems which reduce intake efficiency. Intakes are usually in remote locations with restricted accessibility for routine maintenance. A back-up source to surface water system is prudent for many reasons. The MIS system, for example, derives about 40 percent \((1-(2.7/4.3) = 0.4)\) of its flow from dike confined groundwater. No pumping is necessary most of the time, although pumping wells have been installed as part of the design for supplying supplemental water as needed. The average flow from the west portal has been 4.32 mgd (the maximum flow approximately 25 mgd and the minimum flow 2.5 mgd). By comparison, the surface water contribution at the east portal has been 2.71 average. The difference is the groundwater contribution.

**Reliability of Potential Sources.**

The reliability of the potential sources are analyzed in terms of a risk assessment. Risk is defined here as the probability of attaining (or not attaining) a given level of flow from the potential sources based on the *hydrology* of the basins.

**Methodology.**

A portion of the Pelekunu record (26 years of record) has been tabulated (Hirashima, 1965) into mean flow versus duration (in days). The magnitudes of these flows were ranked and a probability plotting position assigned according to the Gringorten plotting formula:

\[
P = \frac{m-b}{n+1-2b}
\]

where \(m\) = rank
\(n\) = 26 (years of record)
\(b\) = 0.44

The data were plotted (see Figure 2.5) on log extreme value probability paper and a trend line fit visually to the plot. This is a probability model of the average return period versus magnitude of flow that will be equal to or less than the indicated value. The ratios of the 2.3-, 10-, 20-, 50-, and 100-year return period flows versus the median 1.6-year, 183 day duration flow are shown on Table 2.3. It is assumed the critical period for evaluation of risk is the typical six-month, dry summer season.
### ISLAND OF MOLOKAI
### MUNICIPAL & PRIVATE WATER SYSTEMS
### AVERAGE DAILY WITHDRAWALS (MGD)
### BY AQUIFER SECTORS, SYSTEMS, AND SOURCES

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<td><strong>Central Sector</strong></td>
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<td></td>
</tr>
<tr>
<td>Kualapuu System</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Kalae System</td>
<td></td>
<td></td>
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<tr>
<td>Waikalae Tunnel (1059-01)</td>
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<td>0.02</td>
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<td>Kualapuu-Mauka (0801-03)</td>
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<td>Hawaiian Homes (0801-01/02)</td>
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<td>0.002</td>
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<tr>
<td>Kaluakoi (0901-01)</td>
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<td></td>
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<td>NA</td>
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<tr>
<td>Waialala Tunnels (1000-02/03)</td>
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<td><strong>Central Sector Subtotal</strong></td>
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<tr>
<td><strong>Southeast Sector</strong></td>
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<tr>
<td>Ualapue</td>
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<tr>
<td>Ualapue Shaft (0449-01)</td>
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<td>0.18</td>
<td>0.18</td>
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<tr>
<td>Kawela</td>
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<tr>
<td>Kawela Well (0457-01)</td>
<td></td>
<td>0.69</td>
<td>0.31</td>
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<td>MIS Supply</td>
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<td><strong>Southeast Sector Subtotal</strong></td>
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<td>1.06</td>
<td></td>
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</tr>
<tr>
<td><strong>Northeast Sector</strong></td>
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<tr>
<td>MIS Supply</td>
<td></td>
<td></td>
<td>6.7&lt;sup&gt;1&lt;/sup&gt;</td>
<td>8.5&lt;sup&gt;1&lt;/sup&gt;</td>
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<tr>
<td><strong>Northeast Sector Subtotal</strong></td>
<td></td>
<td>6.7</td>
<td></td>
<td>8.5</td>
</tr>
</tbody>
</table>

<sup>1</sup>Surface and groundwater combined.
**TABLE 1.10**

WATER CONSUMPTION FROM MIS SYSTEM FOR DESIGNATED ACREAGE

<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>1000 gal</td>
<td>33848</td>
<td>59955</td>
<td>32975</td>
<td>61643</td>
<td>78819</td>
<td>127571</td>
<td>104617</td>
<td>79893</td>
<td>74284</td>
<td>66846</td>
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<td>36563</td>
<td>43743</td>
<td>54689</td>
<td>100455</td>
<td>103637</td>
</tr>
<tr>
<td>Ave mgd</td>
<td>1.09</td>
<td>2.14</td>
<td>1.06</td>
<td>2.05</td>
<td>2.54</td>
<td>4.25</td>
<td>3.37</td>
<td>2.58</td>
<td>2.48</td>
<td>2.16</td>
<td>1.98</td>
<td>1.22</td>
<td>1.31</td>
<td>1.41</td>
<td>1.82</td>
<td>3.24</td>
<td>3.45</td>
<td></td>
</tr>
<tr>
<td>Acres</td>
<td>1606</td>
<td>1592</td>
<td>1624</td>
<td>1629</td>
<td>1619</td>
<td>1618</td>
<td>1605</td>
<td>1612</td>
<td>1597</td>
<td>1611</td>
<td>1602</td>
<td>1611</td>
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<td>1614</td>
</tr>
<tr>
<td>gpd/ac</td>
<td>679</td>
<td>1344</td>
<td>653</td>
<td>1258</td>
<td>1569</td>
<td>2627</td>
<td>2100</td>
<td>1600</td>
<td>1553</td>
<td>1341</td>
<td>1236</td>
<td>757</td>
<td>572</td>
<td>812</td>
<td>874</td>
<td>1126</td>
<td>2005</td>
<td>2138</td>
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</tbody>
</table>

| Non-Homestead | 1000 gal | 31200  | 30297  | 12611  | 25456  | 41231  | 62406  | 69624  | 60779  | 58292  | 85468  | 60793  | 45978  | 35372  | 35964  | 34442  | 48437  | 77446  | 64821  |
| Ave mgd       | 1.01   | 1.08   | 0.41   | 0.85   | 1.33   | 2.08   | 2.25   | 1.96   | 1.94   | 2.76   | 2.03   | 1.48   | 1.14   | 1.28   | 1.11   | 1.61   | 2.5    | 2.16   |
| Acres         | 749    | 772    | 772    | 796    | 801    | 801    | 801    | 793    | 793    | 818    | 813    | 826    | 854    | 864    | 876    | 959    | 959    | 989    |
| gpd/ac        | 1348   | 1399   | 531    | 1068   | 1660   | 2597   | 2809   | 2472   | 2446   | 3374   | 2497   | 1792   | 1335   | 1481   | 1267   | 1679   | 2607   | 2184   |

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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Homestead</td>
<td>1.09</td>
<td>2.14</td>
<td>1.06</td>
<td>2.05</td>
<td>2.54</td>
<td>4.25</td>
<td>3.37</td>
<td>2.58</td>
<td>2.48</td>
<td>2.16</td>
<td>1.98</td>
<td>1.22</td>
<td>1.31</td>
<td>1.41</td>
<td>1.82</td>
<td>3.24</td>
<td>3.45</td>
<td></td>
</tr>
<tr>
<td>Non-Homestead</td>
<td>1.01</td>
<td>1.08</td>
<td>0.41</td>
<td>0.85</td>
<td>1.33</td>
<td>2.08</td>
<td>2.25</td>
<td>1.96</td>
<td>1.94</td>
<td>2.76</td>
<td>2.03</td>
<td>1.48</td>
<td>1.14</td>
<td>1.28</td>
<td>1.11</td>
<td>1.61</td>
<td>2.5</td>
<td>2.16</td>
</tr>
<tr>
<td>Total mgd</td>
<td>2.10</td>
<td>3.22</td>
<td>1.47</td>
<td>2.90</td>
<td>3.87</td>
<td>6.33</td>
<td>5.62</td>
<td>4.54</td>
<td>4.42</td>
<td>4.92</td>
<td>4.01</td>
<td>2.70</td>
<td>2.06</td>
<td>2.59</td>
<td>2.52</td>
<td>3.43</td>
<td>5.74</td>
<td>5.61</td>
</tr>
</tbody>
</table>

**CONSUMPTION FROM MIS SYSTEM**

- **Homestead**
- **Non-Homestead**

**MGD**

- **Total Consumption**

H-NH-USE.XLS
3.4.1 Existing Uses of Water

Tables 1 and 2 summarize existing uses (withdrawals) of water from ground and surface sources on Molokai for 1988. Withdrawals from all sources total approximately 9.7 MGD. Of this amount, approximately 6.3 MGD (65%) was developed by the Molokai Irrigation System from a combination of ground and surface water sources.

Existing ground-water withdrawals total approximately 5.7 MGD. These are summarized by Table 1, together with the estimated aquifer sustainable yields. The data are adopted from the Hawaii Water Plan which, for Molokai, focussed on major water users. The data do not include uses by approximately 60 additional water users who filed declarations of water use with the Commission on Water Resource Management for relatively small quantities of water. Total existing ground-water withdrawals are equivalent to approximately 7% of the island-wide sustainable yield from all aquifers.

Existing surface water withdrawals total approximately 4.0 MGD. These are summarized by Table 2, together with estimates of stream discharges at the mouth, where available. The data are from: the Hawaii Water Plan, registration and declaration of use forms filed with the Commission for surface water sources, and State of Hawaii Bulletin B16, Water Resources Development, Molokai. Figure 2 shows the locations of streams identified by Table 2. Total existing withdrawals from stream sources are equivalent to approximately 2% of the average island-wide total streamflow discharge into the ocean.

The total existing consumptive water use by end users (i.e., for domestic supply or irrigation) is less than the 9.7 MGD currently being withdrawn from ground and surface sources. This is due in part to distribution system losses and unused flow from abandoned but functioning gravity-flow sources, but more significantly to evaporation losses from the Kualapuu Reservoir and the present under-utilization of water reserved for Hawaiian Home Lands by the Molokai Irrigation System.

The design capacity of the existing first phase of the Molokai Irrigation System (MIS), operated by the State Department of Agriculture, is approximately 7.5 MGD. This value corresponds to the instantaneous flow capacity of a transition section between the MIS tunnel and a pipeline which supplies the main reservoir, and is also approximately equal to the maximum reliable water supply which can be developed from the system's existing sources in Waikolu Valley. At present, the maximum flow into the reservoir cannot exceed 7.5 MGD. During flood periods when tunnel discharges exceed this amount, the excess overflows before entering the transmission pipeline to the main reservoir.

By law, HRS §168-4, the Hawaiian Homes Commission and lessees of the Hawaiian Homes Commission have a prior right to two thirds of the water from the existing first phase of the MIS. With the capacity of this phase established at approximately 7.5 MGD, 5.0 MGD is reserved for use on Hawaiian Home Lands upon actual need being shown to the Board of Agriculture, and the remaining 2.5 MGD is available for non-DHHL users.
As of 1991, lessees on Hawaiian Home Lands were actually using only about 1.7 MGD of the 5.0 MGD available to them from the MIS. The system presently has considerable unused capacity for further irrigation of Hawaiian Home Lands, and present demands do not require that MIS wells in Waikolu Valley be pumped. Some of the water presently delivered into the system is unused, and is lost to evaporation or reservoir overflow.

The total existing consumptive end use of water on Molokai, after adjustment for under-utilization of water reserved for Hawaiian Home Lands by the Molokai Irrigation System, Kualapuu Reservoir evaporation, and an unused (but functioning) DHHL diversion from Waihanau Stream, is approximately 7.5 MGD. This is approximately 2.2 MGD less than the total amount of water withdrawn from stream and ground-water sources in 1988.

### 3.4.2 Authorized Planned Uses

Table 3 summarizes authorized planned uses of water, based on the current Molokai Community Plan which guides development decisions through the year 2000. The authorized planned use (demand) for domestic / municipal water is 4.35 MGD, based on a projected island-wide population of 10,600. The authorized planned use (demand) for irrigation / agricultural water is greater than 21.6 MGD. Most of this water demand is planned to occur in Central and West Molokai.

Water uses are discussed in this section as being either for domestic / municipal supply or for irrigation / agricultural supply. The distinction is made for ease of analysis and understanding, and does not imply any fundamental need or desire for dual water systems. Many water systems provide both agricultural and domestic water supplies through a common distribution system. Potable-quality water is suitable in most instances for irrigation, and irrigation water, if not already potable, can usually be made suitable for human consumption through treatment processes.

Authorized planned use of water is defined by the State Water Code as:

"... the use or projected use of water by a development that has received the proper state land use designation and county development plan/community plan approvals."

Authorized planned use of water relates to future population growth, future land use development, and to the consumption of water in the future by end users for purposes such as domestic and irrigation supply on lands authorized for such purposes. It is the primary mechanism provided by the State Water Code for the Commission on Water Management to assess future water demand and the stress that this might place on available water resources. However, while authorized planned use indicates the future
project is considered to have been approved by a federal, state, or county agency if either of two criteria are met:

1) In the case of water development projects which are initiated and funded by any government agency (such as the U.S. Department of the Interior, State Department of Hawaiian Home Lands, Maui County Department of Water Supply, etc.) the water development project is considered to be approved if the responsible public board or body has approved the expenditure of public funds necessary to actually construct the project.

2) For all water development projects, by both government and non-government entities alike, a water development project is considered to be approved if the Commission on Water Resource Management has issued a water use permit for the withdrawal of water or, in an area not designated as a water management area, if the Commission on Water Resource Management has issued a pump installation permit for the project.

The Commission staff is aware of four ground-water development projects on Molokai which, with 1988 as a reference year, had previously been approved but not yet on-line, or which have since been approved. 1988 is used as a reference year because the existing water use discussed earlier is based on that year. The four projects are:

1) Waikolu Aquifer: Well Nos. 4-0855-04 to 06 for the Molokai Irrigation System, now operated by the State Department of Agriculture, for irrigation supply. A well drilling permit for these wells, which incorporated both well construction and pump installation activities, was issued by the Board of Land and Natural Resources to the State Division of Water and Land Development on April 14, 1987. Separate pump installation permits were not required prior to May 1988, when Administrative Rules for the State Water Code were adopted. The wells were completed in 1988 and a 1000 gallons per minute capacity pump was subsequently installed in two of the three wells. No pump was installed in the third well due to low well yield.

2) Kualapuu Aquifer: Well No. 4-0801-03 for County of Maui Department of Water Supply, for domestic and municipal supply. A permit to install a 900 gallons per minute capacity pump proposed for withdrawing 0.45 MGD from this well was issued by the Commission on Water Resource Management on January 24, 1991.

3) Kawela Aquifer: Well No. 4-0456-10 for Salviolo/Harper, for domestic supply. A permit to construct the well and install a 2 gallons per minute capacity pump was issued by the Commission on Water Resource Management on April 2, 1991.

4) Manawainui Aquifer: Well No. 4-0705-05 for CIBA-GEIGY Seed Division, for domestic supply and for irrigation of seed corn and commercial crops. A permit to install a 500 gallons per minute capacity pump proposed for withdrawing 0.575 MGD from this well was issued by the Commission on Water Resource Management on May 29, 1991.
3.4.4 Proposed Surface Water Diversions

HRS §174C-44 provides that one of the factors to be considered by the Commission in designating an area for surface water use regulation is "increasing or proposed diversions of surface waters to levels which may detrimentally affect existing instream uses or prior existing off stream uses."

A proposed or increasing diversion of surface water in this context would identify a specific stream source from which a new or increased diversion would occur. It differs from authorized planned use in that it identifies the location of the water source rather than the location of the water demand. Unlike the "water development project" criterion for ground-water use regulation, the law does not require that a proposed diversion have any federal, state, or county approval to be considered by the Commission.

There are three well-documented proposals for future or increased diversions of surface water on Molokai, all of which involve out-of-watershed transfers. Other factors being equal, out-of-watershed transfers are more likely than within-watershed diversions to have a detrimental effect on existing instream uses or prior existing off stream uses because there is no opportunity for return flow to the stream.

The three proposed diversions are described below in a west-to-east sequence.

1) Since at least 1988, there has been an active proposal to divert an average of 1.0 MGD from Waihanau Stream at a point in the Kahanui Aquifer System, Northeast Sector, to Meyer Lake, located in the Kualapuu Aquifer System, Central Sector.

2) The presently completed first phase of the Molokai Irrigation System currently delivers an annual average of 6.1 MGD (in 1990) to Central Molokai from a combination of well and stream diversion sources in Waikolu Valley. The system is operated at less than its 7.5 MGD design capacity, because the present water demand of Hawaiian Home Lands serviced by the system is less than 2/3 of first phase system capacity reserved to service those lands.

It is planned that increasing demands for water on Hawaiian Home Lands will initially be met by operating the Molokai Irrigation System at its full design capacity. This will involve pumping water from existing wells in Waikolu Valley which are presently unused and/or used at below design capacity. However, due to ground water - surface water interaction, there are concerns that pumping these wells will cause a reduction in streamflow and detrimentally affect existing instream uses of Waikolu Stream.

3) A large-scale proposal for diversion of surface waters involves the construction of future phases of the Molokai Irrigation System by eastward expansion into Pelekunu and Wailau Valleys. This proposal for development of Molokai's water resources has been studied for many years as a potential source of water supply.
### Table 1
Island of Molokai
Existing Ground-Water Uses (Withdrawals)

<table>
<thead>
<tr>
<th>Aquifer</th>
<th>Sustainable Yield, MGD</th>
<th>Withdrawal in 1988, MGD</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>WEST SECTOR</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kaluakoi</td>
<td>2¹</td>
<td></td>
</tr>
<tr>
<td>Punakou</td>
<td>2¹</td>
<td></td>
</tr>
<tr>
<td><strong>SUBTOTAL</strong></td>
<td>4¹</td>
<td></td>
</tr>
<tr>
<td><strong>CENTRAL SECTOR</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hoolehua</td>
<td>2¹</td>
<td></td>
</tr>
<tr>
<td>Manawainui</td>
<td>2¹</td>
<td>0.56</td>
</tr>
<tr>
<td>Kualapuu</td>
<td>7</td>
<td>1.06</td>
</tr>
<tr>
<td><strong>SUBTOTAL</strong></td>
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<td>1.62</td>
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<tr>
<td><strong>SOUTHEAST SECTOR</strong></td>
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<tr>
<td>Kamiloloa</td>
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<tr>
<td>Kawela</td>
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<tr>
<td>Ulalapue</td>
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<td>0.40</td>
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<tr>
<td>Waialua</td>
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<td></td>
</tr>
<tr>
<td><strong>SUBTOTAL</strong></td>
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<td>3.74</td>
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<tr>
<td><strong>NORTHEAST SECTOR</strong></td>
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<td>Kalaupapa</td>
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<td></td>
</tr>
<tr>
<td>Kahanui</td>
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<td>2²</td>
</tr>
<tr>
<td>Waikolu</td>
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<td>Haupu</td>
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</tr>
<tr>
<td>Pelekunu</td>
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</tr>
<tr>
<td>Wailau</td>
<td>15</td>
<td></td>
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<tr>
<td>Halawa</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td><strong>SUBTOTAL</strong></td>
<td>44</td>
<td>0.30</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>83</td>
<td>5.66</td>
</tr>
</tbody>
</table>

1 Brackish water.

2 Approximately 2.4 MGD of ground water was intercepted by the Molokai Irrigation System transmission tunnel between the east and west portals during 1988. The 23-year average quantity of water intercepted by the transmission tunnel from 1966 through 1988 was approximately 1.6 MGD. Although all of this water is attributed above as from the Kamiloloa aquifer, some is actually from the Kahanui and Waikolu aquifers.
Table 2
Island of Molokai
Existing Surface Water Uses (Withdrawals)\(^1\)

<table>
<thead>
<tr>
<th>Stream including</th>
<th>Average Discharge to Ocean, MGD</th>
<th>Withdrawals in 1988, MGD</th>
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<tr>
<td><strong>WEST SECTOR</strong></td>
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<td></td>
</tr>
<tr>
<td>(none)</td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td><strong>CENTRAL SECTOR</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kalihi</td>
<td>n/a</td>
<td>0.03 e</td>
</tr>
<tr>
<td>Lualoni</td>
<td>n/a</td>
<td>0.07 e</td>
</tr>
<tr>
<td><strong>SUBTOTAL</strong></td>
<td>n/a</td>
<td>0.1 e</td>
</tr>
<tr>
<td><strong>SOUTHEAST SECTOR</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Honoulimaloo</td>
<td>n/a</td>
<td>&lt; 0.01</td>
</tr>
<tr>
<td>Honouliwai</td>
<td>n/a</td>
<td>&lt; 0.01</td>
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<tr>
<td>Kawela</td>
<td>n/a</td>
<td>0.07 e</td>
</tr>
<tr>
<td>Papio</td>
<td>n/a</td>
<td>0.03 e</td>
</tr>
<tr>
<td>Punaula</td>
<td>n/a</td>
<td>&lt; 0.01</td>
</tr>
<tr>
<td>Waialua</td>
<td>n/a</td>
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</tr>
<tr>
<td>Wawaia</td>
<td>n/a</td>
<td>&lt; 0.01</td>
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<tr>
<td><strong>SUBTOTAL</strong></td>
<td>n/a</td>
<td>0.1 e</td>
</tr>
<tr>
<td><strong>NORTHEAST SECTOR</strong></td>
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<td></td>
</tr>
<tr>
<td>Haukoi</td>
<td>n/a</td>
<td>&lt; 0.01</td>
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<tr>
<td>Halawa</td>
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<td>Papalaua</td>
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<td></td>
</tr>
<tr>
<td>Pelekunu</td>
<td>37</td>
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</tr>
<tr>
<td>Waihanau</td>
<td>n/a</td>
<td>0.18 e</td>
</tr>
<tr>
<td>Waikolu</td>
<td>15</td>
<td>3.60(^2)</td>
</tr>
<tr>
<td>Wailau</td>
<td>58</td>
<td>&lt; 0.01</td>
</tr>
<tr>
<td><strong>SUBTOTAL</strong></td>
<td>&gt; 153</td>
<td>3.8 e</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>&gt; 153</td>
<td>4.0 e</td>
</tr>
</tbody>
</table>

The quantity of surface water withdrawals may vary greatly from month to month and from year to year, reflecting the available supply. The withdrawal data presented are for a single year only (1988).

For calendar year 1988, an average discharge of 3.9 MGD was recorded at the east portal of the Molokai Tunnel. Of this amount, approximately 0.3 MGD was from pumped wells in Waikolu Valley.

Agricultural Resource Management Division
Paul Matsuo, Administrator/Chief Engineer

Branch Managers
Albert Kawabata, Waimea Irrigation System
Thomas Matayoshi, Molokai Irrigation System
James Respicio, Waimanalo Irrigation System
Wilfred Muramoto, Agricultural Parks

The Division of Agricultural Resource Management has expanded its workload by acquiring another processing facility at Honalo, Hawaii, and taking over administration of the Waianae and the Waimanalo Phase I Agricultural Parks, both located on Oahu. Existing Waimanalo Phase I lease files were transferred to the Division from the Department of Land and Natural Resources (DLNR) and are now included in our program for management.

Long-range planning for Agricultural Water Development was initiated in this fiscal year. Preliminary studies are being conducted to determine the feasibility of acquiring existing sugar irrigation systems on Oahu, Kauai and Hawaii. The present situation with sugar plantations either reducing acreage in sugar cultivation or under financial constraints provides the opportunity. The basic intent of acquiring such systems is to preserve them from deteriorating and to assure agricultural water for alternative crops in order to maintain prime agricultural lands and protect them from urban encroachment. Other related objectives are to provide open space for groundwater recharge and to insure aesthetic views by keeping open space in greenery instead of conversion to high rises or tract homes.
Major rehabilitation and continued improvements to our aging irrigation system facilities are continuing. Several phases of these projects were completed this fiscal year:

- Puu Pulehu Reservoir Lining, Phase I, provides an additional 40 million gallons of water storage for drought protection at Waimea Irrigation System

- Upper Hamakua Ditch Improvements, Phase III, will increase flow through our collections system by reducing water losses through seepage and leakage

- Waimanalo Pipeline Projects replace open ditch system with closed conduit system

- Kualapuu Reservoir embankment protection insures integrity of the reservoir when filled to capacity of 1.4 billion gallons and stops wind erosion

The Waimanalo Irrigation System's conversion project from an archaic open ditch/flume delivery system to a modern closed conduit/pressurized system is presently under way with the final element, a 60-million gallon reservoir, under construction. With this conversion project, all of our irrigation
systems will become enclosed, underground and pressurized, increasing reliability and eliminating waste.

Efforts were initiated to computerize our irrigation billing system. The individual systems began receiving training and familiarization on procedures necessary to convert into automation. Personal computer equipment, connecting communication facilities and application programs were developed. Most of the equipment were received but not functional; but upon completion, all three systems' billings will be handled, calculated, printed and maintained through the Department's minicomputer.

Became more actively involved with water code regulation, as the Division is a water purveyor and must ascertain its requirements to the Water Resources Commission in order to carry out its objectives. The Division needs to protect and preserve water sources for future needs from regulated use or environmental preservation by those wanting to stop or limit further development.

Successively amended the Agricultural Park statutes to allow this program autonomy from DLNR's land management program. The management of agricultural parks was hampered by the broadness of DLNR's program and often conflicted with objectives of the Division's program. In follow through, the Administrative Rules were rewritten to reflect this new legislative independence. With these two significant actions, the Agricultural Park program will take on an identity of its own and provide more effective use of farmland for productive uses.
Progress is continuing in enforcing provisions of our leases. In the fiscal year, five leases were canceled, and the lots were repossessed to be put back into a pool of lots for redrawing. Also, we are actively pursuing other lessees who are in arrears on meeting terms and conditions of their leases with the threat of cancellation if they do not perform within a specified time.

Completed appraisals to determine fair market lease rents for the three existing produce processing facilities. These appraisals will be used to negotiate long-term leases instead of maintaining a short-term revocable permit, which would be more beneficial for both the Department and the operating cooperatives. Initial offers were transmitted to each produce processing cooperative, and negotiations were under way.

Public Notice for Disposition and, subsequently, applications for Waianae Agricultural Park lots were completed. The Division is in the final applicant qualification stages to determine drawing applicants. There were thirty-three applicants, and out of these there were possibly nineteen qualified applicants, subject to verifications of employment and/or financial condition.

The Honalo Marshalling Yard, the newest processing facility, came under control and management of the Division. Governor's Executive Order 3503 set aside this property to the Department. The Division issued a revocable permit to the Kona Producers Cooperative to operate this new facility.
Statement of Paul Matsuo, Div. Administrator:

The Division's emphasis on bringing agricultural park lessees into compliance with terms and conditions of their leases is progressing satisfactorily. Other program areas receiving more concentration are the long-term planning for additional agricultural infrastructure to support the changing agricultural climate, where large sugar cultivation operations are declining.

The Division needs to be poised to assert its leadership in aggressively pursuing these opportunities to protect and preserve the existing agricultural infrastructure upon the demise of these large sugar plantations.

Continuing efforts are being made to keep all of our irrigation facilities in top operating condition, which allows in an uninterrupted flow of agricultural water. Improvements to existing facilities are systematically being implemented, without disrupting the continuous delivery of water.
## MOLOKAI IRRIGATION SYSTEM
### FISCAL YEAR SUMMARY

<table>
<thead>
<tr>
<th>Month</th>
<th>Water Sold (Gallons)</th>
<th>Acreage Served</th>
<th>Assessment Charges</th>
<th>Water Charges</th>
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| **NON-HOMESTEADERS** |                      |                |                    |                   |
| **1991**   |                      |                |                    |                   |
| July       | 73,971,000           | 981            | 1,079.10           | $11,835.36        |
| August     | 57,721,000           | 1,013          | 1,114.30           | 9,235.36          |
| September  | 112,710,000          | 963            | 1,059.30           | 18,033.60         |
| October    | 75,130,000           | 1,043          | 1,147.30           | 12,020.80         |
| November   | 19,697,000           | 1,073          | 1,180.30           | 3,151.52          |
| December   | 59,871,000           | 1,085          | 1,193.50           | 9,579.36          |
| **1992**   |                      |                |                    |                   |
| January    | 78,862,187           | 1,155          | 1,270.50           | 12,617.95         |
| February   | 58,970,000           | 1,155          | 1,270.50           | 9,435.20          |
| March      | 47,822,000           | 1,220          | 1,342.00           | 7,651.52          |
| April      | 49,929,000           | 1,222          | 1,344.20           | 7,988.64          |
| May        | 64,664,000           | 1,222          | 1,344.20           | 10,346.24         |
| June       | 112,878,000          | 1,250          | 1,375.00           | 18,060.48         |
| **Subtotal | 812,225,187          | ---            | $14,720.20         | $129,956.03       |

| **TOTAL**  | 1,538,203,187        |                | $36,632.20         | $246,112.51       |
## WAIMEA IRRIGATION SYSTEM
### FISCAL YEAR SUMMARY

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<tr>
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| **AG PARK PHASE I** |                      |                |                    |               |
| **1991**            |                      |                |                    |               |
| July                 | 3,279,200            | 121            | $184.00            | $524.67       |
| August               | 2,800,700            | 121            | 184.00             | 448.11        |
| September            | 2,604,200            | 121            | 184.00             | 416.67        |
| October              | 1,714,200            | 121            | 184.00             | 274.27        |
| November             | 2,152,900            | 121            | 184.00             | 344.46        |
| December             | 779,700              | 121            | 184.00             | 124.75        |
| **1992**             |                      |                |                    |               |
| January              | 1,168,100            | 121            | 184.00             | 186.90        |
| February             | 1,642,816            | 121            | 214.00             | 262.85        |
| March                | 2,479,200            | 121            | 214.00             | 396.67        |
| April                | 2,783,400            | 121            | 214.00             | 445.34        |
| May                  | 1,623,700            | 121            | 214.00             | 259.79        |
| June                 | 2,080,600            | 121            | 214.00             | 332.90        |
| **Subtotal**         | 25,108,716           | ---            | $2,358.00          | $4,017.38     |

| **TOTAL**            |                      |                | $31,386.00         | $13,220.51    |
### AGRICULTURAL PARKS
#### FISCAL YEAR SUMMARY

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This year we will be printing the 1992 Annual Report at our own printshop. Please adhere to the following guidelines when submitting narratives and/or tables.

1. Please keep narratives and tables in separate documents.
2. Use italics or boldface for emphasis or for terms such as scientific names.
3. Use underlining to emphasize words or phrases.
4. Format line should only contain necessary tabs/dec tabs.
5. Both electronic and hard copy submissions must be:
   a. Documents residing on the Main Office VS should be copied to the next available document.
   b. Documents residing on PCs at the Main Office should be uploaded to the Main Office VS, library: CHRR on volume: VOL2. (Pride can be used to convert the document to the VS)
   c. Documents residing on Halawa or Ala Moana VS should be transmitted through E-mail to Jane Marcum.
6. For submittals from the Main Office, the hard copy should also indicate, in handwriting, the ID number in library CHRR in which the document resides.

    1. Format line should only contain necessary tabs/dec tabs.
    2. Carriage return should only be used to indicate end of paragraph. Utilize the word processing’s wrap-around feature.
    3. Period within a paragraph should be followed by 2 spaces.

   1. Each table should be on its own page unless the format is exactly the same.
   2. In tables, use tabs/dec tabs to show indentations or spaces between columns.
   3. Format line should only contain necessary tabs/dec tabs. Tabs/dec tabs should be limited to only one per column. It is okay if the column headings or data do not align properly as long as they are within the column. The desktop publishing software has the ability to center, right or left justify information by columns.

If you have any questions on the formatting, please call Helene Okamura at 973-9490.
Division of Agricultural Resources Management
Department of Agriculture
1428 So. King St.
Honolulu, HI 96814
ATTN: Administrator and Chief Engineer

SUBJECT: RENEWAL OF "NIGHT P" AND "P" SCHEDULE AGREEMENTS
FOR PUMPS AT PUULUAHINE, MOLOKAI

Dear Sir:

Enclosed are three (3) copies each of the renewals for the "Night P" and "P" Schedule Agreements for the Division of Agricultural Resource Management, Department of Agriculture (formerly Division of Water and Land Development, Department of Land and Natural Resources) pumps at Puuluhine, Molokai, to run for the one (1) year period of July 1, 1989 to June 30, 1990.

One change is that the minimum charges for both accounts have dropped, from $1,431.17 to $979.60 on the "Night P" and from $2,000.00 to $1,800.00 on the "P" schedule. This is due to the 10% reduction from Hawaiian Electric Company and for your reduced use of the pumps in the current contract period. There are no other changes in the amended contracts.

An operational change has been discussed and worked out with Tom Matayoshi in the Molokai Office. Before finishing the renewals I checked with him to confirm the number of pumps and total horsepower on line and the hours and the time that the pumps were being run. Any changes would have to be incorporated into the renewals. The number of pumps and total horsepower are still the same. However he has on a staggered schedule, been running the pumps for 24 hours. According to MoeCo schedule "P" rules the pumps should not be run during our peak period of 5 p.m. to 9 p.m. This has been resolved by Tom setting his timers so that the pumps will be off during our peak period. He believes he will not lose any pumping capacity. In an emergency you would be allowed to run the pumps during the peak with prior notice to MoeCo and a penalty charge imposed for the kwh during this emergency period. With two pumps available, this would be unlikely.
I volunteered to estimate for Tom the number of hours he would need to run each pump monthly to reach the minimums. Our estimates are 67 hours total for the "Night P" and 92 hours total for the "P" schedule. This is based on a single 100 HP pump. If you run 2 pumps simultaneously, the time should be cut in half. You can run two pumps in any combination you want as long as the total hours for the month are 67 and 92. These are rough estimates and are to be used only as guides. Some adjustments will be necessary.

For maximum savings for each month we suggest you run the pumps during the "P" schedule period to reach the minimum (92 hours) first then concentrate your pumping during the "Night P" period, when the energy rate is approximately one half of the "P" schedule period.

Please review the renewal agreements. Write or call me at 521-8262 (Honolulu) or 553-3234 (Molokai) if you have any questions. Thank you.

MOLOKAI ELECTRIC COMPANY, LTD.

By

John N. Urauchi
Vice President/Adm. & Mktg.

Enclosure

CC: Tom Matayoshi
    Arden G. Henderson
    David C. Slipher
DIVISION OF AGRICULTURAL RESOURCE MANAGEMENT

Estimating Minimum for "Night P"

Total 200 HP Pump

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Schedule "Night P" Rate

Customer Charge $100.00

Demand Charge
$1.50 per Horsepower
$1.50 x 200 HP $300.00

Energy Charge
15,318 kwh x .116/kwh 1,776.89

Total Charges $2,176.89

Less 10% (HECO) 217.69

$1,959.20

$1,959.20 x 50% 979.60
WELL DRILLING PERMIT

for

Waikolu Valley Exploratory Wells
State Well Nos. 0855-04 to 06
Waikolu, Molokai

TO: Division of Water and Land Development
P.O. Box 373
Honolulu, Hawaii 96809

In accordance with Chapter 166 of Title 13, "Rules for the Control of Ground Water Use in the State of Hawaii," your application to drill Waikolu Valley Exploratory Wells, State Well Nos. 0855-04 to 06 is approved subject to compliance with all applicable rules, ordinances, and laws.

WILLIAM W. PATY
Chairperson of the Board

APR 14 1987
Date of Issuance

cc: USGS
Dept. of Health,
Drinking Water Program
Maui Dept. of Water of Supply
Mr. Manabu Tagomori  
Division of Water and Land Development  
P.O. Box 373  
Honolulu, Hawaii 96809

Dear Mr. Tagomori:

We are pleased to inform you that your Conservation District Use Application for drilling test wells at TMK: 6-1-01: 2, Waikolu Valley, Molokai, was approved on June 26, 1987 subject to the following conditions:

1. The applicant shall comply with all applicable statutes, ordinances, rules and regulations of the Federal, State and County governments, and applicable parts of Section 13-2-21, Administrative Rules, as amended;

2. The applicant, its successors and assigns, shall indemnify and hold the State of Hawaii harmless from and against any loss, liability, claim or demand for property damage, personal injury and death arising out of any act or omission of the applicant, its successors, assigns, officers, employees, contractors and agents under this permit or relating to or connected with the granting of this permit;

3. Since this approval is for use of conservation lands only, the applicant shall obtain appropriate authorization through the Division of Land Management, State Department of Land and Natural Resources for the occupancy of State lands;
4. If any unanticipated sites or remains of historic or prehistoric interest (such as shell, bone or charcoal deposits, human burials, rock or coral alignments, paving, or walls) are encountered during construction, the applicant shall stop work and contact the Historic Preservation Office at 548-7460 or 548-6408 immediately.

5. The applicant shall comply with all applicable Public Health Regulations;

6. A fire contingency plan, acceptable to the Division of Forestry and Wildlife, Department of Land and Natural Resources, shall be implemented during and after construction;

7. Any construction, alteration, moving, demolition and repair of any building or other improvement on lands within the Conservation District, authorized by the Board, shall be subject to the building and grading codes of the respective counties in which the lands are located; provided that prior to the commencement of any construction, alteration, or repair of any building or other improvement, four (4) copies each of the final location map, plans, and specifications shall be submitted to the Chairperson, or his authorized representative, for approval of which three (3) copies will be returned;

8. Any work or construction to be done on the land shall be initiated within one (1) year of the approval of such use, and all work and construction must be completed within three (3) years of the approval of such use. Failure to comply with this condition shall render this application null and void;

9. The applicant shall flag the terraces near Well Site #2 with a 30-foot buffer zone to avoid inadvertent damage to archaeological sites as a result of construction. The applicant shall also flag the retaining wall in the vicinity of Well Site #3 and inform the construction crew of its existence;

10. The applicant shall provide a water connection to facilitate movement of stream macrofauna over the dry portion of the stream in consultation with the Division of Aquatic Resources and the U.S. Fish and Wildlife Service;
11. The applicant shall develop monitoring plans in consultation with the Division of Aquatic Resources, the U.S. Fish and Wildlife Service, and the U.S. Geological Survey. The applicant shall monitor the wells and the effect of the wells upon the streamflow and the stream macrofauna during and after test pumping to avoid negative impact upon Waikolu Stream and the native Hawaiian macrofauna which inhabit the stream. One copy of the monitoring report shall be sent to the Office of Conservation and Environmental Affairs;

12. If monitoring indicates that the streamflow and aquatic macrofauna are negatively impacted by the test drilling, the applicant shall cease pumping at once;

13. Should the test wells prove successful, the applicant shall submit a new Conservation District Use Application and an Environmental Impact Statement for development of the wells;

14. If the wells prove unsatisfactory, the applicant shall seal them properly so as not to cause any detrimental effects to the ground water resources of the area;

15. That failure to comply with any of these conditions shall make this Conservation District Land Use application null and void; and

16. Other terms and conditions as prescribed by the Chairperson.

Please acknowledge receipt of this permit, with the above noted conditions, in the space provided below. Please sign two copies. Retain one and return the other.
Should you have any questions on any of these conditions, please feel free to contact our Office of Conservation and Environmental Affairs staff at 548-7837.

Very truly yours,

WILLIAM W. PATY, Chairperson
Board of Land and Natural Resources

Receipt acknowledged

Applicant's Signature

cc: Maui Board Member
Maui Land Agent
Maui County Depts. of Planning,
Public Works, Water Supply
Dept. of Hawaiian Home Lands
U.S. Fish and Wildlife Service
National Park Service
DOH/OEQC/EC/OHA/DPED
NIGHT RATE

POWER SERVICE AGREEMENT

1st
July

THIS AGREEMENT, entered into this 17th
day of November, 1986, between MOLOKAI ELECTRIC
COMPANY, LTD., a Hawaii corporation, whose principal office
is in Kaunakakai, Molokai and whose post office address is
P.O. Box 378, Kaunakakai, Molokai, Hawaii 96748, hereafter
called the "Company", and DIVISION OF WATER AND LAND
DEVELOPMENT, DEPARTMENT OF LAND AND NATURAL RESOURCES, STATE
OF HAWAII, whose post office address is P.O. Box 373,
Honolulu, HI 96809, hereafter called the "Customer".

WITNESSETH:

IT IS AGREED BETWEEN THE PARTIES HERETO AS FOLLOWS:

(1) The Company agrees to furnish and the Customer
agrees to take, use and pay for electrical power service from
the Company's system between 10:30 p.m. and 6:30 a.m. in
accordance with the Company's effective Rate Schedule "P"
Contract Night Rates and the rules and regulations of the
Company applicable to such class of service.

(2) The Customer agrees that the minimum monthly
rate is $2,492.00 for the Customer's pumps totaling 275 HP,
which represent 50% of the estimated monthly billing.
(3) Customer has paid to Company a non-refundable $5,000.00 for the purchase and installation of meters, sensors, controllers and protective devices which enable the Company to control the load. If the controls require a telephone line to be installed between Customer's facility and the Company, the installation and rental cost of said line shall be borne by Customer.

(4) Customer is permitted service outside of the hours of 10:30 p.m. and 6:30 a.m., provided the service shall be calculated as a separate account subject to all regular Schedule "P" rates and conditions except that Special Condition "(c)" would not apply, as it is considered covered by the annual minimum charge contract. Customer shall sign a separate Schedule "P" contract which shall provide for the purchase and installation of utility approved metering and controls.

(5) Company shall have definite interruptible control over load. Customer is aware that service is subject to interruption when the demand for electricity from all customers not on Schedule "P" exceeds the capacity of all of the Company's operable generating units.

(6) This Agreement shall be effective on July 1, 1986 and shall terminate on June 30, 1987. Upon such expiration, this Agreement may be renewed from year to year thereafter upon all the terms and conditions stated herein.
(7) This Agreement is subject to any changes or modifications by the Public Utilities Commission of the State of Hawaii as said commission may from time to time direct in the exercise of its jurisdiction.

(8) The Customer, in the event of selling, leasing or otherwise disposing of the premises in which the electric power service is used, may with the Company's written consent, assign this Agreement to the lessee or purchaser thereof, if the lessee or purchaser will in writing assume and covenant to perform this Agreement.
IN WITNESS WHEREOF, the parties have executed this Agreement on the day and year first above written.

MOLOKAI ELECTRIC COMPANY, LTD.

By                      
David C. Slipper
Its President

By                      
John N. Urauchi
Its Assistant Secretary

DIVISION OF WATER AND LAND DEVELOPMENT, DEPARTMENT OF LAND AND NATURAL RESOURCES, STATE OF HAWAII

By                      
Its Manager-Chief Engineer
FILE CLOSED
1/94

PLEASE FILE IN FOLDER #2
The National Park Service (Service) has objected to the application for water use permit by the Hawaii, Department of Agriculture, Agricultural Resource Management Division, to divert ground water from Waikolu Stream, Molokai, within Kalaupapa National Historical Park. The Service has requested denial of this Application in an August 26, 1993, letter to the Deputy Director of the Commission on Water Resource Management. The Service submitted its objection for the following reasons:

The Department of Agriculture is presently operating a system of wells and surface water diversions along a reach of Waikolu Stream within Kalaupapa National Historical Park. The Department's present diversions greatly reduce flows in Waikolu Stream, especially during the drier summer months. At times, the stream is dewatered in sections from the upper surface water diversion to just below the pumphouse due to those diversions.

The Application by the Department is for ground water diversions for existing and new wells for agricultural irrigation uses. The proposed additional diversions can only further extend the period of dewatering and, possibly, expand the dewatered portion of the stream. The proposed decrease in surface water flows will adversely affect the scenic, aquatic and historical (interpretive) resources within the Kalaupapa National Historical Park.
The National Park Service holds that the altered stream flows will have detrimental effects on the aquatic species found in Waikolu Stream. Presently, the National Park Service is conducting studies to determine the impacts of stream diversion upon selected aquatic species within Waikolu Stream. Aquatic macrofauna which are being studied include several species of 'opae, hiihiwai and 'o'opu. As you may be aware, the U.S. Fish and Wildlife Service has been petitioned to list 'o'opu alamo'o as a threatened species. These species are described in greater detail in the Service's August 26, objection.

The National Park Service also plans to reestablish the cultivation of Native Hawaiian food crops and other plants important to Native Hawaiian culture and religion in Waikolu Valley for purposes of interpretation of the historical scene. As a result, there may be appurtenant water rights and traditional and customary rights associated with these uses as described in Chapter 174C-101 of the State Water Code. The Service holds that these Native Hawaiian Water Rights will be impaired as a result of the appropriation proposed by this Application.

As you know, an interim instream flow standard was adopted by the Commission on June 15, 1988, for all streams on Molokai, including Waikolu Stream. The Commission protected "...that amount of water flowing in each stream on the effective date of this standard, and as that flow may naturally vary throughout the year and from year to year without further amounts of water being diverted offstream through new or expanded diversions, and under
the stream conditions existing on the effective date of the standard,...".

The Hawaii revised Statutes, Chapter 13-169-2, defines an "Instream flow standard" as "...a quantity or flow of water or depth of water which is required to be present at a specific location in a stream system at certain specified times of the year to protect aquatic life, wildlife, recreational, aesthetic, scenic, and other beneficial instream uses". Beneficial instream uses are defined by Statute to include: "Maintenance of aquatic life and wildlife habitats; Outdoor recreational activities; Maintenance of ecosystems such as estuaries, wetlands, and stream vegetation; Aesthetic values such as waterfalls and scenic waterways; (and) The protection of traditional and customary Hawaiian rights".

The Service recognizes that surface water diversions and three wells were in place in Waikolu Stream prior to the effective date of the interim standard. However, authorization to pump additional ground water from the three new wells covered by this Application conflicts with the purpose for which the interim standard was established. The Department of Agriculture recognized this conflict in its Application by admitting, in response to question 15(b), that the interim instream flow standard would be affected "during the summer when rainfall is less".

In addition to the foregoing, the Department's application is defective. In the response to question 8, "QUANTITY OF WATER REQUESTED:"

"3,360,000 gallons per day (or 20 hours per day)"

In response to Question 15 "(a) Impact on
Sustainable yield (7,488,000 gallons per day). The Application should be returned to the Department to rectify this discrepancy.

After submitting its Objection to the Department's Application, the National Park Service learned from the Water Resource Protection Plan (1992), published by the Commission on Water Resource Management, that the total amount of water applied for will be greater than the basin's estimated sustainable yield. The Plan estimates the sustainable yield from the Waikolu Aquifer to be 5 million gallons per day of high level water. The Department's application exceeds the State's estimated sustainable yield by 2.488 million gallons per day. This overdraft of water, if approved, will almost certainly result in decreased surface water flows in Waikolu Stream and will detrimentally effect those attributes which the National Park Service is charged to protect in Kalaupapa National Historical Park.

As I mentioned previously, the National Park Service is conducting studies designed to determine the impacts of water diversion upon the streamflow-dependant aquatic resources in Waikolu Stream. Baseline population surveys and data on habitat use and stream discharge are being collected to make it possible to assess impacts from streamflow depletion. These studies were only recently initiated, and several years will be required before the results can be used to answer management questions.

Therefore, while the National Park Service lacks the necessary data to describe the impacts of present levels of diversion, its
on-going research is expected to provide the information to make such an assessment. Once the National Park Service has scientific information in hand, it will re-evaluate its position with regard to existing and future diversions. However, even without research results, the Service cannot condone the dewatering of portions of Waikolu Stream.

As mitigation of dewatering effects, fish ladders have been considered for Waikolu Stream. While the Service supports the objective to be served, the effectiveness of such devices is uncertain according to available research. The National Park Service supports construction and testing of a fish ladder in Waikolu Stream, however, an increase in the amount of water diverted during this testing would likely aggravate an already difficult situation. Further increases in diversion should not occur until such time as scientifically sound assessments of impact are in hand.

The Service is opposed to any further appropriations of water within the Waikolu surface and ground water system until substantial scientific evidence can show that existing and proposed diversions will not affect the water-related resources of Kalaupapa National Historical Park.

In sum, for the aforementioned reasons the proposed water uses by the Department of Agriculture is not in the public interest and the application should be DENIED. At such time as credible scientific studies reveal that diversion will cause no harm to water-dependent resources, both biotic and cultural, in Waikolu
Basin, the Department of Agriculture may again apply for a water use permit.

The National Park Service appreciates this opportunity to offer comments for the Commission's consideration. If we may be of further assistance, please feel free to contact either the local National Park Service office at Kalaupapa, the area office in Honolulu, or the Water Resources Division office in Colorado.
MEMORANDUM

TO: Paul T. Matsuo, Administrator
FROM: Thomas N. Matayoshi, District Branch Manager
SUBJECT: ELECTRICAL PUMPING USAGE 1984 - PRESENT (N) NIGHT, (D) DAY PUMPING

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TO:  

DATE: ________  TIME: ________

WHILE YOU WERE OUT

Ernesto Deutsch  
Malokai  

1-553-9815

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<td>WILL CALL AGAIN</td>
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RETURNED YOUR CALL

Message: Supports no diversion of Waikolu Stream.
MIS Ground & Surface Diversions
Annual Averages

Interim Instream Flow Standards Established
Grandfathered Diversions

MWG Ground Water Est. = 1.13 mgd

Total = Sur + Ground  Ground water only

*NOTE: Long-term ave flow of Waikou Stream ≈ 8.815 mgd
(based on 26 years of data from West Portal and 30 years of
USGS Enka Station 4055)
MOLOKAI IRRIGATION SYSTEM PUMPAGE
WELLS #22, 23, 24 (Well No. 0855-01, 02, 03)

DATE (Latest Data 11/93)

MONTHLY PUMPAGE  12-MAV  REQUESTED AMOUNT
"EXHIBIT C"

FIGURE 1. LOCATION OF MONITOR AND CONTROL SITES WITHIN THE MOLOKAI IRRIGATION SYSTEM.
Figure 1. Location of monitor and control sites within the Molokai irrigation system.

GROUND WATER USE PERMIT  
WUP NO. 220

PERMITTEE

Applicant/Water User  
Address  STATE DEPT. OF AGRICULTURE  
P.O. BOX 205  
HOOLEHUJA, HI 96829

Landowner of Source  
Address  STATE OF HAWAII  
P.O. BOX 205  
HOOLEHUJA, HI 96829

PERMITTED SOURCE INFORMATION

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PERMITTED USE INFORMATION

| Reasonable beneficial use | AGRICULTURE |
| Withdrawal (12 month moving ave.) | 0.853 mgd |
| Location of water use | 5-2-OIJ9_06, 21 to 27 |
| TMK # | 5-2-01 to 06, 21 to 27 |
| Address | HOOLEHUA |
| State land use classification | AGRICULTURE |
| County zoning classification | AG-2 |

Pursuant to Hawaii’s State Constitution, Article XI, Section 7, Hawaii Revised Statutes, Chapter 174C; Hawaii Administrative Rules, Chapters 13-167 through 13-171; and Hawaii decisional law and custom, the applicant is hereby authorized to use ground water from the sources and in the amount and from and upon the locations described above; subject however, to the requirements of law including but not limited to the following conditions:
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 (1992), 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 174C-101(a), HRS.

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 January 12, 1994 and March 14, 1995 meetings 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.

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;
GROUND WATER USE PERMIT
STATE DOA, AG RES MGT DIV, Well Nos. 0855-01 to 03, WUP No. 220

1. Reserve water for future uses, provided that all legal existing uses of water as of June, 1987 shall be protected;
2. Meet legal obligations to the Department of Hawaiian Home Lands, if applicable; or
3. Carry out such other necessary and proper exercise of the State's and the Commission's police powers under law as may be required.

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

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

11. An approved flowmeter(s) must be installed to measure 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 a monthly basis.

12. This permit shall be subject to the Commission's periodic review of the Waikolu 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 Waikolu Aquifer System, or relevant modified aquifer(s), is reduced.

13. 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.

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

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

16. The permittee understands that under HRS § 174C-58(4), that partial or total nonuse, for reasons other than conservation, of the water allowed by this permit for a period of four (4) continuous years of 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 of forfeiture.

17. 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 Waikolu Ground Water Management Area.
18. 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 years of the filing of the application to continue the existing use.

19. 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.

20. This permit is subject to the special conditions attached as Exhibit A which are incorporated herein by reference.

21. 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.

22. The issuance of this permit was approved by the Commission on Water Resource Management at its meetings on January 12, 1994 and March 14, 1995.

__________________________
MICHAIL D. WILSON, Chairperson
Commission on Water Resource Management

Date of Permit Issuance: FEB 28 1996

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: 7-8-96

Printed Name: Thomas Matayoshi, Manager

Firm or Title: Molokai Irrigation System, State Department of Agriculture

PLEASE SIGN AND RETURN ONE COPY OF THIS PERMIT TO THE COMMISSION AND RETAIN A COPY FOR YOUR RECORD.
GROUND WATER USE PERMIT
STATE DOA, AG RES MGT DIV, Well Nos. 0855-01 to 03, WUP No. 220

EXHIBIT A

Water Use Permit
Ground Water

SPECIAL CONDITIONS

A. The applicant may continue the use of ground water within the limits approved by the Commission, and any delay in receipt of the actual permit document shall not be a reason to interrupt the approved level of use.

B. The applicant shall implement, by December 31, 1995, a biological and hydrologic 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, semiannual 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 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.
WATER SHORTAGE PLAN
MOLOKAI IRRIGATION SYSTEM

1. Request water conservation from water customers via letter. Usually a 10% reduction of water use on voluntary basis.

2. If shortage/drought continues, issue via letter a water restriction. Usually an irrigation schedule which allows only three days a week.

3. If shortage continues, a water allocation delivery will be instigated where water will be delivered only on four days a week.

4. If shortage continues, water delivery will stop when reservoir draws down. Such action will be preceded by a general notice published one week in advance.
Mr. Thomas Matayoshi  
State Department of Agriculture  
Agricultural Resource Management Division  
P.O. Box 205  
Hoolehua, HI 96829  

Dear Mr. Matayoshi:  

This is in regards to our letter of February 28, 1996, transmitting the water use permit for Well Nos. 0855-01 to 03.  

The third line on the second page of the cover letter contains an error. Your water shortage plan should be developed for the Waikolu Ground Water Management Area, not the Kualapuu Ground Water Management Area, pursuant to Condition 17 of your water use permit.  

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

Sincerely,  

[Signature]  
RAE M. LOUI  
Deputy Director  

LN:ss
Mr. Thomas Matayoshi  
State Department of Agriculture  
Agricultural Resource Management Division  
P.O. Box 205  
Hoolehua, HI 96829  

Dear Mr. Matayoshi:  

Approval of Water Use Permit for Well Nos. 0855-01 to 03  
Waikolu Ground Water Management Area, Molokai  

This letter transmits your water use permit for Waikolu Wells #22, #23, and #24 (Well Nos. 0855-01 to 03) for use of 0.853 mgd of water on a twelve-month moving average basis. Enclosed with this letter of approval are the following:  

1. Your water use permit  
2. Your official monthly water use report form  

On January 12, 1994, the Commission on Water Resource Management (Commission) approved your application for a water use permit for Waikolu Wells #22, #23, and #24 (Well Nos. 0855-01 to 03) for use of 0.744 million gallons per day (mgd) of water on a 12-month moving average basis. The Commission deferred action on your request for existing uses in excess of 0.744 mgd pending the submittal of a petition to amend the interim instream flow standard for Waikolu Stream. Your application for future uses over 0.853 mgd from Wells #22, #23, #24, #6, #5, and #4 (Well Nos. 0855-01 to 06) was denied without prejudice pending the results of a monitoring program and any further studies.  

On March 14, 1995, the Commission approved an amendment of the interim instream flow standard for Waikolu Stream and a modification of the interim water use permit to allow an additional 0.109 mgd of ground water to be withdrawn from Well Nos. 0855-01 to 03.  

Please be sure to read the conditions of your approved permit. If you accept these terms, please sign and return one copy of this permit to the Commission and retain a copy for your record.  

We draw your attention to two key conditions of your permit that require your response. First, you are required to keep a record of your monthly total pumpage. This information must be submitted to the Commission on a regular monthly basis using the enclosed water use report form. You should make copies of the enclosed report form as needed.
Second, you are required to submit a water shortage plan to the Commission within thirty (30) days of the issuance date of this permit. Your water shortage plan simply identifies what you are willing to do should the Commission declare a water shortage situation in the Kualapuu Ground Water Management Area and can be as short as a one page letter. In a water shortage situation, the Commission may require temporary reductions in pumpage from all sources. The Commission is required, by law, to formulate a plan to implement such area-wide reductions, which should accommodate, include, and be consistent with your plans. Therefore, your help, by submitting your water shortage plan, is greatly needed in formulating the Commission’s overall Water Shortage Plan.

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

Aloha,

[Signature]

MICHAEL D. WILSON
Chairperson

Attachments
GROUND WATER USE PERMIT  
WUP NO. 220

PERMITTEE

<table>
<thead>
<tr>
<th>Applicant/Water User</th>
<th>Landowner of Source</th>
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<tr>
<td>Address</td>
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<tr>
<td>State Dept. of Agriculture</td>
<td>State of Hawaii</td>
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<tr>
<td>P.O. Box 205</td>
<td>P.O. Box 205</td>
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<tr>
<td>Hoolehua, HI 96829</td>
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PERMITTED SOURCE INFORMATION

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<tr>
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<tr>
<td>Water Management Area</td>
<td>WAIKOLU</td>
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<tr>
<td>Aquifer Sector</td>
<td>NORTHEAST</td>
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<tr>
<td>Aquifer System</td>
<td>WAIKOLU</td>
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<tr>
<td>System Sustainable Yield</td>
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<td>Well Name</td>
<td>WAIKOLU #22 TO #24</td>
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<tr>
<td>State Well No.</td>
<td>0855-01 TO 03</td>
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PERMITTED USE INFORMATION

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<tr>
<td>Withdrawal (12 month moving ave.)</td>
<td>0.853 mgd</td>
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<tr>
<td>Location of water use</td>
<td></td>
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<tr>
<td>TMK #</td>
<td>5-2-01 to 06, 21 to 27</td>
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<tr>
<td>Address</td>
<td>Hoolehua</td>
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<tr>
<td>State land use classification</td>
<td>AGRICULTURE</td>
</tr>
<tr>
<td>County zoning classification</td>
<td>AG-2</td>
</tr>
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</table>

Pursuant to Hawaii’s State Constitution, Article XI, Section 7, Hawaii Revised Statutes, Chapter 174C; Hawaii Administrative Rules, Chapters 13-167 through 13-171; and Hawaii decisional law and custom, the applicant is hereby authorized to use ground water from the sources and in the amount and from and upon the locations described above; subject however, to the requirements of law including but not limited to the following conditions:
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 (1992), 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 174C-101(a), HRS.

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 January 12, 1994 and March 14, 1995 meetings are incorporated into this permit by reference.

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

11. An approved flowmeter(s) must be installed to measure 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 a monthly basis.

12. This permit shall be subject to the Commission's periodic review of the Waikolu 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 Waikolu Aquifer System, or relevant modified aquifer(s), is reduced.

13. 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.

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16. The permittee understands that under HRS § 174C-58(4), that partial or total nonuse, for reasons other than conservation, of the water allowed by this permit for a period of four (4) continuous years of 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 of forfeiture.

17. 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 Waikolu Ground Water Management Area.
18. 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 years of the filing of the application to continue the existing use.

19. 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.

20. This permit is subject to the special conditions attached as Exhibit A which are incorporated herein by reference.

21. 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.

22. The issuance of this permit was approved by the Commission on Water Resource Management at its meetings on January 12, 1994 and March 14, 1995.

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.
A. The applicant may continue the use of ground water within the limits approved by the Commission, and any delay in receipt of the actual permit document shall not be a reason to interrupt the approved level of use.

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Mr. Thomas Matayoshi  
State Department of Agriculture  
Agricultural Resource Management Division  
P.O. Box 205  
Hoolehua, HI 96829

Dear Mr. Matayoshi:

Approval of Water Use Permit for Well Nos. 0855-01 to 03  
Waikolu Ground Water Management Area, Molokai

This letter transmits your water use permit for Waikolu Wells #22, #23, and #24 (Well Nos. 0855-01 to 03) for use of 0.853 mgd of water on a twelve-month moving average basis. Enclosed with this letter of approval are the following:

1. Your water use permit
2. Your official monthly water use report form

On January 12, 1994, the Commission on Water Resource Management (Commission) approved your application for a water use permit for Waikolu Wells #22, #23, and #24 (Well Nos. 0855-01 to 03) for use of 0.744 million gallons per day (mgd) of water on a 12-month moving average basis. The Commission deferred action on your request for existing uses in excess of 0.744 mgd pending the submittal of a petition to amend the interim instream flow standard for Waikolu Stream. Your application for future uses over 0.853 mgd from Wells #22, #23, #24, #6, #5, and #4 (Well Nos. 0855-01 to 06) was denied without prejudice pending the results of a monitoring program and any further studies.

On March 14 1995, the Commission approved an amendment of the interim instream flow standard for Waikolu Stream and a modification of the interim water use permit to allow an additional 0.109 mgd of ground water to be withdrawn from Well Nos. 0855-01 to 03.

Please be sure to read the conditions of your approved permit. If you accept these terms, please sign and return one copy of this permit to the Commission and retain a copy for your record.
Be aware that you are required to keep a record of your monthly total pumpage. This information must be submitted to the Commission on a regular monthly basis using the enclosed water use report form. You should make copies of the enclosed report form as needed.

In addition, you are required to submit a water shortage plan to the Commission within thirty (30) days of the issuance date of this permit. Your water shortage plan simply identifies what you are willing to do should the Commission declare a water shortage situation in the Waikolu Ground Water Management Area and can be as short as a one page letter. In a water shortage situation, the Commission may require temporary reductions in pumpage from all sources. The Commission is required, by law, to formulate a plan to implement such area-wide reductions, which should accommodate, include, and be consistent with your plans. Therefore, your help, by submitting your water shortage plan, is greatly needed in formulating the Commission’s overall Water Shortage Plan.

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

Aloha,

\[Signature\]

MICHAEL D. WILSON
Chairperson

Attachments
GROUND WATER USE PERMIT
WUP NO. 220

PERMITTEE

Applicant/Water User
Address  STATE DEPT. OF AGRICULTURE
P.O. BOX 205
HOOLEHUA, HI 96829

Landowner of Source
Address  STATE OF HAWAII
P.O. BOX 205
HOOLEHUA, HI 96829

PERMITTED SOURCE INFORMATION

Island MOLOKAI
Water Management Area WAIKOLU
Aquifer Sector NORTHEAST
Aquifer System WAIKOLU
System Sustainable Yield 5 mgd
Well Name WAIKOLU #22 TO #24
State Well No. 0855-01 TO 03

PERMITTED USE INFORMATION

Reasonable beneficial use AGRICULTURE
Withdrawal (12 month moving ave.) 0.853 mgd
Location of water use
TMK # 5-2-01 to 06, 21 to 27
Address HOOLEHUA
State land use classification AGRICULTURE
County zoning classification AG-2

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22. The issuance of this permit was approved by the Commission on Water Resource Management at its meetings on January 12, 1994 and March 14, 1995.

MICHAEL D. WILSON, Chairperson
Commission on Water Resource Management

Date of Permit Issuance: FEB 14 1996

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.
SPECIAL CONDITIONS

A. The applicant may continue the use of ground water within the limits approved by the Commission, and any delay in receipt of the actual permit document shall not be a reason to interrupt the approved level of use.

B. The applicant shall implement, by December 31, 1995, a biological and hydrologic 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 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.
The Honorable Michael D. Wilson, Chairperson
Commission on Water Resource Management
P. O. Box 621
Honolulu, HI 96809

Dear Mr. Wilson:

Thank you for your prompt response to our request of September 27 for withdrawal of 4 million gallons per day to counter the effects of the drought conditions on Molokai. Your assistance in this matter has assured the agricultural industry on Molokai of the State's commitment to their viability.

The Molokai Irrigation System will continue to withdraw this amount until the system can recover from the critical water shortage period. At the current rate of pumpage, we will exceed our water use permit allocation before the end of the month. It is our understanding that we will be able to continue pumping to meet the needs of the farmers until conditions return to non-critical status.

We will carefully monitor our withdrawal, put into place conservation measures, and will continue to report our pumpage to you.

Sincerely,

JAMES J. NAKATANI
Chairperson, Board of Agriculture

c: MIS Advisory Board, (W. Joy)
Molokai Farm Bureau, (J. Lichnovsky)
Senator Rosalyn Baker
Representative Michael B. White
The Honorable Michael D. Wilson, Chairperson
Commission on Water Resource Management
P. O. Box 621
Honolulu, HI 96809

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Sincerely,

JAMES J. NAKATANI
Chairperson, Board of Agriculture

MIS Advisory Board, (W. Joy)
Molokai Farm Bureau, (J. Lichnovsky)
Senator Rosalyn Baker
Representative Michael B. White
Mr. Paul Matsuo  
Department of Agriculture  
Agricultural Resources Management Division  
1428 S. King Street  
Honolulu, HI 96814

Dear Mr. Matsuo:

Monthly Water Use Reports for  
Waikolu Wells (Well Nos. 0855-01 to 03)

On November 9, 1993, the State Division of Water and Land Development submitted pumpage records for Wells #22, 23, 24 for the period September 1984 to December 1993. A hardcopy of the digital data set is attached. Please confirm that this data set supersedes all prior submittals of water use data.

Also, since each well is currently equipped with a flowmeter, we request that you report the metered pumpage for each well, rather than estimating monthly water use. If you are unable to comply with this request, please provide your reason(s) to the Commission on Water Resource Management by November 15, 1995.

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

Sincerely,

[Signature]

RAE M. LOUI  
Deputy Director

LN:ss

Attachment
MEMORANDUM

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

FROM: Bill Devick, Acting Administrator
       Division of Aquatic Resources

SUBJECT: Response to October 11 Memorandum, Streamflow Monitoring for Waikolu Stream

Thank you for clarification of current usage of the Waikolu wells by the Department of Agriculture.

The fact remains that the requested allocation will increase from 0.853 mgd to 4.0 mgd. This is an increase that, based on past observations by our Molokai biologist, could very well dry up Waikolu Stream in the vicinity of the lower weir as well as reduce downstream flows if drought conditions continue. Given the high populations of all three species of native gobies in the area, as well as dense populations of endemic hiihiwae, such an impact would have serious consequences. We could see direct mortality of these species, marked distributional changes, and long term stress effects that could harm reproductive viability, if flows decreased to the expected degree even over a short term.

On the other hand, we are not absolutely sure that the increased pumping rate will have this dramatic an effect on stream flows. With acknowledgement of the uncertainties and in the interest of protecting valuable native species populations, we would normally recommend that the request for more water be denied. There seems to be an economic imperative for approval, however, given the potential loss of already planted agricultural crops.

Under these circumstances, a reconnaissance/monitoring effort such as was outlined in our original comments is warranted. We have experienced dry winters in the past and have no guarantee that the drought will be ending soon. Otherwise, why would the Department of Agriculture have submitted its request? Because the biotic population influences will be correlated with minimum flows, assuming a continuing drought, variables such as rainfall and surface runoff will not substantially interfere with assessment of the basic question: will a 4.0 mgd pumping rate during drought conditions obviously harm stream life in Waikolu? We already have adequate baseline information about the biota in the stream for this specific purpose.

If the rainy season arrives, and the increased water use allocation is rescinded, there would be no reason to implement the recommended monitoring scheme.
TO: The Honorable Michael D. Wilson  
Chairperson, Board of Land and Natural Resources  

SUBJECT: Waikolu Valley Hydrologic and Biologic Study

Enclosed is the proposed plan of study for the above project as required by the Commission on Water Resource Management in its water use permit for the Molokai Irrigation System.

The plan has been developed after consultation with Commission staff, Division of Aquatic Resources and other scientists involved in the review of this permit.

Our consultant, Water Resources Associates will be available to answer any technical questions on the plan and we would request that you contact them. If there is a meeting, we would like to be present. Please call Mr. Paul T. Matsuo at 973-9473. Your prompt approval will be greatly appreciated, as this would be an opportune time to do the baseline observation due to the drought.

Sincerely

JAMES J. NAKATANI  
Chairperson, Board of Agriculture

Enclosure

c: Water Resources Associates  
ARM Division
BIOLOGICAL AND HYDROLOGICAL MONITORING PLAN
Upper Waikolu Stream - Molokai Irrigation System
Molokai, Hawaii

INTRODUCTION

Molokai Irrigation System (MIS)

The Molokai Irrigation System, managed and operated by the State Department of Agriculture, serves the irrigation water needs of over 200 customers who farm over 3,000 acres of land in central Molokai. By State law, the Hawaiian Homesteaders have prior rights to two-thirds of the water developed in Waikolu Valley. Currently, non-homesteader customers wishing to obtain MIS irrigation water are being denied due to the already high demand by present users.

Most of the water developed by the Molokai Irrigation System comes from three surface water diversion dams (one mainstream and two tributary) in Waikolu Valley located at an approximate elevation of 1,000 feet. The rest comes from three existing groundwater wells — #22 (0855-01) located in the tunnel and #23 (0855-02) and #24 (0855-03) located in the valley, which have been used for the past 24 years. Two new valley wells — #5 (0855-05) and #6 (0855-06) located downstream of #23 and #24, have yet to be outfitted with pumps. The MIS plans are to operate the five wells on a rotational basis, which will permit greater intervals of time for groundwater recharge and recovery of water levels in the dike compartments tapped by the wells. As a result, the five wells will provide greater reliability of the irrigation water supply.

The MIS water is conveyed through a five-mile long tunnel to central Molokai and stored in a 1.4 billion-gallon reservoir at Kualapuu where it is then distributed to farmers for irrigation use.
Environmental Concerns

Waikolu Stream has abundant native Hawaiian freshwater macrofauna, including 'o'opu alamo'o, o'opu nopili, o'opu nakea, opae kalaole, and wi. These aquatic macrofauna require movement to and return from the ocean to complete their life cycle and environmental concerns have been raised regarding the use of the wells and their impact on streamflow reduction and native aquatic macrofauna. In 1986, the Division of Aquatic Resources reported that short segments of Waikolu Stream between the main diversion dam (Dam #1) at 1,000 ft. elevation and the pump station dam (Dam #4) at 730 ft. elevation were dry and possibly affecting the ocean/land migration and population of the aquatic macrofauna in the upper reaches of Waikolu Stream.

Mitigative Measures

As a result of concerted efforts by the Department of Agriculture, Department of Land and Natural Resources, National Park Service, and Fish and Wildlife Service, the MIS is committed to implement the following mitigative measures:

1. Partially restore the low-flows in Waikolu Stream below the main diversion dam (Dam #1) by installing a low-flow weir and fish ladder combination on the dam, so that a minimum of 0.89 cfs (0.57 mgd or 400 gpm) of water flows over the dam before any water is diverted from the stream.

2. Supplement the low-flows in Waikolu Stream by installing three-inch discharge pipes on the new wells (0855-05 and 06), so that approximately 0.13 cfs (0.09 mgd or 60 gpm) of groundwater is released into Waikolu Stream when these pumps are operating.

3. Conduct a two-year biological and hydrological monitoring program in the affected stretch of Waikolu Stream between Dam #1 and the lower pump station dam (Dam #4).
PLAN OBJECTIVES

The major objectives of the monitoring plan are as follows:

A. Determine any impact on the Waikolu Stream ecosystem from pumping of three existing wells and two new wells.

B. Document the operating procedures of existing wells (Nos. 22, 23, and 24).

C. Define the effectiveness of mitigative measures implemented (weir and fish ladder on main diversion dam [Dam #1] and three-inch discharge pipes on new wells).

D. Determine whether additional mitigative measures are needed, such as optimization of pumping schedule to permit harvesting of wet-season flows and groundwater recharge, and keeping dry-season pumpage to a minimum. Evaluate such alternative operating procedures and document their impacts.

E. Develop and recommend mitigative measures to assure the perpetuation of Waikolu Stream's suitability as a habitat for native aquatic macrofauna.

F. Cooperate and coordinate all work with the Department of Agriculture and the Commission on Water Resource Management. Attend public informational meetings and present findings and any proposed solutions of the study.
BIOLOGICAL MONITORING

Biological Objectives

The objectives of biological monitoring are to develop an aquatic macrofauna data base, in addition to any data from the National Park Service study conducted by Anne Brasher or other studies, and evaluate the efficacy of flow restoration on migration of aquatic macrofauna between the upper (Dam #1) and lower (Dam #4) MIS dams. Specific activities will include:

1. Establishment of baseline data on the abundance and distribution of 'o'opu (Awaous guamensis, Sicyopterus stimpsoni, and Lentipes concolor), hiihiwai (neritina granosa), and 'opae kala’ole (Atyoida bisulcata) between a point above the main diversion dam (Dam #1) and a point below the stream-pumping station dam (Dam #4) prior to flow restoration.

2. Monitoring and documentation of any migration of these aquatic macrofauna for a two-year period in the same stretch of Waikolu Stream as the baseline data survey subsequent to flow restoration.

Biological Activities

As part of the overall monitoring plan, the following biological activities are proposed:

1. **Baseline Surveys**

   Three baseline surveys will be conducted to establish the abundance and distribution of native aquatic macrofauna in the above-mentioned stretch of Waikolu Stream prior to the supplementation and partial restoration of low flows. Baseline biological conditions will be based on the average of macrofauna counts derived
from three separate surveys conducted within approximately a three-month period. Each of the three baseline surveys will be performed during low-flow conditions.

Population densities of 'o'opu, hiihiwai, and 'opae kala'ole will be assessed by conducting counts at appropriate points within the surveyed stretch of Waikolu Stream. Snorkeling will be used to count organisms within randomly selected 1 m² quadrants. Methods used will conform to those of Hawaii Division of Aquatic Resources (HDAR) native fish sampling guidelines (Baker and Foster, 1992). Total length will be estimated for all observed organisms.

2. Quarterly Surveys

After partial restoration and supplementation of low flows between the upper dam (Dam #1) and lower dam (Dam #4), biological monitoring will continue on an approximate quarterly basis. Native aquatic macrofauna sampling and counting will be conducted using the same format and survey points as the baseline surveys. Additional survey points will be added as deemed appropriate under restored low-flow conditions. This approach will permit evaluation of whether or not aquatic organisms are migrating through the corridor, and if so, to what extent. Monitoring above Dam #1 will reveal if any changes are occurring in the distribution and abundance of macrofauna above Dam #1. Because hiihiwai are less mobile than 'o'opu and 'opae kala'ole, it will take longer to ascertain if this species is successfully moving through the affected stretch of Waikolu Stream.

Sampling methods will be identical in nature and intensity to those applied to establish baseline conditions. Methods will again conform to those of HDAR native fish sampling guidelines (Baker and Foster, 1992).

3. Biological Evaluation of Flow Restoration

The efficacy of flow restoration will be evaluated, based upon evidence of land/ocean migration of native aquatic macrofauna between Dams #1 and #4. If no such migration is observed, stream conditions will be evaluated and further mitigative measures will be proposed. These may relate to design of the corridor or simple adjustments in the placement or amount of supplemental and restored low flows.
HYDROLOGICAL MONITORING

Hydrological Objectives

The objectives of the hydrological monitoring activities are:

1. Compile, document, and evaluate existing surface water diversions and groundwater pumpage by the MIS in relation to the geology and hydrology of Waikolu.

2. Document and evaluate the proposed system operating procedures, including operation of the three existing and two new wells.

3. Develop a pump operating plan that will utilization of groundwater storage in the dike compartments during wet periods and perpetuation of Waikolu Stream’s habitat for native aquatic macrofauna.

Hydrological Activities

As a part of the overall monitoring plan, the following hydrological activities are proposed:

1. Collect, compile, and tabulate data on existing operating procedures for both surface water diversion and groundwater pumpage.

2. Utilize existing and additional recording instruments and cameras (still and video) to document streamflows at locations which best represent baseline flows and biological monitoring points. Existing records available from MIS, Commission on Water Resource Management, and U.S. Geological Survey (Station No. 6406000) shall be included in the streamflow network.
3. Collect, compile, and analyze pumpage records and pumping test data available from the MIS or the State Division of Water and Land Development.

4. Collect, compile, and analyze available rainfall records from MIS, U.S. Weather Service, and National Park Service. Record and maintain rainfall records throughout the study period.

5. Document streamflow and water pool conditions during pumping and low-rainfall periods.

6. Analyze and develop pumping alternatives for the three existing and two new wells and monitor the effects on the stream ecosystem for each alternative undertaken.
WATER QUALITY MONITORING

Stream water quality will be monitored at each biological survey point during the baseline and quarterly surveys described earlier. The following water quality parameters will be measured in the field.

1. Temperature
2. pH
3. Dissolved oxygen
4. Turbidity
5. Electrical Conductivity
REPORTS

As a part of the Biological and Hydrological Monitoring Plan, the following reports (with data) will be submitted to the Department of Agriculture, Division of Agricultural Resource Management.

1. Baseline Data Report (three copies, within 60 days of completion of third survey)
2. Semi-Annual Progress Reports (three copies, within 60 days of field work completion)
3. Draft Final Report (ten copies, within 90 days of field work completion)

A draft final report will be prepared by Water Resource Associates to document the findings, evaluation processes, conclusions, and recommendations of the two-year study. The report will include all data, a summary of findings, any adverse impacts, and corresponding solutions and its organization will include the following items:

- Executive Summary
- Introduction
- Characteristics of Study Area
  - Geography
  - Climate and Rainfall
- Regional Hydrogeology
- Waikolu Hydrogeology
- History of the MIS
  - Investigations
  - Initial Development
  - Subsequent Development
- MIS Operating Procedures
  - Existing Diversions and Well Pumpages
  - Alternatives
- Results of Study
  - Biological Baseline Data
  - Hydrological Baseline Data
  - Biological Findings
  - Hydrological Findings
- Conclusions and Recommendations
4. Final Report

Upon approval of the draft report, WRA shall furnish the DOA with six copies of the final report with all necessary plans, maps, tables, graphs, operating pumping procedures, and other related materials.

Water Resource Associates ......................... Prime Consultant
Dan Lum, Hydrologist/Geologist

Pacific Aquatic Environmental ..................... Biological Consultant
Ron Englund, Aquatic Ecologist
Randall Filbert, Aquatic Ecologist
TO: Bill Devick, Acting Administrator
Division of Aquatic Resources

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

SUBJECT: Streamflow Monitoring for Waikolu Stream

We appreciate your concern regarding the possible damage to native aquatic biota as a result of pumping the Waikolu Wells.

With regard to your proposed monitoring strategy, in the event that rainfall occurs, as it has this past weekend, it would be extremely difficult to establish a relationship between the increased pumping and any observed change in the distribution and abundance of stream fishes. How would the rainfall and direct surface runoff to the stream be factored out? Also, you have suggested that the DOA's consultant for the Waikolu study carry out the monitoring. Since the DOA's consultant has not collected baseline data, how would the effects of pumping be assessed?

Please be aware that the Department of Agriculture (DOA) is currently using only about 0.766 mgd (based on the twelve-month moving average withdrawal for the three production wells as of September 30, 1995). This is below the 0.853 mgd Commission-approved allocation for the wells. We expect that, since it is already mid-October, the rainy season will begin soon, thus precluding the need for the DOA to continue pumping at full capacity.

LN:ss
Mr. James Nakatani  
Department of Agriculture  
1428 S. King Street  
Honolulu, HI 96814

Dear Mr. Nakatani:

Thank you for notifying us of your intent to withdraw 4 million gallons per day (mgd) from Waikolu Wells #22 to #24 (Well Nos.0855-01 to 03) to meet the agricultural irrigation requirements of the Molokai Irrigation System (MIS).

We note that your current usage is 0.766 mgd (based on the twelve-month moving average withdrawal for the three production wells as of September 30, 1995). This is below the 0.853 mgd Commission-approved allocation for the wells. Please be reminded that your pumpage may exceed 0.853 mgd on any given day or month, since the Commission's allocation is based on a twelve-month moving average. In fact, pumpage at 4 mgd for two (2) weeks would still allow you to stay within your allocation.

Because the Water Code does not provide for emergency authorization of water use permits, we do not have the authority to award a permit. However, in the event that the drought continues, and you find that is it necessary to exceed the 0.853 mgd allocation, I will recommend that the Commission stay enforcement of the approved water use permit due to the extreme dry conditions that are beyond your control. As it is already mid-October, we are hopeful that the rainy season will preclude your need for prolonged pumping at full capacity.

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

Very truly yours,

[Signature]

MICHAEL D. WILSON

C: CWRM Commissioners
MEMORANDUM

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

FROM: Bill Devick, Acting Administrator
Division of Aquatic Resources

SUBJECT: Comments on Emergency Water Use Permit Request for the Molokai Irrigation System by the Department of Agriculture

October 5, 1995

Due to continuing severe drought conditions and low water levels in the Kualapuu Reservoir, the State Department of Agriculture is requesting the issuance of an emergency water use permit of 4 million gallons per day for a 180-day period beginning September 30 to ensure the survival of agricultural crops dependent upon the irrigation water. The water will be supplied by pumps adjacent to Waikolu Stream and will feed into the Kualapuu Reservoir.

Operation of the pumps will definitely reduce stream flows downstream of the pumphouse in Waikolu Stream and will probably damage native aquatic biota occupying this habitat. There seems to be no option given the nature of the emergency, but we feel there is an incumbent responsibility on the part of the user to at least assess the effects of the activity. We therefore recommend that the applicant be required immediately (1) to monitor stream flows continuously below the pumphouse until pumping is halted and (2) to establish a biweekly reconnaissance program to assess the distribution and abundance of stream fishes to continue for at least two months beyond the termination of pumping.

A National Park Service stream gauge located below the pumphouse may provide the flow information, if it is still functional. Otherwise, a portable gage may need to be installed. The consultant already selected for the Waikolu study funded by the legislature could carry out the monitoring. A report of the findings about flow rates and the distribution and abundance of stream fishes should be submitted to the Division of Aquatic Resources within three months of the termination of pumping.

We understand that the pumping is already underway and wonder why the activity could not have waited for issuance of the emergency water use permit. According to the information provided, the Kualapuu Reservoir still contains a 50-day supply of irrigation water.
TO: The Honorable Michael D. Wilson
Chairperson, Commission on Water Resource Management

SUBJECT: Emergency Water Use Permit Request

The Molokai Irrigation System (MIS), Department of Agriculture, respectfully requests the issuance of an emergency water use permit of 4 million gallons per day (MGD) for a 180-day period beginning September 30, 1995, and ending March 31, 1996, or until sufficient rainfall occurs in the Waikolu Watershed.

The rainfall during the period preceding September 30 has not generated enough water to maintain the requirements of the Molokai Irrigation System, which was 5 MGD, peaking to 7 MGD. Existing storage in our Kualapuu Reservoir is at 11 feet, which translates to approximately 250 million gallons (MG), only a 50-day supply. Our existing water permit allocates an average of 0.853 MGD, and, as of September 30, the MIS has accumulated a reserve of 45 MG, which we intend to utilize in the next 10 days.

It is imperative that immediate action be taken on our request to prevent adverse impacts to the island’s farming economy. The major farming activities employ 300 persons directly and approximately 30 persons in related economic activities in support and contributes the major portion of the island’s tax revenues with an estimated annual payroll of $5,500,000 on Molokai. The shutdown of these farming operations would effectively eliminate the agricultural industry from the island.

The next 100 days are critical for the farmers because of their planting and harvesting plans during this period. Hawaiian Research has acquired many projects from mainland seed companies for the winter months and would be greatly impacted from loss of these projects; Akea Farms (Larry Jefts) has market commitments for crops which must be planted during this period, which without water would result in a major financial crisis; Coffees
Hawaii is in the midst of harvesting and needs irrigation to allow the beans to mature or would lose its major share of this year's crop without the water; the papaya and sweet potato farmers have committed their 1996 crops and need to plant during this period. Without adequate water, it would be impossible for them to have their crops ready for market at the contracted time.

The estimated dollar value of farm gate products is $11,000,000 annually. The major crops to be adversely affected include watermelon, coffee, seed corn, papaya, tomatoes, bell peppers and sweet potatoes. Without some indication of the availability of future water, existing operations will be forced to severely curtail any expansion, resulting in work force reductions.

Your prompt and favorable action would be greatly appreciated. If there are any questions or if further information is required, please call me at 973-9551, or Mr. Paul T. Matsuo, Administrator of the Agricultural Resource Management Division, at 973-9473.

JAMES J. NAKATANI
Chairperson, Board of Agriculture

c: Molokai Farm Bureau
MIS Water Users Advisory Board
Senator Rosalyn Baker
Representative Michael B. White
Michael Wilson
CWRM
P.O. Box 621
Honolulu, HI 96809

Dear Chairman Wilson,

Hawaiian Research Ltd. wholly supports the Molokai Farm Bureau’s appeal to the Hawaii State Department of Agriculture to request that the CWRM allow pumping of the Waikololwells to insure the Molokai Irrigation System can adequately meet the demands of agriculture on Molokai. The Molokai Irrigation System reservoir is critically low with no guarantee water will be available after early November. If the system is allowed to run out of water, it would be devastating to Agriculture on Molokai.

In speaking for Hawaiian Research I can assure you our business would never recover if we were to stop planting because of lack of water. We have remained fairly consistent in our acreage over the past 5 years and currently farm approximately 325 + acres a year. The crop we produce is seed corn and over 100 different mainland and foreign companies along with several Universities send their quality control, research, and production plots for us to propagate, mainly during the winter months. In the 28 years we have been in business we have gained a reputation for dependability within the seed industry. If this dependability is destroyed by the inability to plant or finish a crop’s cycle due to insufficient water, we will lose customers to our competition in areas such as Puerto Rico, Mexico, Chile, Argentina and Costa Rica where cost of production is a fraction of what we experience here in Hawaii.

What would this mean to Molokai? Hawaiian Research hires over 100 people and has a payroll of approximately 1.25 million dollars. Our total expenses of over 2 1/2 million dollars stays mainly in Hawaii and for the most part on Molokai. Each season over 200 plant breeders, research technicians, and seedsmen visit Molokai to work their research plots and have an average stay of over 3 weeks per person. The loss of revenue to car rental companies, hotel and condominiums, restaurants and grocery stores would be reduced by up to half a million dollars without these people visiting Molokai.
80% of Hawaiian Research’s acreage is serviced by the Molokai Irrigation System. Please consider the ramifications to Molokai if even one company, Hawaiian Research, is allowed to go out of business because the Molokai Irrigation System is not allowed to pump what is required by the current level of agriculture on Molokai.

Sincerely,

Peter H. Eichhorn
General Manager

cc: Governor Benjamin Cayetano
Richard Cox
Lawrence Miike
David Nobriga
Robert Girald
Herbert Richards Jr.
September 22, 1995

Mr. Mike Wilson, Chairman
Commission on Water Resource Management
Box 621
Honolulu, HI
96809

Dear Mr. Wilson:

We are writing to ask your assistance concerning the Molokai Irrigation System.

We are facing an emergency situation because of the Commission's decision to limit the pumping in Waikolu valley to 853,000 g.p.d. Under present conditions we will run out of water sometime in late November (see enclosed chart). This would prove disastrous for the entire community of Molokai. Agriculture is the largest private sector of our economy, employing some 300 people.

We hope that you would be able to help us find a way to immediately increase the amount of pumping allowed by CWRM in the Molokai Irrigation System (MIS). This is necessary to sustain agriculture on Molokai.

We would also like to call to your attention the fact that even in normal rainfall years the pumping reservation of CWRM is inadequate to meet the current needs of Molokai farms. Because of this limitation, farms that would normally be expanding and creating new jobs are now facing contraction or relocation.

We would be more than willing to talk to you about this situation at your convenience.

Sincerely,

John Lichnovsky
President,
Molokai Farm Bureau

cc: CWRM Members
GHamachi HFBF
encl.
td/JL
MOLOKAI IRRIGATION SYSTEM ANALYSIS

PRESENT RAINFALL SCENARIO

**POSSIBLE PUMPING LEVELS**

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<th>MAX LEVEL</th>
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**CURRENT RESERVOIR LEVEL**

|                      | 200,000,000 | 200,000,000 | 200,000,000 |
|                      | 59          | 65          | 917         |

**WHICH IS**

18-Nov-95 24-Nov-95 26-Mar-98

AVERAGE RAINFALL SCENARIO

**POSSIBLE PUMPING LEVELS**

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<td>4,500,000</td>
<td>4,500,000</td>
<td>4,500,000</td>
</tr>
<tr>
<td><strong>SYSTEM LOSSES</strong></td>
<td>500,000</td>
<td>500,000</td>
<td>500,000</td>
</tr>
<tr>
<td><strong>TOTAL OUTFLOW</strong></td>
<td>5,000,000</td>
<td>5,000,000</td>
<td>5,000,000</td>
</tr>
<tr>
<td><strong>DAILY DEFICIT</strong></td>
<td>(1,897,000)</td>
<td>0</td>
<td>1,282,000</td>
</tr>
</tbody>
</table>

**FULL RESERVOIR RUNS OUT IN**

3,200,000,000 GAL

1,887 DAYS

5 YEARS

ALL NUMBERS ARE GAL OR GAL PER DAY
September 15, 1995

CERTIFIED MAIL, RETURN RECEIPT REQUESTED

Mr. Daniel Lum
dba: WATER RESOURCE ASSOCIATES
1188 Bishop Street, Suite 607
Honolulu, HI 96813

Dear Mr. Lum:

Subject: NOTICE TO PROCEED
Waikolu Well Development Project
Biological and Hydrological Monitoring Services

You are hereby given notice to proceed with the subject project, pursuant to Contract No. 39140 dated June 20, 1995, a copy of which is enclosed.

The contract time commences as of the date of this letter, and all work specified in the agreement shall be completed within the contract period.

Your proposed plan of study will require prior approval by the Commission on Water Resource Management. Please submit that report through our office for transmittal to the Commission.

The Department designates Paul T. Matsuo, Administrator of the Agricultural Resource Management Division, as the State's authorized representative responsible for the administration of this agreement. Please call him at 973-9473 if there are any questions regarding this matter.

Sincerely,

JAMES J. NAKATANI
Chairperson, Board of Agriculture

Enclosure

C: ARM Division
Fiscal Office
CWRM (David Higa) w/o enclosure
Mr. Larry Jefts  
P.O. Box 86  
Mauna Loa, HI 96770  

Dear Mr. Jefts:  

From your testimony at the public hearing on matters related to Waiahole Ditch water, I understood that your usage of the Molokai Irrigation System (MIS) was cut back by the Department of Agriculture (DOA) as a result of the Commission on Water Resource Management's (Commission) decision in January 1994 on the water use permit application for the Waikolu Wells. You went on to testify that your operations on Molokai were severely impacted to the point where you no longer farm on Molokai.

Please be assured that this was not the intent of the Commission's action. We were not aware that the DOA was unclear in this respect. In effect, the Commission suspended enforcement of the allocation described in the approved permit for existing uses pending resolution of streamflow-related issues. As such, users on the system as of the date of the Commission's action should not have been impacted.

As soon as we became aware of the DOA's lack of understanding regarding the Commission's decision, the attached letter was sent to clarify the issues.

Unfortunately, it appears that restrictions to your water usage occurred during the "gap" period prior to our becoming aware of the situation. Although your understanding of our position at this time may not change your farming plans for Molokai, I did wish to communicate this to you.

Sincerely,

RAE M. LOUI  
Deputy Director

LN:ss  
Attachment
Chairperson Wilson called the meeting of the Commission on Water Resource Management to order at 8:25 am.

The following people were in attendance:

MEMBERS: Mr. Michael Wilson
Mr. Robert Girald
Mr. Robert Nakata
Mr. David Nobriga

STAFF: Ms. Rae Loui
Mr. Edwin Sakoda
Ms. Lenore Nakama
Mr. David Higa
Ms. Janis Uwaine

COUNSEL: Mr. William Tam

EXCUSED: Dr. Lawrence Miike

OTHERS:

Mr. Paul Matsuo
Mr. Thomas Matayoshi
Ms. Wilma Grambusch
Ms. Rebecca Bishop-Yuen
Ms. Ellen Kraftsow
Mr. Cappy Caparida
Ms. Earline Johnston
Mr. D. Scott MacKinnon
Mr. Danny Mateo
Mr. Hide Takahashi
Mr. Water Ritte
Ms. Julie Patton

Ms. Sarah Sykes
Ms. Dorothy Curtis
Mr. Girish Patel
Mr. Walter Ragsdale
Mr. David Craddick
Mr. Glenn Teves
Mr. DeGray Vanderbilt
Ms. Laura Nishiyama
Mr. Ben Neeley
Mr. Keoni K. Agard
Mr. Duane Cranney
Mr. Matthew Adolpho

Ms. Nancy Wescoatt
Ms. Noelanl Joy
Mr. Wayde Lee
Mr. Clyde Tamaru
Ms. Toni Bissen
Ms. Judy Caparida
Mr. Ron Hedani
Mr. Nobu Shimizu
Mr. Peni Telini
Mr. Gregory Helm
Mr. Martin Kahai

All written testimonies submitted at the meeting are filed in the Commission office and are available for review by interested parties. The items were not taken in the order posted on the agenda.

ITEM 1 MINUTES OF THE MARCH 1, 1995 MEETING

Deputy Director, Rae Loui, moved to amend the minutes by adding the following under page three, item three:

"Commissioner Miike requested that Dr. Anthony confine his remarks in the future to the specific issues before the Commission.

In response to a question from Commissioner Miike as to whether Mr. Anthony opposed permits for any well in the aquifer, Mr. Anthony responded that he was so opposed."
Mr. Glenn Teves, Molokai resident felt that the Commission should study the potential effects more. Concerned that Molokai Ranch and Tokyo Kosan wants water to speculate on their land.

Mr. DeGray Vanderbilt, Molokai resident, testified that speculators are concerned with profits from massive amounts of water. Commented that Kukui (Molokai), Inc. is looking out for its investments.

Ms. Toni Bissen stated that the Native Hawaiian Advisory Council supports the additional 2.0 mgd increase in reservation.

Ms. Wilma Grambusch, President of the Kalamaula Homestead Association and a private landowner, commented that testifiers should have representation with Molokai residents.

Mr. Wayde Lee, homestead resident, testified that he is in support of the Department of Hawaiian Home Lands' request. He felt that the residents of Molokai should be taken care of first.

Ms. Ellen Kraftsow of the Maui Department of Water Supply testified in support of the Department of Hawaiian Home Lands request; however, she is concerned that there won't be any water for existing municipal uses that exists.

Mr. Glenn Teves, Molokai resident, stated that the homesteaders needs should come first.

Mr. Matthew Adolpho, Molokai resident, supported the proposal. He felt that the investors and speculators should be checked.

Mr. DeGray Vanderbilt, Molokai resident, stated that he is in support of the proposal. He also voiced concerns that the Molokai Ranch will not come clear with their water sources. He feels that the community needs hard facts.

QUESTIONS/CLARIFICATIONS:

Commissioner Nobriga asked for clarification on what action they will be voting on at this meeting.

Deputy Director, Rae Loui, responded that the Commission can only take action on the submittal presented; not on the additional 1.3 that the Department of Hawaiian Home Lands has asked for at this meeting. Any additional amount requested must be acted upon at another meeting, with a public hearing and adequate notice.

UNANIMOUSLY APPROVED. (GIRALD/NOBRIGA)

ITEM 4

DEPARTMENT OF AGRICULTURE, APPLICATION FOR A STREAM CHANNEL ALTERATION PERMIT, PETITION TO AMEND THE INTERIM INSTREAM FLOW STANDARD, WAIKOLU STREAM, MOLOKAI

PRESENTATION OF SUBMITTAL: Mr. David Higa

The applicant requested a change to Exhibit D. The metal plate at the diversion dam #1 will be located at the far left of the diversion dam (looking upstream) rather than in the center.
Staff recommended approval as amended.

PRESENTATION BY APPLICANT: Mr. Paul Matsuo of the Department of Agriculture stated that they have been complying with the conditions of their water use permit. He also testified that the Department of Agriculture went to the Legislature to get funds appropriated for a biological and hydrologic study. He submitted to the Commission, Act 159, A Bill for an Act Making an Appropriation for the Waikolu Well Development Project. (Enclosed.)

TESTIMONIES:

Ms. Sara Sykes, a Molokai resident and landowner, asked the Commissioners to pay close attention to the data and make sure that it is factual. She also voiced her concern that legitimate biological studies are not being done.

Ms. Wilma Grambusch stated that she did not like the word "diversion"; however, she said she will trust the Department of Agriculture and thus, supports their proposal.

Ms. Noelani Joy supported the proposal.

Mr. Glenn Teves voiced his concern for the o'opu.

Suggestion: Commissioner Nobriga suggested to Chairman Wilson to have the Division of Aquatic Resources come up with a solution to help the o'opu from getting into areas which will endanger them.

MOTION: Commissioner Nobriga moved to approve the staff's recommendation.

UNANIMOUSLY APPROVED AS AMENDED. (NOBRIGNA/NAKATA)

ITEM 6

PALAAU PRAWN & SHRIMP COMPANY. APPLICATIONS FOR A PUMP INSTALLATION PERMIT AND A WATER USE PERMIT FOR PALAAU PRAWN & SHRIMP SALT-WATER WELL (WELL NO. 0706-03) FOR INSTALLATION OF A 250 GPM CAPACITY PUMP FOR PROPOSED AQUACULTURE USE AT TMK 5-1-2:4, MANAWAINUI GROUNDWATER MANAGEMENT AREA, MOLOKAI

PRESENTATION OF SUBMITTAL: Ms. Lenore Nakama

Staff recommended approval with the following special conditions: "The final pump capacity shall be determined from the pump test results and approved administratively by signature of the chairperson."

PRESENTATION BY APPLICANT: Ms. Rebbecca Bishop Yuen stated that the hatchery will not affect the ocean or aquifer and will have no impact.

TESTIMONIES:

Ms. Wilma Grambusch was concerned about the salt water effects.

QUESTIONS/CLARIFICATIONS:

Commissioner Nakata questioned why the need for such a large capacity pump (250 gpm) for such a small use.

Ms. Bishop-Yuen replied that the size requested is the size that fits the casing.
Aloha, I'm Toni Bissen and wish to present a few comments on behalf of the Native Hawaiian Advisory Council (NHAC). I thank you for the opportunity to present testimony to the Water Commission (Commission) concerning Agenda #1 items 3, 4 and 9.

AGENDA #1

Item 3 Amendment to Section 13-171-63, Hawaii Administrative Rules (HAR) Department of Hawaiian Home Lands Reservation for Kualapuu, Molokai

DHHL's reservation of water should be counted against the Molokai Working Group 5.0 MGD "groundwater withdrawal limit" rather than against the additional and uncertain 2.0 MGD above that limit.

DHHL has the first right to water under the Hawaiian Homes Commission Act. NHAC supports the staff's recommendation to reserve an additional 2.0 mgd for the current and foreseeable needs of the Hawaiian Home Lands. DHHL's reservation should be given first priority consistent with the State's policy to fulfill the goals and objectives of the Hawaiian Home Lands Trust.

NHAC asserts that the Water Commission is required to allot water for DHHL's reservation request of 2.0 mgd from the estimated sustainable yield of 5.0 mgd unless it can be shown that the actual sustainable yield is greater than 5.0 mgd. The Water Commission has a duty to fulfill DHHL's priority position before any other allocations are made particularly in light of the uncertainties that exist with respect to any water available above the sustainable yield of 5.0 mgd.

The technical data suggests that the estimated sustainable yield of the Kualapuu aquifer is 5.0 mgd rather than 7.0 mgd. (See exhibit 1). The Molokai Working Group has also found the 5.0 mgd is the appropriate groundwater withdrawal limit to be used. The Molokai Working Group established the 5.0 mgd "groundwater withdrawal limit" based on the current uncertainty about the sustainable yield of the aquifer where estimates range from 3.0 mgd to 7.0 mgd. The Molokai Working Group Final Report dated July 1993 states that, "groundwater withdrawal from the Kualapuu aquifer system over the 5.0 mgd limit set ... may be exceeded by a maximum of 2.0 mgd only if DHHL requires additional resources and water quality is not threatened" (see report at p. 7). This conclusion does not mean that a sustainable yield of 7.0 mgd is an appropriate estimate to use merely because DHHL is making a water reservation. The record does not contain adequate basis for assuming that 5.0 mgd is accurate, in fact, USGS has indicated that the sustainable yield is not likely
to be more than 5.0 mgd. There is no basis in the record to allocate in excess of anything over 5.0 mgd, and to proceed accordingly would be irresponsible and ill advised.

Granting DHHL's reservation of an additional 2.0 mgd within the 5.0 mgd estimated sustainable will allow the Water Commission to allocate water for competing uses as shown by the figures below:

<table>
<thead>
<tr>
<th>Amount</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.000 mgd</td>
<td>(Kualapuu sustainable yield)</td>
</tr>
<tr>
<td>- 1.272 mgd</td>
<td>(DHHL existing use &amp; .905 reserve)</td>
</tr>
<tr>
<td>3.728 mgd</td>
<td>remaining</td>
</tr>
<tr>
<td>- 2.000 mgd</td>
<td>DHHL 2.0 reservation request</td>
</tr>
<tr>
<td>1.728 mgd</td>
<td>remaining</td>
</tr>
<tr>
<td>- .384 mgd</td>
<td>recommended allocation to County of Maui</td>
</tr>
<tr>
<td>1.344 mgd</td>
<td>remaining</td>
</tr>
<tr>
<td>- .871 mgd</td>
<td>recommended allocation to Kukui, Inc.</td>
</tr>
<tr>
<td>.473 mgd</td>
<td>remaining</td>
</tr>
</tbody>
</table>

To fulfill its mandate under the Water Code, the Water Commission has a duty to base its decisions on sound technical data. For the Water Commission to do any less would be irresponsible. The Water Commission therefore cannot allocate water in excess of the 5.0 mgd estimated sustainable yield.

Item 4 Department of Agriculture, Application for a Stream Channel Alteration for a Stream Diversion Works Modification Permit, Petition to Amend the Interim Instream Flow Standard, Waikolu Stream, Molokai

**THE WATER COMMISSION MUST NOT TAKE ACTION THAT WOULD ADVERSELY IMPACT THE WAIKOLU STREAM SYSTEM THAT SUPPORT NATIVE STREAM SPECIES SUCH AS THE O'OPU AND HIHIWAI**

NHAC recommends the Commission require additional information regarding the total impacts of the Department of Agriculture's (DOA) stream diversion project on the Waikolu stream system. There is inadequate information on the record for the Water Commission to take action at this time. Prior to taking any action on this matter the Water Commission should require the DOA to provide further information. A number of matters need to be developed, for example: (1) How would the magnitude of release flows at dam no. 1 located in the upper reaches of the Waikolu stream compare with total flows at this dam? and (2) Would post-project additions to stream flow below dam no. 1 also be present below the 730 foot dam located at the lower reaches of the Waikolu stream or would these flows be diverted at the 730 foot elevation, resulting in no net change to existing flow conditions below this dam?

NHAC does not oppose the use of additional water developed for the Molokai Irrigation System (MIS) by this project provided that the water is used for Hawaiian homesteaders on Hawaiian Home Lands or by Hawaiians on other lands. The MIS provides much needed water for Hawaiian Home Lands. It is imperative that the Waikolu stream remain healthy to provide the necessary stream flow environment to support native species such as the o'opu, hihiwai, and the cultural beliefs, values and practices dependant upon these environments. This should be the first priority; even higher than human use of the water. In order to accommodate these uses, it may be necessary to explore alternatives such as the use of treated effluent.
When considering permit applications for water source development and alteration, the Commission must not take actions that compromise the exercise of traditional and customary rights, including gathering rights dependent upon adequate water resources. The Commission has a duty to develop "adequate provisions for the protection of traditional and customary Hawaiian rights." HRS § 174C-2. The Water Code provides:

[T]raditional and customary rights shall include, but not be limited to, the cultivation or propagation of taro on one's own kuleana and the gathering of hihiwai, opae, o'opu, limu, thatch, ti leaf, aho cord, and medicinal plants for subsistence, cultural and religious purposes. HRS § 174C-101(c). (Emphasis added).

Moreover, traditional and customary rights are constitutionally protected and statutorily recognized. Haw. Const. art. XII, § 7, HRS §§ 7-1 and 1-1. Accordingly, these rights should be afforded adequate protections. The Water Code expressly recognizes the gathering of o'opu and hihiwai as a right to be protected and the Commission should not take action that would potentially compromise this right. The Commission has the duty to protect, conserve and regulate water in the State for the benefit of its people and to protect ground and surface water, watersheds and natural stream environments. Haw. Const. art. XI, § 7, HRS § 174C-2. Thus the Commission is required to ensure adequate flows in streams to support a viable population of o'opu, hihiwai and other native species.

The applicant requests the Commission amend the interim instream flow standard, issue a stream diversion works permit and a stream channel alteration permit. In general, to comply with requirements of further stream monitoring and study, this project will provide approximately .5 mgd additional flow into the upper reaches of the Waikolu stream at dam no. 1. In turn well #22, #23, #24, #4, #5, and #6 will pump an additional .109 mgd into the MIS. It is uncertain what the effect on the different sections of the stream will be. The Commission cannot allow the project to proceed until it has assessed what the potential impacts are. Any detrimental effects on the o'opu and hihiwai that flourish in the stream is simply unacceptable. The Water Commission has a duty to make an affirmative determination that the project would have no adverse effects on the native species in the Waikolu stream.

We would note that the Molokai Working Group Final Report dated July 1993, in discussing the northeast sector of the island, states that, "utilization of existing MIS capacity should be done cautiously with current monitoring. Development beyond the existing water systems in the Northeast Sector should not be allowed, unless assessments indicate more water can be withdrawn without further impacts to the natural ecosystems."

The Water Commission must fulfill its duty to protect traditional and customary rights and natural stream environments. In light of the possible stream impacts that would affect the o'opu and hihiwai population, the Water Commission must require additional information so that these stream impacts can be fully assessed.
Joy Farm
Wilma Noelani Joy
P. O. Box 355
Hoolehua, HI 96729
March 14, 1995

State of Hawaii
Dept. of Land & Natural Resources
Commission on Water Resource Management
P. O. Box 621
Honolulu, HI 96809

RE: Department of Agriculture, Application for a Stream Channel Alteration Permit,
Application of a Stream Diversion Works Modification Permit, Petition to Amend
the Interim Instream Flow Standard, Waikolu Stream, Molokai

Mr. Chairman and respected Commissioner,

Thank you for the opportunity to support staff recommendation of Item 4 of the March 14, 1995
C.W.R.M. meeting agenda.

As a user of the Molokai Irrigation System (M.I.S.), I support the Department of Agriculture (D.O.A.)
request to bring the M.I.S. into compliance with their water use permit. Any further delay may
jeopardize the funding acquired for the Waikolu stream monitoring study. Important information from
the study will assist D.O.A. in managing this major irrigation water source for Molokai agriculture
with minimum negative impact to the stream flow. The stream flow is the majority of M.I.S. irrigation
water that serve agriculture on Molokai.

I support amending the interim instream flow standard from 744,000 to 853,000 to be consistent with
condition 2(a) of the C.W.R.M. action on January 12, 1994. Though farmers using the M.I.S. have
made conservation adjustments in their irrigation operations, it has still proven to be a hardship
during the drought of 1994-1995. The additional 109,000 will help maintain the current agriculture
endeavors on Molokai.

In closing, I respectfully request your support of staff recommendation for approval of Department of
Agriculture applications for permits and their petition for Waikolu Stream. Your approval will greatly
benefit Molokai agriculture by assisting D.O.A. to better serve its current farmers and future farmers
utilizing the Molokai Irrigation System. Any further delays in decisionmaking can only harm
agriculture during this time of drought.

Sincerely,

Wilma Noelani Joy
Joy Farm
State of Hawaii  
Department of Land and Natural Resources  
COMMISSION ON WATER RESOURCE MANAGEMENT  
Honolulu, Hawaii  

March 14, 1995  

Chairperson and Members  
Commission on Water Resource Management  
State of Hawaii  

Gentlemen:  

Department of Agriculture  
Application for a Stream Channel Alteration Permit  
Application for a Stream Diversion Works Modification Permit  
Petition to Amend the Interim Instream Flow Standard  
Waikolu Stream, Molokai (TMK: 6-1-01:02)  

Applicant:  
Department of Agriculture  
1428 S. King St.  
Honolulu, HI 96814  

Landowner  
Department of Health  
1250 Punchbowl St.  
Honolulu, HI 96813  

BACKGROUND  

In January 1994, the Commission approved an interim water use permit for Wells #22, #23, and #24 of the Molokai Irrigation System (MIS) with special conditions (Exhibit A).  

The applicant is requesting four (4) actions of the Commission.  

Action A is to amend the interim instream flow standard to allow for the 12-month average withdrawal of 853,000 gallons per day as of January 1994. This is pursuant to the interim water use permit conditions.  

Actions B, C, and D are to allow the applicant to partially restore the flows from Diversion Dam Number 1 back into Waikolu Stream. This will allow the applicant to comply with Special Condition number 1(b) of the water use permit for wells #22, #23, and #24 that was approved by Commission action on January 12, 1994. The water use permit includes a requirement for a biological and hydrologic monitoring program that documents the existing operating procedure, seeks to identify the impacts of all operating alternatives on Waikolu Stream, and seeks to identify effectiveness of weir modifications on Diversion Dam Number 1 (See Exhibit A).  

A. Amend the interim instream flow standard to allow Wells 22 & 24 to pump 853,000 gallons per day (gpd), the 12-month moving average withdrawal as of January 1994.  

B. Approve a stream channel alteration permit for the alteration of the Waikolu Stream channel to modify the weir at Diversion Dam Number 1.  

C. Approve a stream diversion works modification permit to allow the installation of a metal plate over the existing diversion grate enabling a partial restoration of flow back into Waikolu Stream at Diversion Dam Number 1.  

D. Amend the interim instream flow standard to allow a partial restoration of flow downstream of the fish ladder on Diversion Dam Number 1.
DESCRIPTION

The Department of Agriculture (DOA) operates the Molokai Irrigation System which obtains its water from diversion dams and wells in Waikolu Valley (See Exhibits B and C). Wells #22, #23 and #24 have been in operation for the last 23 years. Two additional wells, wells #5 and #6 were drilled and pump tested by the DOA but have not received approvals for permanent pumps and motors. Well #4 will be used as a monitoring well.

The Commission recognizes the fact that groundwater withdrawals at the existing well sites in Waikolu Valley result in diminished streamflow.

On May 8, 1988, the interim instream flow standard adopted by the Commission for all streams on Molokai became effective. The 12-month moving average withdrawal on that date was 744,000 gpd. However, the current withdrawal to the MIS for the three operating wells (#22, #23, and #24) was computed to be 853,000 gpd as of January 12, 1994.

When the Commission took action on the interim water use permit for the Waikolu Wells, the Commission deferred existing uses in excess of 744,000 gpd until the interim instream flow standard is formally amended to reflect the difference between the amount of water withdrawal from May 1988 to January 1994. Action A would allow the applicant to withdraw the January 12, 1994 amount of 853,000 gpd.

With regards to the stream channel alteration permit and the stream diversion works permit, the applicant proposes to replace a 23" portion of existing steel diversion grate across Diversion Dam Number 1 with a 3/8" inch steel plate (See Exhibit D). This would restore approximately 0.89 cubic feet per second flow back into Waikolu Stream. The restoration of this flow would allow the Department of Agriculture to proceed with complying with condition 1(b) which requires a biological and hydrologic study for a minimum period of two years to assess the pumping practices of the wells in Waikolu Valley. The Department of Agriculture has obtained funding for the study and is currently in the process of procuring services necessary to do the study.

ANALYSIS

We have not received any objections to the petitions to amend the interim instream flow standards, or the stream channel alteration and stream diversion works modification permits.

The Division of Aquatic resources indicates that they support the petition and permits with the understanding that the biological and hydrological monitoring program is implemented and that the monitoring results may be applied to future management protocols such as shifts in scheduling of pumping and operation only during rainy periods to maintain native stream biota.

The U. S. Army Corps of Engineers has indicated that the applicant may be required to obtain a permit if any activity occurs in rivers, streams, wetlands, or other waters of the U. S. The staff has included a special condition requiring the applicant to obtain a written determination from the U. S. Army Corps of Engineers on the applicability of the Corps' permits.

RECOMMENDATIONS

1. That the Commission amend the interim instream flow standard and the interim water use permit for wells #22, #23, and #24 for Waikolu Stream from 744,000 gpd to 853,000 to be consistent with condition 2(a) of its action on January 12, 1994. That the Commission amend the interim instream flow standard for Waikolu Stream by allowing a release of approximately 0.89 cubic feet per second from Dam Number 1 for the purpose of a biological and hydrologic monitoring study consistent with condition number 1(b) of the Interim Well Construction Permit approved by the Commission at their meeting of January 12, 1994.
Chairperson and Members
Commission on Water Resource Management
March 14, 1995

2. That the Commission amend the interim instream flow standard for Waikolu Stream by allowing a release of approximately 0.89 cubic feet per second from Dam Number 1 for the purpose of a biological and hydrological monitoring study consistent with condition number 1(b) of the Interim Well Construction Permit approved by the Commission at their meeting of January 12, 1994.

3. That the Commission approve a stream channel alteration permit, and a stream diversion works modification permit to modify Dam Number 1 at Waikolu Stream TMK: 6-1-01:02, Kalawao, Molokai, to comply with condition 1(b) of the Commission action on January 12, 1994 relating to the interim water use permit for Waikolu Wells #23, #24 and #25. This permit shall be valid for a period of two years subject to the following conditions:

1. The Permit application and staff submittal approved by the Commission at its meeting on March 14, 1995, shall be incorporated herein by reference.

2. The applicant shall comply with all other applicable statutes, ordinances, and regulations of the Federal, State and County Maui, and County of Kalawao governments.

3. The applicant, his successors, assigns, officers, employees, contractors, agents, and representatives, shall indemnify, defend, and hold the State of Hawaii harmless from and against any claim or demand for loss, liability, or damage including claims for property damage, personal injury, or death arising out of any act or omission of the applicant or his successors, assigns, officers, employees, contractors, and agents under this permit or related to the granting of this permit.

4. The applicant shall notify the Commission, by letter, of the actual dates of project initiation and completion. The applicant shall submit a set of as-built plans to the Commission upon completion of this project. This permit may be revoked if work is not started within one (1) year after the date of issuance or if work is suspended or abandoned for one (1) year, unless otherwise specified. The work proposed under this permit shall be completed within two (2) years from the date of permit approval, unless otherwise specified. The permit may be extended by the Commission upon showing of good cause and good-faith performance. A request to extend the permit shall be submitted to the Commission no later than three (3) months prior to the date the permit expires. If the commencement or completion date is not met, the Commission may revoke the permit after giving the permittee notice of the proposed action and an opportunity to be heard.

5. Before proceeding with any work authorized by the Commission, the applicant shall submit one set of construction plans and specifications to determine consistency with the conditions of the permit and the declarations set forth in the permit application.

6. The applicant shall utilize appropriate erosion control measures during construction, and shall perform construction activities only during periods of low stream flow. The applicant shall prevent debris and construction materials, including cement, petroleum products, and other pollutants, from entering the stream. Wash and dust control water shall be properly disposed.

7. In the event that subsurface cultural remains such as artifacts, burials or deposits of shells or charcoal are encountered during excavation work, the applicant shall stop work in the area of the find and contact the Department's Historic Preservation Division (587-0045) immediately.
Chairperson and Members
Commission on Water Resource Management

March 14, 1995

8. Within sixty (60) of the approval of this permit application, the applicant shall submit to the Commission a written determination as to whether this project is subject to permits administered by the U. S. Army Corps of Engineers.

Respectfully submitted,

RAE M. LOUI
Deputy Director

Attachments

APPROVED FOR SUBMITTAL:

MICHAEL D. WILSON, Chairperson
Memorandum for the Record

Subject: Waikolu Valley Well - 'fishladder' Dept. Of Army Permit
Date: January 9, 1995
Place: telephone conference
Time: 1:15 p.m.

Attendees:
2. DOW - Karen Chung and later in joint telephone conference with Eric Yuasa

Discussion:
Reason for my phone call was to inquire on the status of DLNR/DOWALD’s letter dated October 13, 1994 to her office. I explained the scope of work as identified in our October 13th letter and tried to further explain the construction drawing to her. Apparently, her office has discussed the project but could not understand the drawing, nor decide on an applicable Army permit condition. She apologized for their lack of response to us.

Normally, if no work or structure is being constructed below the “ordinary high water mark”, then no permit is required. (The Army considers the ordinary high water mark for an intermittent stream as the typical flood level.) She would consider Waikolu Stream an intermittent stream.

Terrell at first considered the project as falling under the Modification and Repair condition which would then require a Nationwide #3 permit (triggering a 401 Water Quality Certification from the State Dept. Of Health).

Terrell had asked if I had been to the site and if water flowed over the dam such that the grating was submerged, and if so, how often. Since I had not been to the site and did not know whether the dam overflowed, I contacted Eric Yuasa (D&C Branch) to assist in answering her questions.

Eric explained that the site is only accessible during periods of dry weather. The dam overflows possibly once a year. He also further clarified the drawing on the steel plate and baffles.

Terrell then consulted a person from Guam, who happened to be in her office at that moment, whether a permit would be required, and if so, under what condition. This person from Guam has authority on such permits.

As a result of her consultation, the fishladder does not require an Army permit. Terrell requested for more drawings and pictures prior to giving a final written determination.

Eric inquired if the GRP work would require a permit. Terrell considered the work to be “fill” in the stream therefore an Army permit and a 401 Dept. Of Health permit would be required.

I offered for our office to meet with Terrell but she deferred to requesting clearer drawings and photographs.

Action:
Send Terrell Kelly pictures and more drawings (?).

Discussion with Eric after teleconference:
GRP work can be deleted from scope. It was not a design feature designated by the Division of Aquatic Resources and US Fish and Wildlife for the fishladder design. Idea stemmed from Eric’s field investigation to have the base of the dam be extended towards a location in the stream that has been found to pond. GRP work is not related to the stability of the dam.

Telephone conversation with Paul Matsuo (1/12/95): He agrees to removing the GRP work because of the above reasons.

Pending DOWALD management approval to delete GRP work, the following is the proposed plan of action:
1. Eric revise drawing to show deletion of GRP (and also relocation of the steel plate to the side of the dam as was previously requested by Div. Of Aquatic Resources and US Fish & Wildlife in March 1994).
2. Karen resubmit drawing and photographs to Army (Terrell Kelly).

c: Eric Yuasa - D&C Branch
    Paul Matsuo - DOA
Mr. Paul Matsuo  
Department of Agriculture  
Agricultural Resources Management Division  
1428 S. King Street  
Honolulu, HI 96814

Dear Mr. Matsuo:

Pump Installation Permit Applications  
Waikolu Wells #5 & #4 (Well Nos. 0855-05 & 06)

We acknowledge receipt, on November 29, 1994, of pump installation permit applications for two new wells in Waikolu Valley (Well Nos. 0855-05 & 06).

At the Commission on Water Resource Management (Commission) meeting on January 12, 1994, your application to use these wells for production purposes was denied without prejudice pending the completion of a minimum two-year hydrologic and biologic study of Waikolu Stream. The new wells are to be used in the study for monitoring and testing purposes only. Please be advised that the two-year study may proceed using the temporary pumps that are currently installed in the wells. No permit is required to re-install motors on the temporary pumps. A copy of the conditions approved by the Commission is attached.

In addition to the requirement for a two-year study, permits to install permanent pumps in the subject wells may not be issued until the environmental review process has been completed and a Conservation District Use Permit has been approved for the permanent pumps.

As such, we are returning your original pump installation permit applications. We request that you resubmit these applications upon completion of the two-year study and that the study results be included as part of your application.

We are still not in receipt of a draft plan for the two-year study. We understand that you are currently in the process of hiring a consultant to develop and implement the monitoring program. Please be aware that a detailed description of the methodology and approach must be submitted to the Commission for approval prior to implementation of the program.

Lastly, with regard to the transmission tunnel in Waikolu Valley, we have been informed that up to one (1) million gallons per day of water may be developed in the tunnel. If the tunnel is also a groundwater development tunnel, you must apply for a water use permit from the Commission pursuant to Section 174C-51, HRS.

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

Sincerely,

[Signature]

for: RAE M. LOUI  
Deputy Director

LN:ss  
Attachments
December 12, 1994

Ms. Sarah E. Sykes  
P. O. Box 370  
Kaunakakai, Hawaii 96748

Dear Ms. Sykes:

RE: Waikolu Valley Well Development EA

This is to acknowledge receipt of your comments on the above-mentioned EA. The comments will be addressed by the Division of Water and Land Development as our consultant in this matter.

Please direct any further inquiries directly to them in order to prevent any delays in response.

Sincerely,

Paul T. Matsuo, Administrator  
Agricultural Resource Management Division

C: DOWALD  
CWRM

P.S. Thanks for the magazine article, very interesting.
December 8, 1994

State of Hawai‘i
Department of Land and Natural Resources
1151 Punchbowl Street
Honolulu, Hawai‘i 96813

and

State of Hawai‘i
Department of Agriculture
1428 South King Street
Honolulu, Hawai‘i 96814

RE: WAIKOLU VALLEY WELLS DEVELOPMENT, PUMP CONTROLS AND CONNECTING PIPES-DRAFT ENVIRONMENTAL ASSESSMENT

Thank you for the opportunity to comment. We have been discussing the problems with the wells and pumps in Waikolu Valley for a few years. Please incorporate by reference all the information submitted by me to both agencies in letter and testimony regarding that situation since 1989.

Before I tackle the inadequacies of the subject draft EA, please note that the need for this project is clearly disputable. DHHL Homesteaders have not yet fully tapped their two-thirds allocation from the Waikolu watershed. Of equal importance, the Molokai Ranch, Ltd. diversions above this project perhaps illegally remove significant quantities of water before it ever reaches the Waikolu watershed, reducing the amounts available for public use. These two facts should be given full consideration before deciding to spend more taxpayer dollars on a potentially unnecessary project.

The original plans for Waikolu were formulated years ago, lacking current information about the fragility of Molokai’s Sole Source Aquifer, and its inability to continue to sustain withdrawals in the amounts recommended, without threatening the entire island’s water supply for all uses. The project and concept must be re-examined in light of this new information. There simply may not be enough water in the vicinity to justify any further investment.

Issues such as impacts on biota, including instream, near-stream, estuary and ocean, have not been addressed in this draft EA. It is not known if the “fish ladders” will work. Instream water temperature may be a key condition for species survival. This has not been addressed. It is wrong to
proceed with any further investment in this project before the agreed-upon studies have been completed and a feasibility determination made in light of that still-to-come information. Money has been made available to proceed with those studies. All other planning should stop until all the information is available to all interested parties. To go ahead now violates both the letter and the intent of $11-200-9 (a)(4).

$11-200-7 requires that all proposed projects be described in their entirety, not segmented in the manner evident in the subject EA. Long term negative impacts of the overall project are extensive. They have not been properly presented, nor mitigating actions proposed.

Please require a full Environmental Impact Statement for this project, one which properly addresses all areas of impact.

Thank you for your time and attention in reviewing our concerns.

Sincerely,

Sarah E. Sykes
P.O. Box 370
Kaunakakai, Hawaii 96748
(808) 553-3831
December 12, 1994

Mr. John T. Harrison
Environmental Coordinator
University of Hawaii at Manoa
Environmental Center
A Unit of Water Resources Research Center
Crawford 317
2550 Campus Road
Honolulu, Hawaii 96822

Dear Mr. Harrison:

RE: Waikolu Valley Well Development EA

This is to acknowledge receipt of your comments on the above-mentioned EA. The comments will be addressed by the Division of Water and Land Development as our consultant in this matter.

Please direct any further inquiries directly to them in order to prevent any delays in response.

Sincerely,

Paul T. Matsuo,
Administrator
Agricultural Resource Management Division

C: DOWALD
CWRM
OEQC
December 8, 1994
EA:0100

Mr. Edward Lau
Department of Land and Natural Resources
1151 Punchbowl Street
Honolulu, Hawaii 96813

and

Mr. Paul Matsuo
Department of Agriculture
1428 South King Street
Honolulu, Hawaii 96814

Dear Mr. Lau and Mr. Matsuo:

Draft Environmental Assessment (EA)
Waikolu Valley Wells Development
(Pump Controls and Connecting Pipes)
Kalawao, Molokai

In order to ensure water availability during low rainfall periods and provide service to additional farmlands, the Department of Agriculture (DOA) and the Department of Land and Natural Resources (DLNR) propose development of two wells and replacement of an existing pump in Waikolu Valley on Molokai. Operations between the three existing wells and the two proposed wells will be rotated to ensure greater recovery time for the dike compartments from which water is withdrawn.

We have reviewed the Draft EA with the assistance of David Penn, Geography; and Malia Akutagawa of the Environmental Center.

No Accountability

It seems highly improper that the applicants are acting as the approving agencies for their own application. Apart from an inherent conflict of interest, this construction does not allow for any accountability, making the drafting of an environmental assessment a moot requirement.
Inadequate Description of Project Technical Characteristics

The Draft EA, an 11 page text, lacks a clear statement of the exact nature of the proposed activity (test pumping or production pumping) and should resolve this lack of clarity by presenting a chronology of events using accurate terminology. It is unclear whether any pumping of the new wells has yet taken place: if so, the results of this activity should be reported. For instance, page 4 states that the proposed project involves "installing pumps and controls..." (p. 4). Normally, pump installation occurs after wells have been pump tested and refers to placing the wells into active production.

Molokai is a designated ground water management area, and this project requires well construction, pump installation, and water use permits, as well as amendment of interim instream flow standards. The management status of Molokai creates a unique situation for which the various regulatory agencies appear to be developing new regulatory approaches.

The assertion that rotating operations of three existing wells and two proposed wells will allow greater recovery time for the dike-compartments tapped by the wells should be supported by a more detailed explanation of the wells' geohydrology and hydraulic behavior, including summaries of pump tests and other technical observations.

The document fails to quantify the planned extraction rates for the new wellfield, the expected impact of these extraction rates upon streamflows, and the relationship between planned and existing rates and impacts.

Jurisdictional Distinctions

The watershed is not "under the jurisdiction of the DLNR-Commission on Water Resource Management" (p. 7). Perhaps the document intends to note that the groundwater and surface water sources are under Commission jurisdiction. The way in which the multi-jurisdictional situation has been clarified by the referenced cooperative agreement should be summarized in this assessment.

Water Needs And Availability Must Be Quantified

The assertion (p. 1) that "additional groundwater sources are necessary to ensure water is available during periods of low rainfall as well as to service additional acreage of farmland" should be backed up by statistical evidence of existing system source and storage inadequacies during drought and by detailed quantification and classification of existing and planned capacities and uses. On Molokai, irrigation of 2,000 acres would require about 10 MGD (5000 gallons/acre/day). How does this compare with existing system capacity and actual water delivery rates?
This analysis should include more detailed existing use statistics showing what portion of customers are Hawaiian Home Lands lessees, what portion of use is on Hawaiian Home Lands, who the largest irrigators are, and non-agricultural uses of Molokai Irrigation System (MIS) water. This is necessary because of the potentially misleading argument that "potential new customers wishing to obtain MIS water are being denied service due to the already high demand by present users," which is contextually implied to be caused by the reserve of two-thirds of system capacity to Hawaiian Homesteaders (p. 1). In fact, as of 1991, less than 50 homesteads receive water from the MIS, and some of these are farmed by non-Hawaiians under third party leases (out of over 200 customers served).

**Socio-Economic Concerns**

The Water Commission set limits on the amount of water DOA can withdraw from Waikolu. Does the current system supply this allowable amount? If so, is there any justification for having more wells? With more wells in Waikolu, the potential for exceeding the set limits magnifies. Waikolu is isolated; who ensures that allowable limits are not overstepped?

A related issue is the concern that Molokai Electric cannot power the existing pumps at maximum capacity, much less the proposed wells. Will the new wells justify expanding Molokai Electric leading to more development on the island, development that has in the past been rejected by Molokai’s people who wish to preserve their rural lifestyle?

The continuing controversy over the 26-inch diameter water pipeline to serve more development on West Molokai is relevant to this proposed project. The December 5, 1994 issue of the Honolulu Advertiser featured Molokai Ranch’s extensive plans for eco-tourism, increased cattle operations, raising dairy herds, a light industrial park, a game park, redevelopment of Maunaloa, etc. All of these activities require more water than existing sources provide. Consequently, it appears that there is more to this project than just supplementing agriculture. As a potential "commitment [to] larger actions," this project requires the production of an Environmental Impact Statement (EIS) under the significance criteria set forth in Section 11-200-12 of the Hawaii Administrative Rules (HAR).

**Environmental Impacts**

The assessment of environmental characteristics and summary of major impacts on stream biota are wholly inadequate. The Draft EA asserts that water will be pumped out of dike compartments, and withdrawals will be rotated between existing and proposed wells to facilitate greater recharge time. However, whatever water is deemed "needed" will be extracted from the area and lost to the stream.

It is difficult to assess whether this loss of water will adversely affect the many sensitive native species residing in Waikolu Stream, since no figures have been provided on current and projected usage. The current system already creates a dry bed a half-mile in length. It is
probable that additional water withdrawal will result in a greater area of the stream bed becoming dry, thereby creating less habitat for o'opu, hiihiwai, and other native species. Will projected water withdrawals lower stream level such that temperatures will rise and possibly adversely affect the life cycle and mating periods of these species?

Under Section 11-200-12(b)(9), the production of an EIS is required if the project may "substantially affect a rare, endangered and threatened species and their habitats." As stated in the Draft EA, o'opu alamo'o or Lentipes concolor present in Waikolu Stream is a threatened species, as well as a candidate endangered species. Thus, an EIS is required, and the application for a Negative Declaration must be denied.

Mitigation Procedures

The contractor should be bonded to, rather than simply "made aware of the importance of preserving the retaining wall ..." (p. 7). What specific precautions will be taken during construction to prevent the disturbance of agricultural terraces and the retaining wall?

Have funds generated by the legislature towards "the implementation of a biological and hydrological monitoring system" been used yet (p. 10)? The Commission on Water Resource Management (CWRM) has mandated that this study be done for a minimum of two years. Has DOA identified "the impacts of all operating alternatives on Waikolu Stream" as required by the legislature and CWRM before proceeding with this project? If the Water Commission is currently reviewing a plan submitted by DOA for the monitoring program, that plan should be a part of this Draft EA and this assessment should not be accepted until that plan is approved by the Water Commission. In addition, it is a policy of the Water Commission not to approve permits until processes under HRS 343 have been completed, which does not appear to have been followed in this case.

Biological and hydrological monitoring of the MIS has already begun and was reported at the recent Hawaii Stream Restoration Symposium. Summaries of these monitoring results should be presented in this assessment to give a clearer picture of the environment and issues involved.

Although the proposed fish ladder to facilitate migration across the dam appears to be a good idea, historically, fish ladders have not accounted for larvae drifting downstream to continue their life cycle in the ocean. Do existing plans for the fish ladder provide for this phenomenon? How will larvae be prevented from being trapped in the dam and transported into the reservoir where they will inevitably die? As of now, aquatic species below the water diversion area have been 100% successful (notwithstanding variables of predation and other environmental pressures) in getting their larvae to the ocean. Will the fish ladder ensure as much success?
Mr. Edward Lau and Mr. Paul Matsuo
December 8, 1994
Page 5

Examples of the types of "additional mitigative measures" that would be developed if pumping has negative impacts should be presented in this assessment (p. 10).

Inadequate Justification for a Negative Declaration

The applicant's justification for a Negative Declaration ("the economical well being of the customers dependent on receiving water from the MIS will be negatively jeopardized should the proposed project not be completed") is unwarranted (p. 11). Such a statement suggests that any natural resource (e.g., Waikolu Stream and its biota) may be sacrificed for the "economical well being" of society. However, the law does not provide that an applicant need not prepare an EIS solely because others depending on the project will lose money. Every applicant is required to look at all the ramifications of a proposed project: social, cultural, and environmental, in addition to economical concerns.

Conclusion

We recommend that an EIS be prepared, since this project may involve a commitment to larger actions that may have a profound effect on the lifestyle of Molokai's people, and in light of the potential significant impacts on native, threatened aquatic species residing in Waikolu Stream.

Thank you for the opportunity to review this Draft EA.

Sincerely,

John T. Harrison
Environmental Coordinator

cc: OEQC
Roger Fujioka
David Penn
Malia Akutagawa
December 8, 1994

State of Hawai'i
Department of Land and Natural Resources
1151 Punchbowl Street
Honolulu, Hawai'i 96813

State of Hawai'i
Department of Agriculture
1428 South King Street
Honolulu, Hawai'i 96814

RE: WAIKOLU VALLEY WELLS DEVELOPMENT, PUMP CONTROLS AND CONNECTING PIPES—DRAFT ENVIRONMENTAL ASSESSMENT

Thank you for the opportunity to comment. We have been discussing the problems with the wells and pumps in Waikolu Valley for a few years. Please incorporate by reference all the information submitted by me to both agencies in letter and testimony regarding that situation since 1989.

Before I tackle the inadequacies of the subject draft EA, please note that the need for this project is clearly disputable. DHHL Homesteaders have not yet fully tapped their two-thirds allocation from the Waikolu watershed. Of equal importance, the Molokai Ranch, Ltd. diversions above this project perhaps illegally remove significant quantities of water before it ever reaches the Waikolu watershed, reducing the amounts available for public use. These two facts should be given full consideration before deciding to spend more taxpayer dollars on a potentially unnecessary project.

The original plans for Waikolu were formulated years ago, lacking current information about the fragility of Molokai's Sole Source Aquifer, and its inability to continue to sustain withdrawals in the amounts recommended, without threatening the entire island's water supply for all uses. The project and concept must be re-examined in light of this new information. There simply may not be enough water in the vicinity to justify any further investment.

Issues such as impacts on biota, including instream, near-stream, estuary and ocean, have not been addressed in this draft EA. It is not known if the "fish ladders" will work. Instream water temperature may be a key condition for species survival. This has not been addressed. It is wrong to
proceed with any further investment in this project before the agreed-upon studies have been completed and a feasibility determination made in light of that still-to-come information. Money has been made available to proceed with those studies. All other planning should stop until all the information is available to all interested parties. To go ahead now violates both the letter and the intent of S11-200-9 (a)(4).

S11-200-7 requires that all proposed projects be described in their entirety, not segmented in the manner evident in the subject EA. Long term negative impacts of the overall project are extensive. They have not been properly presented, nor mitigating actions proposed.

Please require a full Environmental Impact Statement for this project, one which properly addresses all areas of impact.

Thank you for your time and attention in reviewing our concerns.

Sincerely,

[Signature]

Sarah E. Sykes
P.O. Box 370
Kaunakakai, Hawai‘i 96748
(808) 553-3831
MEMORANDUM:

TO: Rae M. Loui, Deputy Director  
Division of Water Resource Management

FROM: Carl T. Masaki, Acting Administrator

SUBJECT: Draft EA -- Waikolu Valley Wells Development  
File No. 39WJ1

November 28, 1994

We submitted an earlier "no comment" to the above file number. We have since received subsequent information that was recently made available to us. Therefore, we wish to update our comments to File No. 39WJ1:

Should the project be approved:

1) All trash, waster, and debris generated at the project site be properly removed from the area.

2) Any petroleum products used must be contained and properly stored; said petroleum products must also be properly removed once the project is completed.

3) The project manager will be responsible for any fires in the area.

4) The area must be restored completely to its previous state as much as possible.

5) Vegetation and animal life shall not be taken from the area.

6) A botanical survey must be made of any threatened & endangered plants in the project area. If any is found, we wish to be contacted immediately.

7) The area is opened to public hunting; therefore, the project work schedule must take this into consideration.

Thank you for the opportunity to comment.

cc: Maui Branch
October 7, 1994

TO: Mr. Keith W. Ahue, Chairperson
Commission on Water Resource Management
Department of Land and Natural Resources

SUBJECT: Waikolu Hydrologic Monitoring and Biological Study Project

As requested by your letter of September 15, 1994, the following plan of study is submitted for your approval:

1. Prepare and submit EA for pump and connecting pipeline for the two new wells (0855-05 and 0855-06).

2. Prepare and submit CDUA for the installation of the plate over Dam No. 1 intake.

3. Request allotment of $200,000 for the study project and to prepare necessary consultant selection document approvals (Deputy A.G., DAGS and others).

4. Comply with the new procurement interim rules on the Consultant Selection process. The Department only last month received delegation of authority to begin this process.

5. Develop the scope of the study and the request for proposal (a tentative draft is attached).

6. Publish the request for proposals and make the selection of the consultant.

7. Prepare/submit the following:
   a. Stream channel alteration permit
   b. Pump installation permits
c. Amendment to interim instream use standard for Waikolu Stream, based on flow increase from the two 3" nipples and the return of the pump effluent (which is still not determined until the pumps can be installed and operating).


9. Identify and request the additional construction funds for both the pump installation and plate projects, which were escalated due to the delay in the project award. It is anticipated that there will be funds available in the project adjustment account; otherwise, another appropriation request will need to be introduced in the next legislature.

10. Begin all construction work and the monitoring work.

11. Final report on the biological studies and the hydrologic monitoring to be submitted for review and acceptance.

Our apologies for the late response, but allotment processing and the new procurement law were responsible for the delay. If there are any questions or if any further information is required, please call Mr. Paul T. Matsuo, Administrator of the Agricultural Resource Management Division, at 973-9473.

YUKIO KITAGAWA, Chairperson
Board of Agriculture

Attachment

C: ARM Div.
SCOPE OF WORK

1. Record flows at following locations:
   - At Dam No. 1 overflow plate.
   - At 3-inch new pumps nipples.
   - Obtain the USGS stream gauge data (USGS 16406000).
   - At lower stream dam pump station.

2. Maintain and chart new wells pumpage, showing dates pumps operating, quantity pumped, duration of pumping and the rainfall during the period.

3. Rainfall readings on a daily or, if possible, on continuous recording chart over the study period. Also, compile any long-term rainfall records (historic) in order to determine the rainfall cycle pattern.

4. Record and document the stream water level or existence of pools in the stream bed over the reach of the new wells. Also, track and record the periods of drying of the stream beds from no- or low-rainfall periods.

5. Provide aquatic animal count of presence, any migration that occurs, the period when it occurs and the base population within the upper, lower and in the reach of the new wells.

6. Incorporate the data developed by Ann Brasher for her graduate work and provide concurrence on her data. Also available is data collected by the U. S. Corps of Engineers, a draft copy of which is attached and may be incorporated.

7. Conduct biological studies required to determine if aquatic animal habitats are affected by pumping and how their habitats are affected. Prepare mitigating measures to assure that the pumping of the new wells will not cause impact to these aquatic animals.

8. Prepare a draft report for review, and conduct a briefing or informational meeting to present the findings. Upon approval, prepare a final report together with supporting plans and maps of the area between the No. 1 dam and the diversion pump station.
Honorable Yukio Kitagawa, Chairperson
Board of Agriculture
P.O. Box 22159
Honolulu, HI 96823-2159

Dear Mr. Kitagawa:

The intent of this letter is to clarify the action by the Commission on Water Resource Management (Commission) on the water use permit application filed by the Department of Agriculture (DOA) for use of ground water sources in Waikolu Valley by the Molokai Irrigation System (MIS). Statements made by Department of Agriculture staff at a September 30, 1994 meeting at the Farm Bureau indicated that the action on January 12, 1994 was unclear with respect to the approved use of the wells.

Please be advised that the existing use of Wells #22-#24 (Well Nos. 0855-01 to 03) may be continued, pending a final decision on the application. At the time of the Commission action, the existing use was estimated to be 853,000 gallons per day (based on the 12-month moving average withdrawal as of November 30, 1993). As such, all current users of the MIS should be accommodated.

Because use of the wells affect the flow in Waikolu Stream, an amendment to the interim instream flow standard for Waikolu Stream must be made prior to the approval of a water use permit for the full 853,000 gpd. The Commission did approve a water use permit for 744,000 gpd for the existing use as of the October 1988 effective date of the standard. We understand that a petition to amend the standard for the increase in use of 109,000 gpd is being prepared for Commission consideration. Should the Commission approve the amendment, the existing water use permit will be modified to specify an allocation for 853,000 gpd.

To provide you with further detail, we have attached a copy of the approved water use permit conditions, the staff submittal to the Commission, and a portion of the minutes for that meeting.

Sincerely,

Keith W. Ahue

Attachments

c: Paul Matsuo, Department of Agriculture
To: Rae Loui, Deputy Director  
Commission on Water Resource Management

From: Manabu Tagomori, Manager-Chief Engineer

Subject: Waikolu Valley - Applications for Permits

Transmitted are the following five applications with attachments for approval by the Commission:

1. Pump Installation - Application for Permits (2)
   a. Waikolu Well #4 (0855-06)
   b. Waikolu Well #5 (0855-05)

2. Stream Channel Alteration - Application for Permit (1) for Waikolu Stream Diversion Dam Improvement ('fishladder').

3. Petition to Amend Interim Instream Flow Standards (PAIIFS) (2)
   a. to allow for an increase in pumpage of 109,000 gpd
   b. to allow for the continuation of flow across the Upper Diversion Dam due to the construction of the 'fishladder'

The PAIIFS (3a.) is submitted in accordance with the Commission's January 12, 1994 meeting where action on uses in excess of 744,000 gpd (i.e., an increase of 109,000 gpd which includes the return of pumped ground water to Waikolu Stream via 3-inch bypass nipples on the proposed wells) was deferred pending its submittal. To the best of our knowledge, there is no available stream data pertinent to the segment of stream in the immediate vicinity of the proposed wells.

Should you have any questions, please call Edward Lau of my Project Development Branch at ext. 7-0227.

kc

Attach. (5 applications w/attach.)

c. P. Matsuo - Dept. Of Agric.(5 applications w/o attach)
PETITION TO AMEND INTERIM INSTREAM FLOW STANDARDS

Instructions: Please print in ink or type and send completed petition with attachments to the Commission on Water Resource Management, P.O. Box 621, Honolulu, Hawaii 96805. Petition must be accompanied by a non-refundable filing fee of $25.00 payable to the Dept. of Land and Natural Resources. The Commission may not accept incomplete applications. For assistance, call the Regulation Branch at 587-0225.

1. PETITIONER
   State of Hawaii - Department of Agriculture
   Contact Person: Paul Matsuo
   Ph: 973-9475
   Address: 1428 S. King Street, Honolulu, HI 96816

2. STREAMFLOW DATA - none available
   USGS stream gaging station
   Period of Record
   Location/Reach
   (Attach a USGS map, scale 1"=2000", and a property tax map showing diversion location referenced to established property boundaries.)

   TABLE 1. PERIOD OF RECORD AVERAGE MONTHLY STREAMFLOW WITHIN THE AFFECTED STREAM REACH, IN CFS
   Jan  Feb  Mar  Apr  May  Jun  Jul  Aug  Sep  Oct  Nov  Dec  Annual
   - none available -

   Annual Median flow in cfs =

   TABLE 2. PROPOSED AVERAGE MONTHLY STREAMFLOW DIVERSION FROM AFFECTED STREAM REACH, IN CFS
   Jan  Feb  Mar  Apr  May  Jun  Jul  Aug  Sep  Oct  Nov  Dec  Annual
   - an addition on average of 0.89 cfs -

   Annual Median flow in cfs =

   TABLE 3. AVERAGE MONTHLY STREAMFLOW IN AFFECTED STREAM REACH AFTER DIVERSION (min release flow), IN CFS
   Jan  Feb  Mar  Apr  May  Jun  Jul  Aug  Sep  Oct  Nov  Dec  Annual
   - an addition on average of 0.89 cfs -

   Annual Median flow in cfs =

3. EXISTING INSTREAM AND OFFSTREAM WATER USES FOR ENTIRE STREAM REACH

   TMK  OWNER  USE

   (If more space is necessary, attach an extended list following above format)

4. ANTICIPATED IMPACTS ON STREAM AND BASIS FOR SUCH IMPACTS:
   Purpose of fishladder is to supplement flow along the stream and to provide continuous migration across the Upper Diversion Dam. This project is to fulfill a requirement of the Conservation District Use application of 1987 for the Drilling Test Wells in Waikolu Valley. During periods of low flow, the clean-out valve at the diversion dam will be opened to provide equivalent flow to the stream that the fishladder would have provided (on average of 0.89 cfs). This plan was concurred upon by the Division of Aquatic Resources during a January 25, 1994 meeting. The actual impacts are unknown at this time until the results of a biological and hydrologic study are complete.

OCT 06 1994

Signature

Department of Agriculture
MEMORANDUM FOR THE RECORD

FROM: Neal Imada

SUBJECT: Waikolu Stream Fish Ladder

The Special Management Area (SMA) Permit and Conservation District Use Permit for the drilling of additional wells in Waikolu Valley, Molokai both require the construction of a fish ladder.

The purpose of the fish ladder/artificial stream is to assure continuous streamflow for the diadromous species of o'opu found in the upper reaches of Waikolu Stream. The proposed work is to be designed in collaboration with the Division of Aquatic Resources and the U.S. Fish and Wildlife Service.

Per telephone conversation of June 30, 1987, with Clayton Yoshida, County of Maui Planning Department, an SMA permit application will not be necessary as the project is a condition of the Waikolu Valley Wells SMA permit. They would, however, like to be notified in writing of the commencement of the project.

Per telephone conversation, of June 30, 1987, with Faith of the Office of Environmental Quality Commission, an Environmental Assessment (EA) will not be necessary if the project was mentioned as a mitigating measure in our previous EA "Drilling Additional Wells, Waikolu Valley, Molokai." On page 4, paragraph 6, of the EA, it was stated, "To maintain a continuous connection to the ocean, the Department will construct a fish ladder." Therefore, the design and construction of the fish ladder will not require an additional EA. Additionally, a letter of notification is not required by OEQC for the project.

Per telephone conversation of July 2, 1987 with Gail Harada, Office of Conservation and Environmental Affairs, a CDUA is not required for the water connection project. They do require that a set of the final construction plans and specifications be submitted to their office.
MEMO FOR THE RECORD

July 6, 1987

There being no other environmental permits/clearance requirements the project can proceed with the design phase. The following tasks should be undertaken for this project:

1. Initiate project

2. Meet with the Division of Aquatic Resources and U.S. Fish and Wildlife Service to discuss the project and scope of work.

3. Determine if consultant or DOWALD to prepare construction plans and specifications.

[Signature]
NEAL IMADA

NI:fe
Mr. Manabu Tagomori
Chief Engineer
State of Hawaii
Department of Land and Natural Resources
Division of Water and Land Development
P.O. Box 373
Honolulu, HI 96809

Dear Mr. Tagomori:

Re: Special Management Area Permit by the State of Hawaii, Department of Land and Natural Resources, Division of Water and Land Development for the proposed drilling of additional wells at TMK 6-1-01:2, Waikolu Valley, Molokai (87/SMA-11).

At a joint meeting of the Maui Planning Commission and the Molokai Advisory Committee to the Maui Planning Commission held on Molokai on March 17, 1987, the Maui Planning Commission voted to grant the Special Management Area Permit approval, subject to the following conditions:

1. That construction of the proposed project shall be initiated within a period of two (2) years from the date of the granting of the Special Management Area Permit.

2. That appropriate measures shall be taken during construction to mitigate the short-term impacts of the project relative to soil erosion, from wind and rain, to nearby historic sites, to native Hawaiian freshwater macrofauna, and on the basal aquifer.

3. That DLNR, Division of Water and Land Development staff meet with the Department of Public Works regarding their comments on subdivision dated February 24, 1987.

4. That a fish ladder shall be constructed to provide the freshwater macrofauna with a continuous connection to the ocean.
5. That slides of the completed project identifying all elevations of the structures and surrounding improvements shall be submitted to the Planning Department for our records.

6. That the applicant, his successors, and assigns shall defend, indemnify, and hold the County of Maui harmless from and against any loss, liability, claim, or demand arising out of this permit.

7. That full compliance with all other State and County requirements shall be met.

A copy of the Staff Report dated March 17, 1987 is enclosed for your reference.

Should further clarification be necessary, please contact Mr. Clayton Yoshida of this office at 244-7735.

Very truly yours,

CHRISTOPHER L. HART
Planning Director

CY:wc
encl.

cc: LUCA/CZM
Dept. of Water Supply
William Paty, DLNR
C. Yoshida
MEMORANDUM

March 17, 1987

TO: Maui Planning Commission

FROM: Planning Department Staff

SUBJECT: Special Management Area Permit by the STATE OF HAWAI'I, DEPARTMENT OF LAND AND NATURAL RESOURCES, DIVISION OF WATER AND LAND DEVELOPMENT for the proposed drilling of additional wells at TMK 6-1-01:2, Waikolu Valley, Molokai (87/SMA-11).

RECOMMENDATION

The Planning Department Staff finds that the objectives, policies, and guidelines set forth in Part II, Sections 2-8.1, 2, and 3 of the Special Management Area (SMA) Rules and Regulations of the County of Maui have been essentially met in accordance with plans dated June 3, 1986 and therefore recommends approval of the request subject to the following conditions:

1. That construction of the proposed project shall be initiated within a period of two (2) years from the date of the granting of the Special Management Area Permit.

2. That appropriate measures shall be taken during construction to mitigate the short-term impacts of the project relative to soil erosion, from wind and rain, to nearby historic sites, to native Hawaiian freshwater macrofauna, and on the basal aquifer.

3. That DLNR, Division of Water and Land Development staff met with the Department of Public Works regarding their comments on subdivision dated February 24, 1987.

4. That a fish ladder shall be constructed to provide the freshwater macrofauna with a continuous connection to the ocean.

5. That slides of the completed project identifying all elevations of the structures and surrounding improvements shall be submitted to the Planning Department for our records.

6. That the applicant, his successors, and assigns shall defend, indemnify, and hold the County of Maui harmless from and against any loss, liability, claim, or demand arising out of this permit.

7. That full compliance with all other State and County requirements shall be met.

In consideration of the foregoing, staff further recommends that the Planning Commission adopt as its "Findings of Fact, Conclusions of Law, Decision and Order" the Staff Report and Recommendation Memorandum dated March 17, 1987.
STAFF REPORT

March 17, 1987

TO: Maui Planning Commission and Molokai Advisory Committee to the Maui Planning Commission

FROM: Planning Department Staff

SUBJECT: Special Management Area Permit Application by the STATE OF HAWAII, DEPARTMENT OF LAND AND NATURAL RESOURCES, DIVISION OF WATER AND LAND DEVELOPMENT for the proposed drilling of additional wells at TMK C-l-01:2, Waikolu Valley, Molokai.

A. PHYSICAL CHARACTERISTICS

1. Applicant -- Manabu Tagomori, Manager-Chief Engineer, State of Hawaii, Department of Land and Natural Resources, Division of Water and Land Development

2. Location -- The project site is located approximately 2 miles south of Kukaiwaa Point on Molokai's north shore, and 5 miles southeast of Kalaupapa Town. The three wells will be drilled along the banks of Waikolu Stream. Waikolu Stream is located in Kalawao County of Molokai. The proposed sites are within the boundaries of the Kalaupapa National Historical Park (Exhibits 1 and 2).

3. Ownership -- The property is owned by the State of Hawaii (Department of Health).

4. Existing Use -- The site contains two existing wells, State Well Nos. 0855-02 and 0855-03 (Exhibit 3).

5. Land Use Designations --
   a. State Land Use -- Conservation
   b. Special Management Area -- The entire site is located within the Special Management Area.

6. Surrounding Land Use -- The surrounding land use is conservation lands. The closest residence is located approximately six miles away from the well site.

7. Soils -- Geology at the project site is classified primarily as colluvial land - a mixture of soil material, gravel, stones, and boulders moved by gravity and water. The soil material is very dark brown silty clay loam and silty clay.

8. Plant and Animal Life -- No threatened or endangered plant species were found by Department of Land and Natural Resources staff on any of the proposed sites. The overhead canopy was made up primarily of guava and kukui.

There were no birds or animals seen at the sites, however, there were indications that the area is frequented by feral pigs and goats.

The aquatic resource survey revealed an abundant supply of native Hawaiian freshwater macrofauna, including the o'opu alamo'o, o'opu nopili, o'opu nakea, opae kala ole, and wi in Waikolu Stream. These native Hawaiian stream fauna require a connection to the ocean to complete their life cycles. Portions of Waikolu Stream have, in the past, experienced absence of stream flow.
S. Historic Sites -- The archaeological survey revealed no evidence of cultural resources in all three of the proposed well sites. At well site #2, there are agricultural terraces found in the vicinity of the well site (Exhibit 4). The terraces are located outside of the 30 by 30 foot work area. There is also a retaining wall located outside of work area at well site #3 (Exhibit 5).

10. Access -- Access to the site is available from dirt roads.

B. PROJECT BACKGROUND

There appears to have been three settlements on the Kalaupapa peninsula. One was located on the peninsula near the site of the present leprosy settlement, a second at the mouth of Kalawao, and a third at the mouth of Waikolu Valley. In 1836, the population of the Kalaupapa peninsula, probably including Waikolu, was estimated around 2,700. In 1853, a population of 140 was reported for Waikolu. Wet and dry taro varieties were grown in Waikolu.

The government acquired Waikolu Valley in 1865 to be incorporated into the leprosy settlement, so that the leprosy victims could work these agricultural areas and be self-sufficient. The leprosy victims were unable to work the fields since many were ill and lacked the knowledge of farming. The fields of Waikolu have been neglected since 1865.

Waikolu has been recognized as a dependable water source with a sufficient water quantity available for transporting. The leprosy settlement constructed a water ditch that supplied water to the Kalaupapa settlement from Waikolu, the intake is approximately at the 500 foot elevation.

The Molokai Irrigation Tunnel was constructed between 1957 and 1959 to transport water from Waikolu to Puu Kaea, a distance of 5 miles. Irrigation water was distributed to the farmers of southern Molokai. The tunnel takes water from the upper Waikolu Valley at around the 1,000 foot elevation. The State Division of Water and Land Development has two wells and a pump house between the 800 and 1,000 foot elevations to facilitate the quantity and the transport of the water.

The Molokai Irrigation System (MIS), financed by State and Federal funds, the MIS develops surface and ground water sources in Waikolu Valley and dike water in Waikolu Tunnel. The tunnel serves to convey the water to a system of ditches and pipelines leading to Kualapuu Reservoir, a 1.4 billion gallon rubber-lined storage facility. The distribution system involves 125,000 feet of pipeline and serves approximately 150 customers irrigating over 4,000 acres of land.

C. PROJECT REQUEST

The applicant is requesting a Special Management Area Permit to drill three new ground water sources in Waikolu Valley between the 750 foot and 900 foot elevation levels for the Molokai Irrigation System (MIS). From 1977 to present, farm acreage for homesteaders grew from 235 to 893 acres. Potential new customers wishing to obtain MIS water are being denied service due to the already high demand by present users. The three proposed wells would allow the MIS to service more customers as well as additional acreage of farmland. The additional sources would also relieve the heavy burden placed on the MIS during prolonged dry periods.
D. PROJECT DESCRIPTION

Three wells are to be drilled along Waikolu Stream. The wells will be drilled downstream of two existing wells. The three vertical wells will each have a total depth of 200 feet from ground level with a maximum depth of 300 feet. The test range will be 300 to 1,400 gallons per minute.

The well sites are located as follows:

Well Site #1: This site is on the west side of the stream and about 300 feet from the tunnel entry. The site is located on land previously graded for water facilities with a wooden structure on the west side of the level area. The area graded is approximately 30 feet by 30 feet and the well construction should not impact an area outside this already disturbed area (Exhibit 3).

Well Site #2: This site is located on the east side of the stream and approximately 300 feet downstream from well site #1. The well site is located 60 feet north of the road where the road crosses the stream. The well site is located on a small alluvial terrace about 10 feet above the stream level. The well site will occupy an area 30 feet by 30 feet and will be located on the southern end of this alluvial terrace (Exhibit 4). The remains of four agricultural terraces are located 50 feet north of the well site.

Well Site #3: Well site #3 is located on the west side of the stream and approximately 300 feet north of well site #2. The site area is situated between the dirt boulders and the stream bed. The well site will occupy a 30 foot by 30 foot area. A retaining wall with a height of 2 meters and a length of 8 meters lies to the west of the dirt road (Exhibit 5).

The pump house is approximately another 300 feet downstream from well site #3.

To maintain a continuous connection to the ocean, DLNR will construct a fish ladder.

Construction equipment will be brought to each well site by way of existing dirt roads. Precautions will be taken during construction to prevent disturbance to the agricultural terraces and the retaining wall.

After drilling is completed, well tests will be conducted to determine the chemical content of the water, adequacy of withdrawal rate, change in chloride content, and recovery of the aquifer. Impacts of the testing on the water table will be temporary and will cause no undue stress on the basal aquifer.

Stream flow can be affected by the climatic conditions, period of pumping, and the drawdown of the well.

Should the wells prove unsatisfactory, they shall be properly sealed so as not to cause any detrimental effects to the ground water resources of the area. No alternative sites have been selected, thus no additional wells will be drilled.
E. DEPARTMENTAL REVIEW

The application was sent to the following agencies and boards for review and comment:

1. Department of Public Works -- Memo dated February 24, 1987 (Exhibit 6).


In addition, the following agencies have reviewed the project's Environmental Impact Assessment:

1. Division of State Parks, Department of Land and Natural Resources -- Archaeological Survey Recommendations from August 1986 (Exhibit 8).

2. Department of Land and Natural Resources -- Memo dated August 26, 1986 (Exhibit 9).

3. Division of Aquatic Resources, Department of Land and Natural Resources -- (Exhibit 10).


F. DEVELOPMENT ASSESSMENT -- Pursuant to Section 2-9.4 Significance Criteria of the Special Management Area Rules and Regulations of the County of Maui.

1. Involves an irrevocable commitment to loss or destruction of any natural or cultural resource -- Precautions will be taken during construction to prevent the disturbance of the agricultural terraces and the retaining wall.

2. Significantly curtails the range of beneficial uses of any natural or cultural resources -- To maintain a continuous connection to the ocean, DLNR will construct a fish ladder. This would allow the various stream fauna a water connection to the ocean. The situation will be monitored to prevent any damage to the environment by the significant loss of stream flow.

3. Conflicts with the County's or State's long-term environmental policies or goals -- The project does not conflict with the environmental policies of the Hawaii State Plan, Maui County General Plan, or the Molokai Community Plan.

A policy of the Molokai Community Plan calls for the development of new water sources for the Molokai Community Plan area (p. 14).
4. Substantially affects the economic or social welfare and activities of the community, County, or State -- The wells are a much needed addition to the irrigation system to serve the growing agricultural needs of Molokai. If the wells prove successful the MIS will be able to accommodate a greater number of consumers, thus improving the prospects for increased agricultural production. Potential new customers wishing to obtain MIS water are being denied service due to the already high demand for present users.

The economy of Molokai is heavily dependent upon agriculture. With Dole out of active production and Del Monte cultivating only 2,600 acres, Molokai has begun to readjust with shifts in population, employment, and outlook. Agricultural production on homestead lands has increased from 235 acres in 1977 to 893 acres at present.

In a status-quo situation, the Molokai Irrigation System would continue to service its present customers and requests for additional water service would be held in abeyance, pending additional source development.

5. Involves substantial secondary impacts, such as population changes and increased effects on public facilities -- If the wells prove successful, they would be a much needed addition to the irrigation system to serve the growing agricultural needs of Molokai. The proposed wells will have effects on the ground water resources, quality of service, and growth on Molokai.

The Department of Water Supply (Exhibit 7) and the Department of Hawaiian Home Lands (Exhibit 4) have written letters in support of the project.

The Department of Health (Exhibit 3) advises that:

a. The Kalaupapa Settlement currently uses Waikolu Stream as its source of potable water. Care must be taken to ensure that construction and operation of new wells does not reduce Waikolu Stream flow and affect the water supply of Kalaupapa Settlement.

b. The National Park Service has developed a ground water well in the mouth of the Waihanau Valley. DLNR should ensure that the fluctuations of the water table caused by the testing, development, and pumping of these three wells does not interfere with the National Park Service well.

c. The Molokai irrigation system provides water to the Kalua Koi domestic water. Ground water wells contributing to the irrigation system must comply with regulations for potable water sources.

The Department of Public Works recommends that the well sites and access roads be subdivided (Exhibit 6).

6. Considerable cumulative effect upon the environment or commitment for larger action -- As long as mitigative measures are taken to ensure that the project does not interfere with stream flow, the project will not have a considerable effect upon the environment or involve commitment for larger action.

7. Substantially affects rare, threatened, or endangered species or its habitat -- DLNR will construct a fish ladder to ensure that the native Hawaiian freshwater macrofauna would have a continuous water connection to the ocean to complete their life cycles.
No threatened or endangered plant species were found on any of the proposed sites. No birds or animals were seen at the sites, there are indications that the area is frequented by feral pigs and goats.

8. Substantial or adverse effects on air or water quality or ambient noise levels --

Air Quality -- Short-term impacts will be minimal since the closest residence is located six miles from the proposed site.

Water Quality -- After drilling is completed, well tests will be conducted to determine the chemical content of the water, adequacy of withdrawal rate, change in chloride content, and the recovery of the aquifer. Impacts of the testing on the water table will be temporary and will cause no undue stress on the basal aquifer.

Precautions should be taken to ensure that the water supply of the Kalaupapa Settlement or the National Park Service well are not affected.

Ambient Noise Levels -- Increases in short-term ambient noise levels during construction will be negligible since the nearest residence is located 6 miles from the project site.

9. Substantial effects on an environmentally sensitive area -- As long as precautions are taken to protect the resources of the surrounding area and the stream flow is carefully monitored, the project will not have substantial impacts on an environmentally sensitive area.

10. Substantially alters natural land forms and existing public views to and along the shoreline -- The proposed project will not affect natural land forms nor existing public views to and along the shoreline.

G. ANALYSIS -- (Relative to Part II, Section 2-8.3.b, Guidelines of the Special Management Area Rules and Regulations of the County of Maui)

1. Environmental or Ecological Effect -- The project as proposed will have short-term impacts on the water table, but no undue stress on the basal aquifer. Caution will be taken to protect the archaeological and biological resources of the area. The affect of the project on stream flow will be monitored to prevent any damage to the environment.

2. Consistency with State and County Environmental Policies -- The project is consistent with the environmental sections of the Hawaii State Plan and the Maui County General Plan.

3. Consistency with County General Plan, Zoning, Subdivision, and other applicable ordinances -- The project is consistent with the Maui County General Plan, the Molokai Community Plan, and the Special Management Area Significance Criteria.

H. LETTERS

As of March 9, 1987, no letters have been received either in support of or in opposition to the proposed project by this department.

I. CONCLUSION

This concludes the Staff Report.
FIG. 2: NATIONAL HISTORIC LANDMARK BOUNDARY FOR THE KALAUPAPA LEPROSY SETTLEMENT.

Exhibit 2
LOCATION PLAN
WAKARU WELLS
FIG. 5: SCHEMATIC MAP OF WELL SITE #2. NUMBERS DESIGNATE THE AGRICULTURAL TERRACES.
FIG. 6: SCHEMATIC MAP OF WELL SITE #3.
MEMO TO: Christopher Hart, Planning Director

FROM: Alvin K. Fukunaga, Director of Public Works

SUBJECT: Special Management Area Permit Application By the State of Hawaii, Department of Land and Natural Resources, Division of Water and Land Development for the Proposed Drilling of Additional Wells at TMK: 6-1-01:02, Waikolo Valley, Molokai

We have reviewed the above application and offer the following comment:

1. The Department of Public Works has no jurisdiction within the subject area. However, we would like to recommend that the well sites and access roads be subdivided.

AS/ms

Exhibit 6
February 10, 1987

Mr. Chris Hart, Planning Director
Department of Planning
County of Maui
Wailuku, Hi 96793

Dear Mr. Hart:

Subject: SMA Permit Application by State of Hawaii, Department of Land & Natural Resources for the Proposed Drilling of Wells at Waikolo Valley, Molokai, TMK 6-1-01:02

Thank you very much for the opportunity to review the SMA Permit Application relative to the State's proposed wells at Waikolo Valley, Molokai.

Our office is very supportive of the State's efforts to develop and increase the water source supply for the island of Molokai. These additional wells will provide adequate and reliable source of water for the farming community of the island.

If we can be of further assistance, please feel free to contact us.

Sincerely,

Vince G. Baboyo, Jr.
Director

VGB/ao

cc: Engr.

"By Water All Things Find Life"
Exhibit 7
ARCHAEOLOGICAL SURVEY:
UPPER WAIKOLU VALLEY, KALAWAO, MOLOKAI

Prepared For:
Division of Water and Land Development
Department of Land and Natural Resources

Prepared By:
Martha Yent, Archaeologists
Division of State Parks, Outdoor Recreation and Historic Sites
Department of Land and Natural Resources

August 1986

TMK: 6-1-01
Recommendations

Well site #2 should be planned and constructed in such a way as to avoid any impact to the agricultural terraces in the vicinity of the well site. There should be a buffer delineated on the south side of the agricultural terraces which should be marked prior to construction and pointed out to the construction crew to prevent any disturbance. A 30 foot (10 meter) buffer is recommended and would not limited the already delineated 30 by 30 foot well site. These agricultural sites are not the most significant or impressive of the terraces in Waikolu Valley but are important for indicating the use of these marginal areas for agriculture. The location of agricultural features this far upvalley and on small alluvial terraces indicates an agricultural intensity and extensiveness which probably reflects the large population of the Kalaupapa peninsula area. It has been shown that the production demands correspond very closely to the population. Based on the general cultural pattern for Hawaii, the peak of agricultural production probably occurred by circa A.D. 1600. It is likely that these more marginal areas would have been the first to be abandoned as population decreased during the historic period. Consequently, the sites have fallen into disrepair from neglect and natural erosion.

Construction should also be planned around the retaining wall feature in the vicinity of well site #3. Although it is likely that the retaining is outside the impact area, the construction crew should be made aware of the area to prevent any machinery or backfilling in the site area.
MEMORANDUM

TO: Mr. Manabu Tagomori  
Manager-Chief Engineer

THRU: Libert K. Landgraf  
State Administrator

FROM: Wesley H. C. Wong, Jr.  
Forestry Manager

SUBJECT: Waikolu Valley Well Site Inspection

On August 19, 1986, a survey was conducted by Forestry Manager Wesley H. C. Wong, Jr. and Irrigation Manager Mr. George Harada at the four (4) proposed well sites in Waikolu Valley, Molokai. The purpose of this survey was to determine what plant and animal species were occupying the site. The following are results of this survey:

Site #1 - This site is located about 25' above the stream bed on the crest of the west bank of Waikolu Stream between the access road and the stream. The project site is covered with large rocks and boulders.

The overstory canopy is 25' to 30' tall and made up of guava (Psidium guajava), and scattered kukui (Aleurites moluccana).  

Understory vegetation is a dense cover of Oak fern (Christella itata), Hilo grass (Paspalum conjugatum), thimble berry (Rubus saefolius), Hamakua Pamakani (Eupatorium riparium), honohono (Helenium nudiflora), awapuhi kua Iwi (Zingiber zerumbet), awapuhi (Hedychium coronarium), Asiatic pennywort (Hydrocotyle latica), Florida beggarweed (Desmodium torruosum), Kaluha (Altingia pumila), and Ageratum (Ageratum conyzoides).  

No threatened or endangered plant species was found at this site.

There were no birds or animals seen at the project site but animal tracks and browse marks on plants indicate that the area is frequent by feral pigs and goats.
Site #2 - This site is located about 30' above the stream bed on a broad gently sloping bench on the east side of Waikolu Stream. The project site is rocky with scattered large rocks.

The overstory canopy is made up of Kukui almost 70 feet in height. The understory vegetation consists primarily of awapuhi kuahiwi, with scattered Oak fern, O'kupu kupu (Nephrolepis exaltata), thimbleberry, air plant (Bryophyllum calycinum), ti leave (Cordyline terminalis), pohole (Diplazium Sandwichianum), and akolea (Boehmeria grandis).

No threatened or endangered plant species was found on the site nor were any birds or animals seen there. The area is frequent by feral pigs and goats.

Site #3 - This site is located about 15 to 20 feet above the stream bed on the crest of the west bank of Waikolu Stream between the access road and the stream. The project area is rocky with large boulders.

The overstory canopy is made up of guava and kukui about 30 feet high. The understory vegetation is composed of the same plants found at Site #1 and O'kupukupu, air plant, and honohono-kukui (Oplismenus hirtellus).

No threatened or endangered plant species was found on the site nor were any birds or animals seen there. The area is frequent by feral pigs and goats.

Site #4 - This site is located about 15 to 20 feet above the stream bed on the crest of the west bank of Waikolu Stream between the access road and the stream. This site is located very close to Site #3 and has the same vegetation type with the exception Maui pamakani (Eupatorium odoratum).

No threatened or endangered plant species was found on the site nor were any birds or animals seen there. The area is frequent by feral pigs and goats.
Survey of the Freshwater Aquatic Fauna in Waikolu Stream, Island of Molokai

INTRODUCTION

A survey of the aquatic macrofauna in the Waikolu Stream, Molokai was accomplished on September 3 and 24, 1986. The survey was conducted by the Division's Aquatic Biologists Dennis Shinno and William Puleloa, with assistance from Division Administrator Henry Sakuda on September 24.

OBJECTIVE

To assist the Division of Water and Land Development in obtaining quantitative and qualitative data on aquatic macrofauna for a proposed project to drill three new wells in Waikolu Valley.

PROCEDURES AND DESCRIPTION OF AREA

Surveys of the macrofauna were conducted by underwater snorkeling observations in consecutive pools and riffles following the course of the Waikolu Stream. Samples for identification purposes were collected with a net and by hand. The survey area was accessed through the 5-mile Waikolu Water Tunnel maintained by the Department.

Waikolu Stream (Figure 1) was surveyed from approximately 0.3 mile above the existing (upper) diversion dam to 0.5 mile downstream of the pump station dam, a distance of about 1.5 miles. This section of Waikolu Stream consisted of large boulders and a relatively steep gradient resulting in numerous small falls and pools. Visibility was good and maximum stream depth encountered was seven feet.

Stream flow from the upper reaches (Figure 2) is piped from the diversion dam into the Waikolu water tunnel. Although an intermittent trickling flow and some standing pools were observed for approximately 0.3 mile below the diversion dam (Figure 3), no stream flow or standing pool was found along the next 0.2 mile of stream (Figure 4). Stream flow resumed from a small tributary (Figure 5) entering the dry section about 0.2 mile upstream of the pump station dam. Below the pump station to the end of the survey area, a distance of about 0.5 mile, stream flow remained continuous (Figure 6).
Six faunal species were observed during the surveys and included: 1) native fishes (gobies), o'opu alamo'o (Lentipes concolor), o'opu nopili (Sicydium stimpsoni), and o'opu nakea (Awaous starnineus); 2) native atyid shrimp, opae kalaole (Atya bisulcata); 3) native mollusk, wi (Neritina granosa); and 4) introduced Tahitian prawn (Macrobrachium lar). The native stream fauna are diadromous, requiring exposure to salt/brackish water to complete their life cycles. In general terms, this means that these aquatic life: (1) grow to maturity in freshwater; (2) migrate down to and spawn near stream mouths (i.e. o'opu), and/or the eggs hatch and the larvae are swept out to sea; (3) have a period of larval development drifting in the ocean; and (4) the juveniles return to the stream mouths to migrate up into freshwater to grow, mature, and complete their life cycles.

The relative abundance and distribution of these species varied between sections of the stream within the survey area. Quantitative assessments of the o'opu alamo'o which has been suggested to be a "threatened" species by some scientists, were very high, ranging from 10 per pool to estimated counts of greater than 500 per pool.

In the stream section above the upper diversion dam, the o'opu alamo'o and opae kalaole were very abundant (probably many thousands). The o'opu nopili was fairly abundant and wi was present, but few in number. The o'opu alamo'o in this section were fairly large (larger than 2 inches in length and up to 6 inches), as compared to other sections of Waikolu Stream.

One portion of the stream's course below the upper diversion dam was dry. The two existing wells are located in this section. Two new wells are proposed for this area.

The third well is proposed to be located approximately 0.2 mile upstream of the pump station dam, in an area where stream flow was resumed from a small tributary flowing into the main stream bed. Comparatively large numbers of o'opu alamo'o (probably many thousands) and o'opu nopili were observed in this stream section. Only one o'opu nakea was sighted. The opae kalaole and wi were present, but few in number. Many of the o'opu alamo'o encountered in this section were less than 1-1/2 inches in length.

Aquatic fauna below the pump station dam was also highly diversified and abundant. High numbers and varied sizes of o'opu alamo'o, o'opu nopili and wi were observed. Large o'opu nakea (8-10 inches) and a few prawns were encountered in this section.

CONCLUSIONS

Waikolu Stream is a natural quality stream with abundant native Hawaiian freshwater macrofauna, including the o'opu alamo'o, o'opu nopili, o'opu nakea, opae kalaole, and wi.
The two existing wells and three additional proposed wells are located in the stream section between the two dams. There was stream flow above the upper diversion dam and below the pump station dam. The dry stream bed encountered between these dams interrupts water flow to the ocean which is vital to the diadromous movement of the native aquatic macrofauna present. The larger size o'opu and opae found above the upper diversion dam and the varied smaller sizes and species found below the lower pump station dam suggest inadequate stream flow to allow necessary movement to and from the ocean. Under normal conditions, all sizes of o'opu and opae should be present even above the upper diversion dam. A water connection over the dry section should be devised to provide passage of the freshwater organisms with additional surveys to monitor the system.
Dear Mr. Tagomori:

Thank you for soliciting our comments on the Division's Environmental Impact Assessment (EA) for the proposed development of three additional water wells in Waikolu Valley, Molokai, Hawaii.

Despite tunnel development of its waters, Waikolu Stream does maintain populations of at least three endemic freshwater animals including 'opu nopili (Sicyopterus stimpsoni), 'opu alamo'o (Lentipes concolor), and opae kala'ole (Atvoida bisulcata). The Fish and Wildlife Service has classified Lentipes concolor as a Category I candidate endangered species (50 FR 37958-37967): sufficient biological information is available to support its listing as a protected endangered species; however, its official listing has been postponed for other priority species. We recommend that the EA include this information in Section V, Environment.

It is unclear from the EA whether the proposed wells will be vertical, horizontal or sloping. Does the 300 foot value given for maximum well depth mean that the end of the pipe will be located at 300 ft. MSL, or at 300 ft. below ground level? We recommend that the EA clarify this point, and discuss the relationship between perched groundwaters and base stream flow. The EA should further indicate how construction equipment will be brought to the well sites (e.g. helicopter or roadway). The impacts of access and site preparation, clearing and grubbing upon water quality and aquatic habitat should be assessed and stated in the EA.

According to current U.S. Geological Survey (USGS) data, the average discharge for Waikolu Stream as measured below the existing diversions is 7.1 cubic feet per second (cfs), or 4.6 million gallons per day (mgd). The stream at the USGS gauging station (about 900 ft. elevation) was dry for an 18-day period in September 1984. It is likely that development of additional
0.4 - 2.0 mgd from Waikolu Stream will periodically reduce valuable aquatic habitat for the endemic species listed above. This impact should be fully evaluated in the EA.

We appreciate the opportunity to comment on this proposed action. Please contact us if we can provide specific information or assist you further.

Sincerely yours,

Ernest Kosaka
Project Leader
Office of Environmental Services
June 13, 1986

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

Dear Mr. Tagamori:

Thank you for providing us with a copy of the draft Environmental Impact Assessment for the proposed project, Drilling Additional Wells, Waikolu Valley, Molokai.

As you know, Waikolu Valley is within the authorized boundary of Kalaupapa National Historical Park, all of which is on the National Register of Historic Places by virtue of its being a National Historic Landmark. We are sympathetic to the need to augment the water supply for the Molokai irrigation system. From a hydrologic standpoint, it makes good sense to tap this underground reservoir. However, in the absence of any supporting information, we are unable to determine if there will be any adverse impacts on biological or cultural resources.

Although not based on any biological surveys, it is our understanding that Waikolu Stream supports several native species of aquatic organisms, including Oopu, Hiihihi, and opae. Also, substantial withdrawals from this aquifer, especially during drought periods, would eliminate or reduce stream flows for some undetermined distance downstream from the well sites.

Limited archeological surveys of Waikolu Valley above and below the existing wells have revealed a large number of sites, both prehistoric and historic. Therefore, if you have not already done so, we request that surveys be conducted by professional biologists and archeologists prior to any construction/drilling activity to identify and quantify impacts along with the necessary mitigative measures.
We would appreciate receiving copies of the results of these surveys. With this information in hand, together with your plans to avoid any adverse impacts to the greatest extent possible, we should have no objections to the project.

Sincerely,

Bryan Harpy
Director, Pacific Area
MEMORANDUM

To: Honorable Susumu Ono, Chairperson
   Board of Land & Natural Resources

From: Director of Health

Subject: Environmental Assessment for the Drilling of Additional Wells in Waikolu Valley, Molokai

April 15, 1986

Thank you for the opportunity to comment on the proposed project. It is our understanding that three wells will be drilled along Waikolu Stream about five miles from Kalaupapa Settlement to support the Molokai irrigation system. The Kalaupapa Settlement currently uses Waikolu Stream as its source of potable water. Therefore, care must be taken to ensure that construction and operation of the new wells does not reduce Waikolu Stream flow and affect the water supply of Kalaupapa Settlement. Also, the National Park Service has developed a groundwater well in the mouth of the Waihanau Valley. DLNR should ensure that the fluctuations of the water table caused by testing, development, and pumping of these three wells does not interfere with the National Park Service well.

The Molokai irrigation system provides water to the Kalua Koi domestic water system. Therefore, groundwater wells contributing to the irrigation system must comply with regulations for potable water sources.

Please be advised that these wells will require compliance with Section II-20-29, Chapter 20, Title II, Administrative Rules. This section requires Department of Health approval of all new potable water sources serving public water systems. Such approval is based upon the submission of an engineering report satisfactorily addressing all concerns set down in Section II-20-29, Chapter 20, Title II, Administrative Rules.

Concerns for well sources identified in Section II-20-29 of Chapter 20, Title II, include but are not limited to:

1. Nature of the soil and stratum overlaying the water source;
2. Nature, distance, direction of flow and time of travel of contaminants from present and projected domestic, industrial and agricultural sources of pollution, and waste injection wells and other waste disposal facilities;
3. Probability and effect of surface drainage or contaminated underground water entering the subject water source; and

Exhibit 13

Your careful review of these and other concerns as set down in Section II-20-29, Chapter 20 is urged. Your consideration and use of this information in the determination of sites for wells of this nature will serve to avoid possible conflicts in use of resources.

cc: Maui DHSA
June 26, 1987

Gentlemen:

Conservation District Use Application for
Drilling Test Wells in Waikolu Valley, Molokai

APPLICANT: Mr. Manabu Tagomori
Division of Water and Land Development
P.O. Box 373
Honolulu, Hawaii 96809

LANDOWNERSHIP: State Department of Health

LOCATION: TMK: 6-1-01: 2, Waikolu Valley, Molokai
(See Exhibit A.)

AREA OF PARCEL/USE: 7213.775 acres/900 square feet at each well site

SUBZONE: Resource

DESCRIPTION OF AREA/CURRENT USE:

Waikolu Valley is located on the east side of the Kalaupapa peninsula on the northern coastline of Molokai. It is the largest and easternmost of the three valleys with streams draining into the Kalaupapa vicinity. It is over three miles long, and is approximately one mile wide at its mouth. Waikolu is a wet valley with a perennial stream and annual rainfall of about 75 inches. Waikolu Valley is located within the Kalaupapa National Historical Park. The proposed well sites are located in upper Waikolu Valley.
Ground slopes in the area range between five percent and twenty percent. The proposed wells will be sited on relatively flat areas alongside an existing dirt road and near Waikolu Stream. Well Site #1 is on the west side of the stream and about 300 feet from the tunnel entry. It is located on land previously graded for water facilities with a wooden structure on the west side of the level area. The area graded is approximately 30 feet by 30 feet. Well Site #2 (Exhibit B) is located on the east side of the stream approximately 300 feet downstream of well site #1. It is situated on a 230 feet by 50 feet alluvial terrace. There are remains of four agricultural terraces on the northern half of the alluvial terrace. Well Site #2 appears to be centered in the dry water channel and is approximately 50 feet from the southernmost agricultural terrace. There are no features on the southern side of the alluvial terrace that would be impacted by the well construction or access to the well site. Well Site #3 (Exhibit C) is located on the west side of the stream and approximately another 300 feet downstream from well site #2. It is between the dirt road and the stream. There is a retaining wall located outside the work area of the proposed well site.

Existing structures include a water tunnel which begins in Waikolu Valley and ends in Kaunakakai, two existing wells in the valley, one existing well in the water tunnel, a diversion pump structure, and an abandoned wood shed. (See Exhibit D.) The tunnel, pump, and diversion structure area used to supply water for the Molokai Irrigation System.

Access to the proposed well site is via existing dirt roads and the Waikolu Tunnel. The roads and tunnel are used by employees of the irrigation system to maintain and repair the existing structures.

Electricity is available in the valley. Telephone service is available at the diversion pump structure.

PROPOSED USE:

The applicant is proposing to drill three test wells along Waikolu Stream in Waikolu Valley, Molokai. The wells will be drilled downstream of the two existing wells, State Well Nos. 0855-02 and 0855-03. The three wells, if proven successful, would supplement the present supply of irrigation water provided by the Molokai Irrigation System to the farmers of the island. The anticipated yield is 1.5 million gallons per day per well.

The Molokai Irrigation System (MIS) is financed by State and Federal funds. The MIS develops surface and ground water sources in Waikolu Valley and dike water in Waikolu Tunnel. The tunnel serves to convey the water to a system of ditches and pipelines leading to Kualapuu Reservoir, a 1.4 billion gallon rubber-lined storage facility. The distribution system includes 125,000 feet of pipeline and serves approximately 150 consumers irrigating over 4,000 acres of land in Hoolehua.
If the proposed wells prove satisfactory, they will be connected to the MIS to increase the supply of water available for its customers. A separate assessment and CDUA will be filed by the applicant for well development should the test wells prove satisfactory.

If the wells prove unsatisfactory, they shall be properly sealed so as not to cause any detrimental effect to the ground water resources of the area. The Molokai Irrigation System would continue to service its present customers. Requests for additional water service would be held in abeyance, pending additional source development. No alternate sites have been selected.

SUMMARY OF COMMENTS:

The application was referred to the following agencies for review and comment: the Department of Land and Natural Resources Divisions of Aquatic Resources, Forestry and Wildlife, State Parks/Historic Sites, Land Management, Conservation and Resources Enforcement, Water and Land Development, and the Natural Area Reserves System; the Maui County Planning Department, and Department of Water Supply; the State Department of Health; the Environmental Council; the Office of Environmental Quality Control; the Office of Hawaiian Affairs, the Department of Planning and Economic Development, the Department of Hawaiian Home Lands, and the U.S. Fish and Wildlife Service. Comments received are as follows:

The Division of Forestry and Wildlife comments:

This project area is in Unit C of the Molokai Game Management Area. Hunting for feral pigs and goats is permitted in this unit year round on weekends and State holidays. Because of the remoteness of the this area and design of the well structures, the feral animals are generally not disturbed by this type of use.

We foresee no impact (positive or negative) on the current and future programs of the Division of Forestry and Wildlife should this project be permitted in the proposed sites.

On August 19, 1986, a survey was conducted by the Division of Forestry and Wildlife to determine the plant and animal species which were occupying the well sites. No threatened or endangered plant species were found at any of the proposed sites. No birds or animals were observed. Animal tracks and browse marks on plants indicated that the area is frequented by feral goats and pigs.

State Parks/Historic Sites remarks are as follows:

Historic Sites Section Concerns:

The applicant proposes to drill three wells along Waikolu Stream in the upper part of the valley.
In the preparation of the Environmental Impact Assessment, staff archaeologists of the Division of State Parks conducted an archaeological survey of the area for the Division of Water and Land Development. A report of the survey ("Archaeological Survey: Upper Waikolu Valley, Kalawao, Molokai," 1986) was attached to the EIA. Four agricultural terraces and a retaining wall were identified near well sites #2 and #3. The retaining wall near well site #3 has been determined by the applicant to be outside the impact area.

We agree with the recommendations made that precautionary measures such as the creation of a buffer area, and the construction crews' awareness of the presence of the sites, would ensure the protection of the sites. Thus, the applicant is advised that the sites need to be clearly flagged, and their location pointed out to the construction crew. This should be done in coordination with our staff archaeologists, prior to construction work. Compliance to these measures would therefore result in a determination of "no effect."

Recreational Concerns:

The subject wells, are located within Kalaupapa National Historical Park. Therefore, the proposed project, should continue to be reviewed by the National Park Service.

The Division of Aquatic Resources comments:

The Environmental Impact Assessment indicates that should the new wells be found to be suitable as a supplemental source of water for the Molokai Irrigation System, a separate assessment will be prepared for the well development phase and the impact of additional ground water withdrawal would be addressed at such time.

We remain concerned over the native stream species inhabiting Waikolu Stream due to the already existing absence of continuous year-round streamflow in portions of the Stream. These freshwater species are diadromous, requiring exposure to salt/brackish water to complete their life cycles. The Environmental Impact Assessment indicates that a water connection would be constructed to maintain continuous connection to the ocean.

The County of Maui Planning Department comments as follows:

The Planning Department has reviewed the subject application and wishes to reiterate its earlier comments made on the subject Environmental Impact Assessment in a letter dated April 16, 1986 (attached). The subject sites are within the Special Management Area of the County of Maui. The applicant has filed an SMA application with the County of Maui and a public hearing will be held by the Maui Planning Commission on this matter on March 17, 1987, 7:00 p.m. at the Mitchell Pauole Center, Kaunakakai, Molokai. The Maui Planning Commission's decision on this request will be transmitted to your office.
The Planning Department's other concerns are reflected in the April 16, 1986 letter.

The County of Maui's comments in the above-mentioned April 16, 1986 letter were as follows:

In acknowledging your March 21, 1986, request for comment pertaining to the subject environmental impact assessment, we have the following comments to offer:

1. The subject sites are within the Special Management Area of the County of Maui.
2. The project is in accordance with the support system policies of the Molokai Community Plan which call for the development of new water sources for the Molokai Community Plan area.
3. During the drilling process, mitigative measures to control impacts on adjacent and downstream properties should be implemented.

The Office of Environmental Quality Control comments as follows:

Our primary concern regarding the drilling of wells is that well pumping does not reduce nearby streamflow to the extent that stream fauna are adversely impacted. Generally we have been agreeable to negative declarations for exploratory wells and environmental impact statements for development wells. Our reasoning for this is that data from exploratory wells are needed to determine the impacts of production wells.

The Office of Hawaiian Affairs submits:

We were pleased to learn that large numbers of the 'o'opu alamo'o (Lentipes concolor) were sighted in the upper reaches of Waikolu Stream. The United States Fish and Wildlife Service has classified this endemic diadromous fish as a Category I candidate endangered species.

It is unclear from the Environmental Impact Assessment (EA) whether this project will adversely affect the existing population of this species.

The EA states that DOWALD will construct a fish ladder to facilitate the movement of diadromous species such as the 'o'opu over dry portions of the stream. Similarly the Division of Aquatic Resources recommended a "water connection" over the dry section of the stream.

We support the construction of such devices to facilitate the movement of diadromous species over the dry spots and dams in the stream. We recommend that they be designed in consultation with staff from the U.S. Fish and Wildlife Service.
These efforts to develop additional ground water sources for the Molokai Irrigation System will clearly benefit Molokai homesteaders. The Office of Hawaiian Affairs supports the Department of Hawaiian Home Lands' and the Division of Water and Land Development's efforts to improve farming conditions for Molokai homestead farmers.

However, we hope that efforts will be made to accomplish this end without further depleting the populations of endangered endemic species such as the 'o'opu alamo'o.

The Department of Hawaiian Home Lands offers the following comments:

The Department of Hawaiian Home Lands supports environmentally-sensitive efforts to increase water in the Molokai Irrigation System (MIS) which supplies native Hawaiian agricultural homesteads. We are pleased to note in the environmental assessment that measures will be taken to assure that the life cycles of native Hawaiian macrofauna (which includes o'opu, opae, and wi) will not be adversely affected (page 4); and that if and when the new wells are used to supply water to the MIS, drawdowns will be carefully monitored to prevent any damage to the environment (page 6).

We would appreciate being kept advised on the progress and results of the drilling, as well as of any significant environmental changes.

The U.S. Fish and Wildlife Service conducted a field investigation to provide the following comments:

The Service is concerned that the proposed action is likely to reduce habitat availability for anadromous fishery resources within our jurisdiction, including the rare o'opu alamo'o (Lentipes concolor), a candidate endangered species.

Our concerns have been coordinated with the professional staff of the Division of Water and Land Development (DOWALD) since June 1986. We have also been engaged with DOWALD and the University of Hawaii Water Resources Research Center in studies on the application of instream flow technologies in Hawaii since 1983.

Biologists of the Fish and Wildlife Service and National Marine Fisheries Service conducted a biological reconnaissance survey in Waikolu Stream, Molokai between March 24-26, 1987. The purpose of the survey was to assess the populations of native macrofauna in the stream, and estimate the impacts of the proposed development of three additional groundwater wells by the State of Hawaii upon these populations. Although this survey was fully coordinated with the Division of Aquatic Resources, conflicting schedules prevented our staffs from conducting joint-agency field studies.

- 6 -
Several water diversion structures and wells exist within the valley. An older system constructed in the early 1900's consists of two intake weirs and a pipeline aqueduct. A pipeline crossing structure exists in the streamed immediately above the stream mouth. Neither the intakes nor the aqueduct are maintained; however, some water is collected and carried through the aqueduct along the shore beneath Puu Kauwa to Kalaupapa. Although this water is not currently used on Kalaupapa, a substantial quantity is being wasted across the beach through a large crack in the aqueduct near Ka Lae Kiloa.

Roughly 25 million gallons of water per day (mgd) are exported from Waikolu Stream through the Molokai Tunnel for use in central Molokai. Three surface diversions located near 1,000 feet on Waikolu Stream have an estimated combined capacity of 20 mgd. An additional 3 mgd is developed from two groundwater wells located at the 900-foot and 875-foot levels on the valley floor.

A pumphouse and weir constructed in 1972 at an elevation of 750 feet on the mainstream contains two 700 gallon per minute (gpm) pumps and one 1,400 gpm pump. These are capable of drawing a maximum volume of 3 mgd to the Molokai Tunnel. However, actual pumpage is believed to be considerably less than capacity (Hawaii Division of Water and Land Development, pers. comm.). Additionally, the base flow of Waikolu Stream at an elevation of 900 feet is reduced by about 1 mgd by the seepage of dike water into the Molokai Tunnel (Parsons Brinkerhoff and Hirota Associates 1969).

Waikolu Stream, below an elevation of 500 feet, supports a normal assemblage of native, diadromous fishes, crustaceans and mollusks. However, neither the o'opu nakea (a valuable fishery resource) nor o'opu nopili reach their normal upstream limits in Waikolu Stream. Only large o'opu alamo'o exist in the stream above the upper intake structures at 1,000 feet, suggesting very infrequent upstream movement of juvenile fishes.

Under present conditions habitat availability for native, diadromous species is reduced, and their upstream migration is interrupted by prolonged periods of no flow and the presence of artificial instream barriers. Intake gratings at 1,000 feet and 750 feet undoubtedly entrain large quantities of eggs, juvenile and some adult animals. Animals and propagules entrained in the irrigation system may be considered lost from the ecosystem and do not contribute to subsequent generations. The proposed project is expected to exacerbate existing conditions within the affected reaches.

The proposed action involves construction and testing of three groundwater wells on the Waikolu Valley floor at elevations between 750 feet and 900 feet. These wells would develop storage and drainage water that would otherwise not be available to the Molokai Tunnel. If the wells prove suitable as a supplementary source of water, they will be connected to the Molokai Irrigation System. Between .43 and 2.0 mgd per...
well will be pumped uphill into the west portal of the Molokai Tunnel. Conceivably, the maximum pumping capacity could be 6.0 mgd.

Pumping effects on the water table would extend outward from each new well, eventually affecting the base flow of the stream. If total well yield on a continuous basis were to equal sustainable yield from the water table, drawdown would stabilize and groundwater drainage to the stream would cease (Parsons Brinkerhoff and Hirota Associates 1969). Hence, it is likely that the proposed wells, if developed, would extend both the duration and length of stream affected by no flow conditions.

From a biological standpoint, further well development will impede the upstream migration of indigenous fishes, crustaceans and mollusks, and reduce or eliminate suitable habitat for these species over a mile-long reach of Waikolu Stream in excess of 80% of the time. Under a worst-case scenario, this condition could lead to the gradual depopulation of rare o'opu alamo'o in the upper stream reaches and reduce production of valuable fishery resources (nakea and hiihiwai).

Prolonged dewaterment of a portion of the stream would allow encroachment of riparian vegetation into the channel resulting in increased suspended sediment and organic load during freshets. These conditions may be detrimental to habitat suitability and recruitment for native species in the lower reaches of the stream. Lastly, further reduction of streamflow may be in violation of State of Hawaii Chapter 54 Water Quality Standards.

Therefore, the Service recommends that the following measures be taken to reduce the impacts of the proposed action upon valuable fish and wildlife resources:

a. Appropriate instream flows should be provided between 1,000 feet and 600 feet in Waikolu Stream to provide suitable habitat and passage flows for valuable aquatic resources. Determination of flow volume and frequency through the affected reach will require some additional study. Specifically, known habitat suitability data for selected species must be applied to site-specific hydraulic information. Empirical measurements of channel morphology at selected sites within the reach would be necessary to determine adequate flows. Computer-based simulations could then assess a range of habitat conditions under flows ranging from 0 to about 475 mgd.
b. Construction of an artificial fish ladder may only be practicable or desirable as a means of enhancing animal migration over weirs. An extended artificial channel along the stream invert may degrade the natural, heterogeneous substrata and habitat value to the detriment of native species. Alternatively, we suggest that minor reconfiguration of the pumphouse weir and upper intake weir be considered to reduce the entrainment of eggs and animals.

c. If the old aqueduct which runs along the shore from Waikolu Valley to Kalaupapa is to be abandoned or left in disrepair, the intake structures serving this waterline should be opened to restore flow to the natural stream channel.

Lastly, the Service recommends that construction of wells inside the Molokai Tunnel, as discussed in Parsons Brinkerhoff and Hirota Associates (1969), be evaluated in lieu of well construction on the valley floor. Although high-level water taken by tunnel wells would also be connected with streamflow, there appear to be several attractive advantages to this alternative. Foremost, tunnel wells appear to be much less costly than wells on the valley floor. They would not draw saline water with heavy pumping; yet, they could draw down the aquifer to the capacity of the pumps without injuring the integrity of the aquifer. They could also control the supply of water to the tunnel more effectively (Parsons Brinkerhoff and Hirota Associates 1969). Adequate adjustments could be made under this scenario to provide for instream flow.

The Department of Land and Natural Resources Divisions of Land Management, Conservation and Resources Enforcement and Natural Area Reserves; the County of Maui Departments of Water Supply, and Public Works; the State Department of Planning and Economic Development and the Department of Health have no objections to the proposed project.

ANALYSIS:

Following review and acceptance of the application for processing, the applicant, by letter dated March 3, 1987, was notified that:

1. The proposed use is a conditional use in the Resource Subzone of the Conservation District according to Title 13, Chapter 2, Administrative Rules, as amended;

2. No public hearing pursuant to Chapter 183-41, Hawaii Revised Statutes, as amended, will be required in that the use was of a non-commercial nature; and

3. A negative declaration in accordance with Title 11, Chapter 200 of the Administrative Rules, was determined for the proposed use, and written clearance from the County of Maui regarding SMA requirements has been obtained.
The objective of the Resource subzone is to develop, with proper management, areas to ensure sustained use of the natural resources of those areas.

Section 13-2-21(b)(1) relating to standards requires all applications be reviewed in such a manner that the objective of the subzone is given primary consideration.

On March 17, 1987, the Maui Planning Commission approved the SMA Permit for the proposed well drilling at TMK: 6-1-0-1-2, Waikolu Valley, Molokai subject to the following conditions:

1. That construction of the proposed project shall be initiated within a period of two (2) years from the date of the granting of the Special Management Area Permit.

2. That appropriate measures shall be taken during construction to mitigate the short-term impacts of the project relative to soil erosion, from wind and rain, to nearby historic sites, to native Hawaiian freshwater macrofauna, and on the basal aquifer.

3. That DLNR, Division of Water and Land Development staff meet with the Department of Public Works regarding their comments on subdivision dated February 24, 1987.

4. That a fish ladder shall be constructed to provide the freshwater macrofauna with a continuous connection to the ocean.

5. That slides of the completed project identifying all elevations of the structures and surrounding improvements shall be submitted to the Planning Department for our records.

6. That the applicant, his successors, and assigns shall defend, indemnify, and hold the County of Maui harmless from and against any loss, liability, claim, or demand arising out of this permit.

7. That full compliance with all other State and County requirements shall be met.

The National Park Service submitted comments which were included in the applicant's Environmental Assessment. (See Exhibit E.) Staff contacted the National Park Service by telephone. They indicated that their concern was that aquatic resources not be negatively impacted by the proposed wells. They are in receipt of the report by the U.S. Fish and Wildlife Service. They recognize the need for development of water sources on Molokai and have no objections provided the aquatic macrofauna in Waikolu Stream are not adversely affected by well development.
Environmental Impacts

Each well will require a 30-foot by 30-foot work area. Construction effects will include traffic, noise, and dust. These effects are anticipated to be minimal in that the nearest residence is six miles away, and the noise and dust are not considered significant for this project. Construction equipment will be brought to each site by way of already existing dirt roads.

Temporary fluctuations of the water table during well testing and recovery of the aquifer are anticipated. After drilling is completed, well tests will be conducted to determine the chemical content of the water, adequacy of withdrawal rate, change in chloride content, and recovery of the aquifer. Impacts of testing on the water table will be temporary and will cause no undue stress on the basal aquifer.

Archaeological Concerns

There are agricultural terraces found in the vicinity of well site #2. The terraces are located outside the 30-foot by 30-foot work area. An additional buffer area will be delineated during construction to prevent possible damage to the terraces. A 30-foot buffer has been recommended by Historic Sites.

There is a retaining wall in the vicinity of Well Site #3. The construction crew will be notified of its location to ensure that no damage occurs to the wall.

Aquatic Resources Concerns

The proposed wells would tap water confined at high levels by dikes. Within the rift zones of East Molokai Volcano, the lavas are cut by numerous dikes. Rainwater sinking in to the rock at the tops of permeable compartments tends to accumulate in the compartments due to its lateral movement being prevented or retarded by the dikes. Depending on climatic conditions, period of pumping, and the drawdown of the well, the streamflow may be affected. The applicant will monitor this situation to prevent any damage to the environment.

To maintain a continuous connection to the ocean, the applicant originally proposed to construct a fish ladder. A fish ladder is usually used to allow macrofauna to overcome obstacles such as dams. The applicant stated that what they meant by fish ladder is simply an artificial stream or water connection. Discussion with Division of Aquatic Resources staff further clarified that a water connection over the dry portion of the stream could facilitate movement of macrofauna between the ocean and the upper reaches of the stream.

Concerns regarding the impact of the proposed drilling upon aquatic macrofauna in Waikolu Stream were raised by the survey report by the U.S. Fish and Wildlife Service, the Division of Aquatic Resources, and other agencies.
On September 3 and 24, 1986, the Division of Aquatic Resources conducted a survey of Waikolu Stream. Their findings were included in the Survey of the Freshwater Aquatic Fauna in Waikolu Stream, Island of Molokai, in the environmental assessment submitted by the applicant. The survey was conducted from approximately 0.3 miles above the existing diversion dam to 0.5 miles downstream of the pump station dam (a distance of about 1.5 miles). (See Exhibit F for Division of Aquatic Resources' complete survey report.)

The conclusions of the Division of Aquatic Resources survey are as follows:

Waikolu Stream is a natural quality stream with abundant native Hawaiian freshwater macrofauna, including the o'opu alamo'o, o'opu nopili, o'opu nakea, opae kaia ole, and wi.

The two existing wells and three additional proposed wells are located in the stream section between the two dams. There was stream flow above the upper diversion dam and below the pump station dam. The dry stream bed encountered between these dams interrupts water flow to the ocean which is vital to the diadromous movement of the native aquatic macrofauna present. The larger size o'opu and opae found above the upper diversion dam and the varied smaller sizes and species found below the lower pump station dam suggest inadequate stream flow to allow necessary movement to and from the ocean. Under normal conditions, all sizes of o'opu and opae should be present even above the upper diversion dam. A water connection over the dry section should be devised to provide passage of the freshwater organisms with additional surveys to monitor the system.

The U.S. Fish and Wildlife Survey contained a number of points which the applicant was able to provide some clarification on.

Clarification was offered regarding the figures on the quantity of water currently exported for use from Waikolu Stream. The U.S. Fish and Wildlife survey states that the current amount of water being pumped is 25 mgd. The applicant states that much less than 25 million gallons of water per day are used. Average figures for 1985 were 5.67 mgd. The tunnel is designed, however, to carry a maximum of 21 mgd and upwards to 42 mgd with additional improvements. Additionally, the three wells will only be capable of pumping 4.2 mgd, of which 1.4 mgd will be for standby purposes. In actuality, the maximum withdrawal at any time would be 2.8 mgd for the three proposed wells, rather than 6.0 mgd.

The applicant offered additional clarification that contrary to statements made in the U.S. Fish and Wildlife survey, the Kalaupapa water system is separate from the MIS system and is under the jurisdiction of the Department of Health. The old aqueduct which is mentioned as being in need of repair is also under the jurisdiction of the Department of Health.
The U.S. Fish and Wildlife Service recommended the alternative of using the tunnel for well sites to avoid impact upon the stream, and for cost effectiveness purposes. The applicant contends that both wells in the tunnel and valley tap high-level dike water, and that there would be no advantage in placing a well site in the tunnel. Further, the applicant states that contrary to the report's assessment of the cost of drilling a well in the tunnel, construction costs would be greater in the tunnel than in the valley. The higher construction costs would be due to the necessity of excavating a 50-foot tall compartment within the currently eight to ten foot tall tunnel to accommodate well drilling equipment.

Mitigating Measures:

Both the Department's Division of Aquatic Resources and the U.S. Fish and Wildlife Service report that organisms above the diversion were larger whereas those in the lower stream were of mixed sizes, indicating that the young returning from the ocean have not been able to pass up to the upper reaches of the stream. The U.S. Fish and Wildlife report suggests the current intake gratings at 1,000 feet and 750 feet interrupt to the life cycles of diadromous stream life by entraining large quantities of eggs. Although only limited information is available on the life history of o'opu alamo'o, o'opu nopili and opae kalaole, the Division of Aquatic Resources suggests that due to the diadromous nature of these organisms, which require downstream migration and spawning near the stream mouth similar to the o'opu nakea, there should be no eggs released in these upper reaches of the stream. They also submit that entrainment of large quantities of eggs and larvae is highly unlikely since the eggs of these o'opu are adhesive and are attached to rocks, and the female opae carry their eggs on their pleopods.

Both the Division of Aquatic Resources and the U.S. Fish and Wildlife Service concur that a year round water connection and passage flow are desirable. However, there is some difference in the method of providing alternative continuous stream flow. Though the Division of Aquatic Resources does not object to allowing a natural stream channel, they comment:

We question the rejection of artificial fish ladders since we feel they are a practical way to separate the diadromous endemic species which are good "climbers" from brackish and exotic species at the stream mouth. Further, we also see the ladders as a way of artificially creating optimum water conditions for diadromous species in place of the adverse conditions offered by the natural stream beds at their lower reaches. We feel that mortality is probably the greatest at the ocean/stream interface and in the lower part of the stream until the organisms reach cooler waters. Should it be possible to bring the cooler waters to the lower reaches, mortality might be reduced significantly.
The applicant maintains that the construction of a water connection such as an artificial stream bed with rocks for the endemic stream fauna to cling to is the most efficient method of providing alternative continuous stream flow with minimum loss of water into the ground. The Division of Aquatic Resources suggests that the artificial water connection may remedy the current situation, in that it will facilitate the movement of endemic stream fauna to the cooler waters at the upper reaches of the stream.

As pointed out by the Office of Environmental Quality Control in their comments on the subject CDUA, data from exploratory wells is needed to determine the impacts of production wells. The subject CDUA is for such exploratory test wells. Should the test wells prove satisfactory, a new Conservation District Use Application and an Environmental Impact Statement would be required for development of the wells. Many of the concerns raised regarding well development will be more appropriately addressed at that time.

The applicant has represented that Waikolu Stream will be carefully monitored during test pumping to avoid impacting the populations of endangered endemic species such as the o'opu alamo'o as well as other native Hawaiian aquatic macrofauna. Additionally, the applicant proposes to provide a water connection over the dry portion of the stream. Such a device would provide a continuous connection to the ocean for stream macrofauna. It would be monitored for its efficacy and to ensure that no detrimental effects to the environment result.

The applicant is proposing to use appropriate mitigating measures to ensure that negative impact to archaeological sites and aquatic resources will be minimized. The proposed test drilling is necessary to gather data on the suitability of developing wells which will benefit farmers on the Molokai Irrigation System. The proposed project is not inconsistent with the objective of the Resource subzone. Therefore, staff recommends as follows:

RECOMMENDATION:

Staff recommends that the Board approve CDUA MO-12/30/86-1988 for exploratory well drilling in these sites on TMK: 6-1-01: 2, Waikolu Valley, Molokai, subject to the following conditions:

1. The applicant shall comply with all applicable statutes, ordinances, rules and regulations of the Federal, State and County governments, and applicable parts of Section 13-2-21, Administrative Rules, as amended;

2. The applicant, its successors and assigns, shall indemnify and hold the State of Hawaii harmless from and against any loss, liability, claim or demand for property damage, personal injury and death arising out of any act or omission of the applicant, its successors, assigns, officers, employees, contractors and agents under this permit or relating to or connected with the granting of this permit;
3. Since this approval is for use of conservation lands only, the applicant shall obtain appropriate authorization through the Division of Land Management, State Department of Land and Natural Resources for the occupancy of State lands;

4. If any unanticipated sites or remains of historic or prehistoric interest (such as shell, bone or charcoal deposits, human burials, rock or coral alignments, paving, or walls) are encountered during construction, the applicant shall stop work and contact the Historic Preservation Office at 548-7460 or 548-6408 immediately;

5. The applicant shall comply with all applicable Public Health Regulations;

6. A fire contingency plan, acceptable to the Division of Forestry and Wildlife, Department of Land and Natural Resources, shall be implemented during and after construction;

7. Any construction, alteration, moving, demolition and repair of any building or other improvement on lands within the Conservation District, authorized by the Board, shall be subject to the building and grading codes of the respective counties in which the lands are located; provided that prior to the commencement of any construction, alteration, or repair of any building or other improvement, four (4) copies each of the final location map, plans, and specifications shall be submitted to the Chairperson, or his authorized representative, for approval of which three (3) copies will be returned;

8. Any work or construction to be done on the land shall be initiated within one (1) year of the approval of such use, and all work and construction must be completed within three (3) years of the approval of such use. Failure to comply with this condition shall render this application null and void;

9. The applicant shall flag the terraces near Well Site #2 with a 30-foot buffer zone to avoid inadvertent damage to archaeological sites as a result of construction. The applicant shall also flag the retaining wall in the vicinity of Well Site #3 and inform the construction crew of its existence;

10. The applicant shall provide a water connection to facilitate movement of stream macrofauna over the dry portion of the stream in consultation with the Division of Aquatic Resources and the U.S. Fish and Wildlife Service;

11. The applicant shall monitor the wells during and after test pumping to avoid negative impact upon Waikolu Stream and the native Hawaiian macrofauna which inhabit the stream;
12. If monitoring indicates that the streamflow is negatively impacted by the test drilling, the applicant shall cease pumping at once;

13. Should the test wells prove successful, the applicant shall submit a new Conservation District Use Application and an Environmental Impact Statement for development of the wells;

14. If the wells prove unsatisfactory, the applicant shall seal them properly so as not to cause any detrimental effects to the ground water resources of the area; and

15. Other terms and conditions as prescribed by the Chairperson.

Respectfully submitted,

GAIL N. HARADA
Staff Planner

Attachments

Approved for Submittal:

WILLIAM W. PATY, Chairperson
Board of Land and Natural Resources
FIG. 5: SCHEMATIC MAP OF WELL SITE #2. NUMBERS DESIGNATE THE AGRICULTURAL TERRACES.

EXHIBIT B
FIG. 6: SCHEMATIC MAP OF WELL SITE #3.
PROSPECT SITE--WAIKOLO VALLEY WELLS

EXISTING STRUCTURES

CDUA no. 40 - 12/12/86 - 1988
APPLICANT Division of Water and Land Development
AGENT
TMK 6-1-01-2

NORTH

EXHIBIT D
United States Department of the Interior

IN REPLY REFER TO:
L7621 (PAAR)

June 13, 1986

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

Dear Mr. Tagamori:

Thank you for providing us with a copy of the draft Environmental Impact Assessment for the proposed project, Drilling Additional Wells, Waikolu Valley, Molokai.

As you know, Waikolu Valley is within the authorized boundary of Kalaupapa National Historical Park, all of which is on the National Register of Historic Places by virtue of its being a National Historic Landmark. We are sympathetic to the need to augment the water supply for the Molokai irrigation system. From a hydrologic standpoint, it makes good sense to tap this underground reservoir. However, in the absence of any supporting information, we are unable to determine if there will be any adverse impacts on biological or cultural resources.

Although not based on any biological surveys, it is our understanding that Waikolu Stream supports several native species of aquatic organisms, including Oopu, Hiihiwai, and opde. Also, substantial withdrawals from this aquifer, especially during drought periods, would eliminate or reduce stream flows for some undetermined distance downstream from the well sites.

Limited archeological surveys of Waikolu Valley above and below the existing wells have revealed a large number of sites, both prehistoric and historic. Therefore, if you have not already done so, we request that surveys be conducted by professional biologists and archeologists prior to any construction/drilling activity to identify and quantify impacts along with the necessary mitigative measures.
We would appreciate receiving copies of the results of these surveys. With this information in hand, together with your plans to avoid any adverse impacts to the greatest extent possible, we should have no objections to the project.

Sincerely,

Bryan Harry
Director, Pacific Area
State of Hawaii
Department of Land and Natural Resources
DIVISION OF AQUATIC RESOURCES

Survey of the Freshwater Aquatic Fauna in Waikolu Stream, Island of Molokai

INTRODUCTION

A survey of the aquatic macrofauna in the Waikolu Stream, Molokai was accomplished on September 3 and 24, 1986. The survey was conducted by the Division's Aquatic Biologists Dennis Shinno and William Puleloa, with assistance from Division Administrator Henry Sakuda on September 24.

OBJECTIVE

To assist the Division of Water and Land Development in obtaining quantitative and qualitative data on aquatic macrofauna for a proposed project to drill three new wells in Waikolu Valley.

PROCEDURES AND DESCRIPTION OF AREA

Surveys of the macrofauna were conducted by underwater snorkeling observations in consecutive pools and riffles following the course of the Waikolu Stream. Samples for identification purposes were collected with a net and by hand. The survey area was accessed through the 5-mile Waikolu Water Tunnel maintained by the Department.

Waikolu Stream (Figure 1) was surveyed from approximately 0.3 mile above the existing (upper) diversion dam to 0.5 mile downstream of the pump station dam, a distance of about 1.5 miles. This section of Waikolu Stream consisted of large boulders and a relatively steep gradient resulting in numerous small falls and pools. Visibility was good and maximum stream depth encountered was seven feet.

Stream flow from the upper reaches (Figure 2) is piped from the diversion dam into the Waikolu water tunnel. Although an intermittent trickling flow and some standing pools were observed for approximately 0.3 mile below the diversion dam (Figure 3), no stream flow or standing pool was found along the next 0.2 mile of stream (Figure 4). Stream flow resumed from a small tributary (Figure 5) entering the dry section about 0.2 mile upstream of the pump station dam. Below the pump station to the end of the survey area, a distance of about 0.5 mile, stream flow remained continuous (Figure 6).
Six faunal species were observed during the surveys and included:
1) native fishes (gobies), o'opu alamo'o (Lentipes concolor), o'opu nopili (Sicydium stimpsoni), and o'opu nakea (Awaous stamineus); 2) native atyid shrimp, opae kalaole (Atya bisulcata); 3) native mollusk, wi (Neritina granosa); and 4) introduced Tahitian prawn (Macrobrachium lar). The native stream fauna are diadromous, requiring exposure to salt/brackish water to complete their life cycles. In general terms, this means that these aquatic life: (1) grow to maturity in freshwater; (2) migrate down to and spawn near stream mouths (i.e. o'opu), and/or the eggs hatch and the larvae are swept out to sea; (3) have a period of larval development drifting in the ocean; and (4) the juveniles return to the stream mouths to migrate up into freshwater to grow, mature, and complete their life cycles.

The relative abundance and distribution of these species varied between sections of the stream within the survey area. Quantitative assessments of the o'opu alamo'o which has been suggested to be a "threatened" species by some scientists, were very high, ranging from 10 per pool to estimated counts of greater than 500 per pool.

In the stream section above the upper diversion dam, the o'opu alamo'o and opae kalaole were very abundant (probably many thousands). The o'opu nopili was fairly abundant and wi was present, but few in number. The o'opu alamo'o in this section were fairly large (larger than 2 inches in length and up to 6 inches), as compared to other sections of Waikolu Stream.

One portion of the stream's course below the upper diversion dam was dry. The two existing wells are located in this section. Two new wells are proposed for this area.

The third well is proposed to be located approximately 0.2 mile upstream of the pump station dam, in an area where stream flow was resumed from a small tributary flowing into the main stream bed. Comparatively large numbers of o'opu alamo'o (probably many thousands) and o'opu nopili were observed in this stream section. Only one o'opu nakea was sighted. The opae kalaole and wi were present, but few in number. Many of the o'opu alamo'o encountered in this section were less than 1-1/2 inches in length.

Aquatic fauna below the pump station dam was also highly diversified and abundant. High numbers and varied sizes of o'opu alamo'o, o'opu nopili and wi were observed. Large o'opu nakea (8-10 inches) and a few prawns were encountered in this section.

CONCLUSIONS

Waikolu Stream is a natural quality stream with abundant native Hawaiian freshwater macrofauna, including the o'opu alamo'o, o'opu nopili, o'opu nakea, opae kalaole, and wi.
The two existing wells and three additional proposed wells are located in the stream section between the two dams. There was stream flow above the upper diversion dam and below the pump station dam. The dry stream bed encountered between these dams interrupts water flow to the ocean which is vital to the diadromous movement of the native aquatic macrofauna present. The larger size o'opu and opae found above the upper diversion dam and the varied smaller sizes and species found below the lower pump station dam suggest inadequate stream flow to allow necessary movement to and from the ocean. Under normal conditions, all sizes of o'opu and opae should be present even above the upper diversion dam. A water connection over the dry section should be devised to provide passage of the freshwater organisms with additional surveys to monitor the system.
DATE: Oct. 7, 1994

TO: Lenore Nakama

COMPANY OR DEPARTMENT: DLNR

FROM: Paul Matsuo

SUBJECT: DRAFT: Waikolu Hydrologic Monitoring & Biological Study Project

FAX TRANSMITTAL

DATE: Oct. 7, 1994

TO: Lenore Nakama

COMPANY OR DEPARTMENT: DLNR

FROM: Paul Matsuo

SUBJECT: DRAFT: Waikolu Hydrologic Monitoring & Biological Study Project

TOTAL NUMBER OF PAGES (INCLUDING THIS PAGE): 4

TIME: 14:05

FAX NO.: (808) 973-9613

BRANCH: Comm. on Water Resource Mgt.

FAX NO.: (808) 973-9613


FAX NO.: (808) 973-9613

TOTAL NUMBER OF PAGES (INCLUDING THIS PAGE): 4

If you do not receive the total number of pages noted above and/or have problems with our transmission, please contact the sender at (808) 973-9473.
TO:  
Mr. Keith W. Ahue, Chairperson  
Commission on Water Resource Management  
Department of Land and Natural Resources  

SUBJECT: Waikolu Hydrologic Monitoring and Biological Study Project

October 7, 1994

As requested by your letter of September 15, 1994, the following plan of study is submitted for your approval:

1. Prepare and submit EA for pump and connecting pipeline for the two new wells (0855-05 and 0855-06).

2. Prepare and submit CDUA for the installation of the plate over Dam No. 1 intake.

3. Request allotment of $200,000 for the study project and to prepare necessary consultant selection document approvals (Deputy A.G., DARGS and others).

4. Comply with the new procurement interim rules on the Consultant Selection process. The Department only last month received delegation of authority to begin this process.

5. Develop the scope of the study and the request for proposal (a tentative draft is attached).

6. Publish the request for proposals and make the selection of the consultant.

7. Prepare/submit the following:
   a. Stream channel alteration permit
   b. Pump installation permits
Mr. Keith W. Ahue  
October 7, 1994  
Page 2

c. Amendment to interim instream use standard for Waikolu Stream, based on flow increase from the two 3" nipples and the return of the pump effluent (which is still not determined until the pumps can be installed and operating)


9. Identify and request the additional construction funds for both the pump installation and plate projects, which were escalated due to the delay in the project award. It is anticipated that there will be funds available in the project adjustment account; otherwise, another appropriation request will need to be introduced in the next legislature.

10. Begin all construction work and the monitoring work.

11. Final report on the biological studies and the hydrologic monitoring to be submitted for review and acceptance.

Our apologies for the late response, but allotment processing and the new procurement law were responsible for the delay. If there are any questions or if any further information is required, please call Mr. Paul T. Matsuo, Administrator of the Agricultural Resource Management Division, at 973-9473.

YUKIO KITAGAWA, Chairperson  
Board of Agriculture

Attachment

c: ARM Div.
REQUEST FOR PROPOSAL

SCOPE OF WORK

1. Record flows at following locations:
   - At Dam No. 1 overflow plate.
   - At 3-inch new pumps nipples.
   - Obtain the USGS stream gauge data (USGS 16406000).
   - At lower stream dam pump station.

2. Maintain and chart new wells pumpage, showing dates pumps operating, quantity pumped, duration of pumping and the rainfall during the period.

3. Rainfall readings on a daily or, if possible, on continuous recording chart over the study period. Also, compile any long-term rainfall records (historic) in order to determine the rainfall cycle pattern.

4. Record and document the stream water level or existence of pools in the stream bed over the reach of the new wells. Also, track and record the periods of drying of the stream beds from no- or low-rainfall periods.

5. Provide aquatic animal count of presence, any migration that occurs, the period when it occurs and the base population within the upper, lower and in the reach of the new wells.

6. Incorporate the data developed by Ann Brasher for her graduate work and provide concurrence on her data. Also available is data collected by the U. S. Corps of Engineers, a draft copy of which is attached and may be incorporated.

7. Conduct biological studies required to determine if aquatic animal habitats are affected by pumping and how their habitats are affected. Prepare mitigating measures to assure that the pumping of the new wells will not cause impact to these aquatic animals.

8. Prepare a draft report for review, and conduct a briefing or informational meeting to present the findings. Upon approval, prepare a final report together with supporting plans and maps of the area between the No. 1 dam and the diversion pump station.
Mr. Paul Matsuo  
Department of Agriculture  
Agricultural Resources Management Division  
1428 S. King Street  
Honolulu, HI 96814

Dear Mr. Matsuo:

Biological and Hydrological Monitoring Program  
Waikolu Valley, Island of Molokai

As you are aware, the water use permit that was approved for your existing use of Wells #22-#24 (Well Nos. 0855-01 to 03) at the January 12, 1994 meeting of the Commission on Water Resource Management (Commission) was conditioned on the submittal of a draft plan for a biological and hydrological monitoring program within ninety (90) days and implementation of the program by December 1995. As we are still not in receipt of the draft plan, which was due in mid-April 1994, we are inquiring as to the status of the draft plan.

We understand that you are currently preparing a Request for Proposal (RFP) to hire a consultant to conduct the biological and hydrological monitoring program for Waikolu Valley and that selection of the consultant will be made by January 1995. If the RFP is for both development and execution of the program, may we then expect a draft to be submitted sometime after January 1995?

Please notify us if this is the case and provide an approximate date by which a draft plan will be submitted to the Commission. For the record, you should also indicate the reasons for your late submittal. We request that you respond to this inquiry by September 30, 1994.

Sincerely,

RAE M. LOUI  
Deputy Director

LN:ss
Comission on Water Resource Management

FROM: RE 

TO: INIT: E. Hirano  
     E. Sakoda  
     Y. Shiroma  
     R. Hardy  
     G. Bauer  
     D. Higa  
     L. Nakama  
     S. Edmunds  
     (Last) X  

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

REMINDERS:  
     7/14/94  
     2 local guys go w/ ann.  
     "poaching"  
     deer calcasses found once  
     after Anne entered  
     until DOCARE can investigate  
     Paul wants to restrict  
     access.  

FOR YOUR:  
     R. LOUI  
     S. KOKUBUN  
     F. CHING  

DATE: 7/11  
FILE IN: 0855-01 to 040
July 6, 1994

Ms. Rae Louie, Deputy Director
Commission on Water Resource Management
Department of Land and Natural Resources
P. O. Box 621
Honolulu, HI 96809

Dear Rae,

In mid May I heard a rumor that members of Ann Brasher's water research team had been denied access to Waikolu through the tunnel because it was alleged that some poaching had occurred. I left for the mainland May 18 and returned June 1.

On Friday June 10 I was scheduled to take a member of the Hunting Test Group into Waikolu through the M.I.S. Tunnel. Tom Matayoshi, (MIS supervisor) had previously arranged with me when I was to pick up the key but on Wednesday the 8th he called and said that I had better call Matsuo as something had come up.

I called Paul Matsuo right away. He wasted little time with pleasantries and stated that he is "...not going to permit us to go through Molokai tunnel." He further stated that he "...has tried to cooperate with us..." but that I am "...causing him too much trouble." He closed by waving the threat that he once used before the Commission that "...if there is a drought we will run out of water and it will be your fault."

As you know Brasher's research project is structured to service pressure transducers monthly, perform microhabitat studies that last 3 to 4 days twice in the remaining time allocated, and flume studies. The cost of these elements was predicated on vehicular access through the tunnel. If the research team has no access through the tunnel we estimate that a total of about 20 hours of contract helicopter time will be required to transport research personnel and equipment in and out. A second scenario is that the time required to complete the field portions of the work will be extended by some amount. It is very difficult to estimate how much longer it will take to perform the work if it is all approached afoot from below after flying in from topside. There is added cost also in the flight from topside to Kalauapapa.

I have instructed Brasher to fly in and out from this time forward. I have withdrawn the National Park Service's helicopter support for the Molokai Hunting Test program for the remainder of
our fiscal year to cover the increase in water research requirements. It is clearly a "rob Peter to pay Paul" situation, but there is absolutely no question in anyone's mind in our shop that the water research is top priority.

If your office could prevail on Mr. Matsuo for a less expensive solution to this situation we would be indebted.

Yours very truly,

Peter Thompson
Superintendent
June 29, 1994

TO: Mr. Manabu Tagomori, Manager-Chief Engineer
Division of Water and Land Development
Department of Land and Natural Resources

FROM: Paul T. Matsuo, Administrator-Chief Engineer
Agricultural Resource Management Division

SUBJECT: Waikolu Valley Biological Monitoring Project

We respectfully request your assistance in carrying out the conditions of our water use permit (copy attached). The Governor signed SB 2272 which authorizes the study, together with $200,000 of special funds. A copy of Act 159, SLH 1994, is also attached.

The first phase before actual monitoring can begin is to submit the following applications:

(a) Stream channel alteration permit. This is to install the plate over Dam No. 1 which will allow a steady water flow over the dam. This project is already awarded as Job No. 3-9W-J.

(b) Pump installation permit for Well Nos. 5 and 6, and modifications to the connecting pipeline in order that effluent from pumping will re-enter the stream and not be used by the Molokai Irrigation System. This project already has been awarded as Job No. 3-9W-Ji.

(c) Amendment to the interim instream use standard. This is to increase streamflow from the flow by the 3-inch effluent pipe when the new wells are being pumped.

In the interim, we will prepare a Request for Proposal (RFP) to hire a consultant to conduct the biological monitoring program. Close coordination will be required during this period when the RFP is being developed. Please provide the name of your staff who will be handling the permit applications.
Also, we are scheduling the following:

- Permits and clearance by December 1994.
- Installation of plate and pumps completed by March 1995.
- Consultant selected and on board by January 1995.
- Begin biological monitoring by the beginning of the rainy season of 1995. As the water use permit specifies, the project must start by December 1995.

Please let me know if the above timetable cannot be met, as we would need to request an extension from the Water Commission.

Attachments
PERMIT CONDITIONS APPROVED AT THE 1/12/94
COMMISSION ON WATER RESOURCE MANAGEMENT MEETING

1. That the Commission approve the issuance of an interim water use permit to the State Department of Agriculture, Agriculture Resource Management Division, for the reasonable and beneficial use of 744,000 gallons per day subject to the standard water use permit conditions listed in Attachment B and the following special conditions:

a. The applicant may continue the use of ground water within the limits approved by the Commission, and any delay in receipt of the actual permit document shall not be a reason to interrupt the approved level of use.

b. That the applicant implement, by December 31, 1995, a biological and hydrologic 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 (Wells 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 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.

2. That the Commission defer existing uses in excess of 744,000 gallons per day pending the submittal of a petition to amend the interim instream flow standard for Waikolu Stream to allow for:

a. An increase in pumpage of 169,000 gallons per day to meet the current 12-month moving average withdrawal of 855,000 gallons per day.

b. The return of pumped ground water to Waikolu Stream via 3-inch bypass nipples on Wells #5 & #6 (which is part of the 855,000 gpd). It is further recommended that the Commission give favorable consideration to this proposed amendment of the interim instream flow standard for Waikolu Stream for the following reasons:

(1) To maintain a consistent hydrologic base for the duration of Anne Brasher's data collection effort, thereby avoiding the introduction of additional factors and uncertainties.
(2) To avoid the economic hardship to existing MIS users that may result from constraints in the reservoir water supply, particularly during extended dry periods.

(3) The increase in pumpage required to meet the existing demand is very small relative to the total diversion from the watershed.

3. That the Commission deny without prejudice future uses over 853,000 gallons per day from Wells #22-#24 & #4-#6 (Wells Nos. 0855-01 to 03 & 0855-06, 03, & 04) pending the results of the monitoring program and any further studies.

4. Reconvene Molokai Working Group to review recommendations regarding Wells #22-#24, #4, #5, and #6.

5. That the Commission deny the request for a contested case.
June 29, 1994

TO: Mr. Manabu Tagomori, Manager-Chief Engineer
Division of Water and Land Development
Department of Land and Natural Resources

FROM: Paul T. Matsuo, Administrator-Chief Engineer
Agricultural Resource Management Division

SUBJECT: Waikolu Valley Biological Monitoring Project

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(b) Pump installation permit for Well Nos. 5 and 6, and modifications to the connecting pipeline in order that effluent from pumping will re-enter the stream and not be used by the Molokai Irrigation System. This project already has been awarded as Job No. 3-9W-J1.

(c) Amendment to the interim instream use standard. This is to increase streamflow from the flow by the 3-inch effluent pipe when the new wells are being pumped.

In the interim, we will prepare a Request for Proposal (RFP) to hire a consultant to conduct the biological monitoring program. Close coordination will be required during this period when the RFP is being developed. Please provide the name of your staff who will be handling the permit applications.
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Attachments
ATTACHMENT 1

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a. The applicant may continue the use of ground water within the limits approved by the Commission, and any delay in receipt of the actual permit document shall not be a reason to interrupt the approved level of use.

b. That the applicant implement, by December 31, 1995, a biological and hydrologic 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 (Wells 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 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.

2. That the Commission defer existing uses in excess of 744,000 gallons per day pending the submittal of a petition to amend the interim instream flow standard for Waikolu Stream to allow for:

a. An increase in pumpage of 109,000 gallons per day to meet the current 12-month moving average withdrawal of 853,000 gallons per day.

b. The return of pumped ground water to Waikolu Stream via 3-inch bypass nipples on Wells #5 & #6 (which is part of the 853,000 gpd). It is further recommended that the Commission give favorable consideration to this proposed amendment of the interim instream flow standard for Waikolu Stream for the following reasons:

(1) To maintain a consistent hydrologic base for the duration of Anne Brasher's data collection effort, thereby avoiding the introduction of additional factors and uncertainties.
(2) To avoid the economic hardship to existing MIS users that may result from constraints in the reservoir water supply, particularly during extended dry periods.

(3) The increase in pumpage required to meet the existing demand is very small relative to the total diversion from the watershed.

3. That the Commission deny without prejudice future uses over 853,000 gallons per day from Wells #22-#24 & #4-#6 (Wells Nos. 0855-01 to 03 & 0855-06, 05, & 04) pending the results of the monitoring program and any further studies.

4. Reconvene Molokai Working Group to review recommendations regarding Wells #22-#24, #4, #5, and #6.

5. That the Commission deny the request for a contested case.
1 SECTION 2. The sum appropriated shall be expended by the department of agriculture for the purposes of this Act.

2

3 SECTION 3. This Act shall take effect on July 1, 1994.

APPROVED BY THE GOVERNOR ON
JUN 9 1994
BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF HAWAII:

SECTION 1. There is appropriated out of the irrigation system revolving fund of the State of Hawaii the sum of $200,000, or so much thereof as may be necessary for fiscal year 1994-1995, for the implementation of a biological and hydrologic monitoring program for the Molokai irrigation system. The program shall:

(1) Last for a minimum of one year;
(2) Document the existing operating procedures of the Molokai irrigation system;
(3) Identify the impacts of all operating alternatives on Waikolu stream;
(4) Evaluate the effectiveness of diversion weir modifications; and
(5) Test the effects that the pumping of three new wells have on the stream ecosystem.

The specified sum shall be in addition to the operating appropriation made for agricultural resource management (AGR 141) by Act 283, Session Laws of Hawaii 1993.
Cooperate w/Commission's initiative
(in lieu of jointly develop alt. non-potable same plan)

- Race to schedule intgr. w/developers next Thurs.
  
  Get list/table of proposed alternatives from each developer.
TO: Honorable Dwight Y. Takamine, Chair  
Committee on Water and Land Use Planning (WLP)  
FROM: Rae M. Loui, Deputy Director  
SUBJECT: Waikolu Well Development Project

Dona Hanaike asked me to write this in response to questions raised at the hearing held on Tuesday, March 22, 1994, regarding an appropriation for the Waikolu Well Development Project. I'll try to describe the major points regarding the water use permit conditions below. I have attached three items to provide you with further detail: 1) the water use permit conditions approved by the Commission on Water Resource Management (CWRM) on January 12, 1994, 2) the staff submittal for that meeting, and 3) a portion of the minutes for that meeting.

1. The CWRM awards water use permits on a 12-month moving average basis. This means that water use can be higher (such as during drought times) or lower during the year.

2. The CWRM is first awarding water use permits for EXISTING USES, then will entertain applications for NEW USES.

3. The actual average usage for the pumps from Waikolu as of November, 1993 is 0.853 mgd. The average usage as of the date of interim instream standard adoption (1989) is 0.744 mgd.

4. By rule, the CWRM cannot approve usage above 0.744 mgd without first amending the interim instream standard. Dept. of Ag (DOA) still has not submitted a petition to amend the interim instream standard.

5. The purpose of the biological study is to determine how pumping affects streamflow so that DOA can have info to justify (or not justify) increases in pumpage above 0.853 mgd, or perhaps expand to Pelekunu and Wailau.
6. There are ways to shortcut the one-year study by utilizing work conducted by National Park Service (Ann Brasher). But at this point no one is clear what she's doing and what data has been collected.

7. DOA does not know what the Waikolu pump operational procedures are. Water supply limitations, current and future, are not necessarily due to limits on pumping the wells. For example, I believe it is probable that operating improvements (such as pumping during the rainy season to fill up the reservoir) could improve the water supply situation.

I hope this helps. Call me if you want to discuss this (587-0214).
PERMIT CONDITIONS APPROVED AT THE 1/12/94
COMMISSION ON WATER RESOURCE MANAGEMENT MEETING

1. That the Commission approve the issuance of an interim water use permit to the State Department of Agriculture, Agriculture Resource Management Division, for the reasonable and beneficial use of 744,000 gallons per day subject to the standard water use permit conditions listed in Attachment B and the following special conditions:

   a. The applicant may continue the use of ground water within the limits approved by the Commission, and any delay in receipt of the actual permit document shall not be a reason to interrupt the approved level of use.

   b. That the applicant implement, by December 31, 1995, a biological and hydrologic 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 (Wells 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 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.

2. That the Commission defer existing uses in excess of 744,000 gallons per day pending the submittal of a petition to amend the interim instream flow standard for Waikolu Stream to allow for:

   a. An increase in pumpage of 109,000 gallons per day to meet the current 12-month moving average withdrawal of 853,000 gallons per day.

   b. The return of pumped ground water to Waikolu Stream via 3-inch bypass nipples on Wells #5 & #6 (which is part of the 853,000 gpd). It is further recommended that the Commission give favorable consideration to this proposed amendment of the interim instream flow standard for Waikolu Stream for the following reasons:

      (1) To maintain a consistent hydrologic base for the duration of Anne Brasher's data collection effort, thereby avoiding the introduction of additional factors and uncertainties.
(2) To avoid the economic hardship to existing MIS users that may result from constraints in the reservoir water supply, particularly during extended dry periods.

(3) The increase in pumpage required to meet the existing demand is very small relative to the total diversion from the watershed.

3. That the Commission deny without prejudice future uses over 853,000 gallons per day from Wells #22-#24 & #4-#6 (Wells Nos. 0855-01 to 03 & 0855-06, 05, & 04) pending the results of the monitoring program and any further studies.

4. Reconvene Molokai Working Group to review recommendations regarding Wells #22-#24, #4, #5, and #6.

5. That the Commission deny the request for a contested case.
Chairperson and Members
Commission on Water Resource Management
State of Hawaii
Honolulu, Hawaii

Gentlemen:

RESUBMITTAL
State of Hawaii, Dept. of Agriculture
Agriculture Resource Management Division
Application for a Water Use Permit
Wells #22-#24 & #6-#4 (Well Nos. 0855-01 to 06)
Waikolu Ground Water Management Area, Molokai

Applicant: State of Hawaii, Dept. of Agriculture
Agriculture Resource Management Division
P.O. Box 205
Hoolehua, HI 96829

Landowner: Same

Background

This application for a water use permit was filed with the Commission on March 19, 1993 and completed by the applicant on June 8, 1993. This is the only permit application that has been filed to date for the Waikolu Aquifer System. Specific information regarding the source, use, notification, objections, and field investigation(s) are described in Attachment A and the attached exhibits.

On September 15, 1993, the Commission deferred action on the application and directed staff to initiate public hearing proceedings in response to objections filed by the Division of Aquatic Resources (DAR) and the National Park Service (NPS). The following analysis of the proposed water use has been made in light of verbal and written testimony gathered at the November 17, 1993 public hearing on Molokai.

Analysis & Issues

The application is for a total use of 3.36 million gallons per day (mgd) of potable water from the Waikolu Aquifer System from six existing sources located adjacent to Waikolu Stream (Exhibit 1). The water will be diverted to the 1.4 billion gallon Kualapuu Reservoir for agricultural irrigation use within the existing Molokai Irrigation System (MIS) service area. The water will be used to irrigate approximately 2,000 acres of agricultural land in Hoolehua via 203 service connections. The Dept. of Hawaiian Home Lands (DHHI) has priority usage of two-thirds of the established 7.5 mgd capacity of the existing MIS. Most of the water delivered to the reservoir is derived from surface water diversion sources in Waikolu Valley (Exhibit 2). Wells #4-#6 are new wells that have not been active to date. Wells #22-#24 have been used for the past 23 years to support the MIS. The applicant proposes to rotate operation of the six wells to allow greater recovery time for the dike-compartment tapped by the wells. The wells will be pumped primarily during the summer months to augment the supply of water stored in the reservoir.

The major issue regarding the proposed water use is the effect of ground water withdrawals on Waikolu Stream. The Division of Aquatic Resources (DAR) and the National Park Service (NPS) have objected to the proposed permit and commented that
existing diversions of surface and ground waters has dewatered a middle section of Waikolu Stream between the upper diversion at approximately 1,100 feet and a lower diversion at 730 feet. The concern is that any increase in pumping will result in further degradation of Waikolu Stream, which supports a notably large population of native fish species and macroinvertebrates. Restoration of the flow through the dewatered section is being addressed by conditions of the Conservation District Use Permit for the three new wells.

There appears to be general agreement that existing uses by homesteaders and non-DHHL users should continue. The applicant estimates the existing use from Wells #22-#24 is about 1.5 to 2.0 mdg. The Final Report from the Molokai Working Group (MWG) estimates the existing use is 1.13 mdg. From Exhibit 3, the 12-month moving average withdrawal was about 1.13 mdg for one period in 1991, but has been less than 0.9 mdg since 1986. The current 12-month moving average withdrawal of 0.853 mdg as of November 1993 appears to be a more reasonable estimate of actual needs.

Previous hydrologic studies have indicated that a large fraction of the ground water is discharged to Waikolu Stream and that a direct relationship may exist between ground water withdrawals and streamflow. This has prompted a recommendation from the MWG that a developable yield of 0.00 mdg be used for long-range water planning and management of the aquifer, although a sustainable yield of 5.0 mdg has been formally adopted by the Commission. Therefore, the interim instream flow standard for Waikolu Stream may be an issue.

The interim instream flow standard for Molokai streams, effective as of October 8, 1988, is "...that amount of water flowing in each stream on the effective date of this standard, and as that flow may naturally vary throughout the year and from year to year without further amounts of water being diverted offstream through new or expanded diversions, and under the stream conditions existing on the effective date of the standard...". Assuming a one-to-one relationship between ground and surface waters exists in the Waikolu Valley, an increase in usage above that experienced in 1988 should address potential effects on Waikolu Stream. This may be accomplished by a petition to amend the interim instream flow standard or the establishment of a permanent standard. The 12-month moving average withdrawal as of the effective date of the standard is about 0.744 mdg, which is relatively close to the existing use estimate of 0.853 mdg; differences in streamflow resulting from an increase in pumpage of 0.109 mdg are most likely unmeasurable. Further, average withdrawals from the system have been higher for previous periods. However, the most conservative approach would be to assume that average withdrawals exceeding 0.744 mdg are subject to an amendment of the interim instream flow standard for Waikolu Stream.

A final issue regarding the existing use portion of the total request is whether the new wells can be used to meet current needs. The applicant proposes to incorporate the three new wells, Wells #4-#6, to support future operations of the MIS. In most cases, distributing the pumpage over a larger area reduces the overall stress on the system and should be encouraged by the Commission. Use of additional sources to withdraw an equal amount of water should minimize any effects on ground water contributions to streamflow. However, concern has been expressed by members of the community that use of the new wells, even within the limits of the existing use, will result in further adverse impacts to Waikolu Stream. A contested case hearing has been requested if the new wells are approved for production purposes. The Office of the Attorney General has advised that the petitioner lacks proper standing to be admitted as a party in a contested case hearing. However, staff has attempted to address the concerns raised in the petition through the conditions within the staff recommendation.

There appears to be a justifiable need for further study and assessment of the resource, particularly in light of the proposed future expansion of the MIS, the provisions for DHHL water needs in the Hawaiian Homes Act and the State Water Code, and the
Chairperson and Members  
Commission on Water Resource Management  
January 12, 1994

need to protect Waikolu Stream. As the largest user of water from this system, the DOA should be encouraged to address the need for baseline data and for an operating plan for these six existing sources that minimizes impact to the stream. Future uses should be denied until a study is completed that seeks to address the impact of operating alternatives on Waikolu Stream.

RECOMMENDATION

Staff recommends:

1. That the Commission approve the issuance of an interim water use permit to the State Department of Agriculture, Agriculture Resource Management Division, for the reasonable and beneficial use of 744,000 gallons per day of potable water for agricultural irrigation use by the Molokai Irrigation System from Wells #22-#24 (Well Nos. 0855-01 to 03), subject to the standard water use permit conditions listed in Attachment B and the following special conditions:

   a. The applicant may continue the use of ground water within the limits approved by the Commission, and any delay in receipt of the actual permit document shall not be a reason to interrupt the approved level of use.

   b. Implementation of a two-year biological and hydrologic monitoring program that seeks to identify the impacts of pump operating alternatives on Waikolu Stream and 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. Further, semi-annual reports summarizing data and preliminary findings shall be submitted to the Commission. It is suggested that the Dept. of Agriculture work with the State Division of Aquatic Resources, National Park Service, and U.S. Fish & Wildlife Service 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 NPS study by Anne Brasher. A draft of this plan shall be submitted to 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 the future use of the wells, and shall be made readily available to all interested parties.

2. That the Commission deny without prejudice future uses from Wells #22-#24 & #4-#6 (Well Nos. 0855-01 to 03 & 0855-06,05,&04) pending further studies.

Respectfully submitted,

RAE M. LOUI  
Deputy Director

Attach.

APPROVED FOR SUBMITTAL:

KEITH W. AHUE, Chairperson
ATTACHMENT 1

PERMIT CONDITIONS APPROVED AT THE 1/12/94
COMMISSION ON WATER RESOURCE MANAGEMENT MEETING

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(1) To maintain a consistent hydrologic base for the duration of Anne Brasher's data collection effort, thereby avoiding the introduction of additional factors and uncertainties.
PARTIAL SCHEMATIC OF THE
MOLOKAI IRRIGATION SYSTEM

Figure 2
Ms. Lenora Nakama  
Commission on Water Resource Management  
Department of Land and Natural Resources  
P.O. Box 621  
Honolulu, Hawaii  96809

Dear Lenora:

Enclosed is a study plan for the physiographic and biological assessment of Waikolu and Pelekunu Streams on the Island of Moloka'i. This should give you a general idea of our research program and the types of studies we are conducting. Additional collaborative studies are also in preparation. Results of the studies will be published in peer reviewed scientific journals. We will also be preparing technical reports for The National Park Service, and the data will be part of my PhD dissertation at the University of California at Davis. I have given several talks about different aspects of our research at scientific meetings, and will continue to present papers at national scientific meetings. During March and April I will be preparing a status report for The National Park Service which will summarize our studies to date and provide research plans for the remainder of the project. Please feel free to give me a call if you have any questions.  572-0591

Sincerely,

Anne Brasher

cc:  B.Devick  
J.Hughes  
B. Kinzie  
R. Loui  
P. Moyle  
C. Smith  
P. Thompson  
A. Yuen
STUDY PLAN FOR THE PHYSIOGRAPHIC AND BIOLOGICAL ASSESSMENT OF WAIKOLU AND PELEKUNU STREAMS ON THE ISLAND OF MOLOKA'I

Prepared by Anne M. Brasher

INTRODUCTION

The native Hawaiian freshwater fish fauna of Waikolu and Pelekunu Streams consists of three endemic gobies; Awaous stamineus ('o'opu nakea), Lentipes concolor ('o'opu alamo'o), and Sicyopterus stimpsoni ('o'opu nopili), and an endemic eleotrid Eleotris sandwicensis ('o'opu akupa). Native crustaceans include the mountain shrimp Atyoida bisulcata ('opae kala'ole) and an estuarine species Macrobrachium grandimanus ('opae oeha'a). A native gastropod, the limpet-like Neritina granosa (hihiwai) and other endemic snails in the families Thiaridae and Lymnaeidae are also present.

The proposed studies will focus on hydrologic and biological data and their interrelationships in Waikolu Stream and Pelekunu Stream. Methods for long term monitoring will be established and baseline data collected. Studies at the community level and the population level will be conducted to improve our understanding of the ecological requirements of the fishes and macroinvertebrates. Results from these studies will describe the role of biotic and abiotic factors (including random recruitment) in structuring assemblages of Hawaiian stream fish and macroinvertebrates and allow us to test some basic ecological principles concerning community structure.

Biological Studies

Population monitoring of 'o'opu and hihiwai from the mouth to the headwaters. Information on longitudinal distribution, abundance, population structure, growth and recruitment will be obtained. Data will be collected over a two year period to provide baseline population density estimates and information on the stability of species abundance and composition over time. The data will be used for future monitoring of Waikolu Stream and for comparison with other Hawaiian streams where similar data is being collected.
Hihiwai tagging. During phase one, 1000 hihiwai (size 12 to 16 mm) will be tagged with individual numbers and released. Hihiwai will be recaptured at varying intervals over the following fourteen months, and growth will be measured and movement along the stream channel (distance from previous recapture) will be determined. During phase two, 1000 additional hihiwai (size 9 to 11 mm) will be tagged and released. Again, growth and movement will be recorded.

Microhabitat and macrohabitat use by 'o'opu, hihiwai and 'opae. Habitat availability will be determined by sampling randomly chosen locations. Habitat preference will be determined by comparing available habitat with habitat actually used. Four types of comparisons will be made: 1) frequency of utilization of habitat parameters relative to habitat availability, 2) comparison of habitat use between species, 3) habitat use dependent on species composition and 4) habitat use in different streams.

A survey of aquatic insects will be conducted at intervals throughout the study. Benthic and drift samples will be collected and analyzed. Relative abundance, longitudinal distribution, and habitat use will be determined.

Analysis of diel water chemistry cycles. As part of the biological monitoring program, water chemistry will be analyzed using portable water quality test kits, and diel cycles and seasonal variability will be described. Parameters to be measured include dissolved oxygen concentration, pH, phosphate, nitrogen, hardness, alkalinity, conductivity, and temperature.

Hydrological Studies

Hydrologic data is currently being collected by the U.S. Geological Survey (USGS) at one site on Waikolu Stream, located between the upper and lower diversions. In addition, two data collection sites using pressure transducers have been established above the upper diversion and below the lower diversion. Hydrologic data will be collected in Pelekunu basin on Kawaihui Stream at a discontinued USGS station. Data will also be used from several other discontinued and currently operating USGS gaging stations near the study sites to determine the hydrological characteristics of the area. Discharge
measurements are also being collected at a number of sites using standard methods to develop stage-discharge relationships.

Precipitation data will be gathered at three locations within Waikolu Basin. Two stations are currently operating and an additional gage will be installed. A precipitation gage will also be installed in Pelekunu Basin. The data gathered from these stations will be used to determine the similarities and differences of precipitation between basins and to estimate the precipitation gradient from sea level to the pali.

Impacts of hydrological characteristics on biological parameters will be evaluated. An analysis will be made of the relationship of specific hydrologic variables such as stream discharge, water depth, flow velocity, and water temperature to biological attributes of the native stream species.

Flume studies. Laboratory and streamside flume studies will be conducted. Drag coefficients will be calculated for different species and size classes of 'o'opu. Physiological and behavioral responses to various flow regimes will be analyzed.
Table 2.--List of selected wells and available period of record of ground-water pumpage, water-level, and chloride data

(*, observation well; --, no data)

<table>
<thead>
<tr>
<th>Well</th>
<th>Pumpage Period</th>
<th>Number of record years</th>
<th>Water-level Period</th>
<th>Number of record years</th>
<th>Chloride Period</th>
<th>Number of record years</th>
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<tr>
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<td>31</td>
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<td>--</td>
<td>1976-present</td>
<td>16</td>
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<tr>
<td>0855-02</td>
<td>1961-present</td>
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<td>1979-present</td>
<td>13</td>
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<tr>
<td>0855-03</td>
<td>1961-present</td>
<td>31</td>
<td>--</td>
<td>--</td>
<td>1991-present</td>
<td>1</td>
</tr>
<tr>
<td>Kualapuu area</td>
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<tr>
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<td>1979-present</td>
<td>13</td>
</tr>
<tr>
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<td>0805-01*</td>
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<td>1938-46</td>
<td>8</td>
<td>1938-49</td>
<td>11</td>
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<td>South shore of East Molokai</td>
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<td>0648-02*</td>
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<td>1956-present 38</td>
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<td>1967-77</td>
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Table 3.--Pumping rates of wells in Waikolu Valley, Kualapuu area and along the south shore of East Molokai

[gal/min, gallons per minute; Mgal/d, million gallons per day; --, no data]

<table>
<thead>
<tr>
<th>Well</th>
<th>Pumping Rate (gal/min)</th>
<th>24-hr pumping capacity (Mgal/d)</th>
<th>July 1991 mean pumping capacity (Mgal/d)</th>
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</tr>
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<td>0855-01</td>
<td>1000*</td>
<td>1.44</td>
<td>0.49**</td>
</tr>
<tr>
<td>0855-02</td>
<td>1000*</td>
<td>1.44</td>
<td>0.48**</td>
</tr>
<tr>
<td>0855-03</td>
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<td>0.48**</td>
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<tr>
<td>Total</td>
<td>4.32</td>
<td>1.44</td>
<td>1.44</td>
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<tr>
<td>Kualapuu area</td>
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<td>0.55</td>
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<td>0801-07</td>
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<td>75*</td>
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<td>--</td>
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<tr>
<td>0456-09</td>
<td>75*</td>
<td>0.11</td>
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<td>0457-01</td>
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<tr>
<td>Total</td>
<td>2.71</td>
<td>0.94</td>
<td>0.33</td>
</tr>
</tbody>
</table>

* Indicates rated pump capacity; ** Indicates value is estimated from rated pump capacity and the number of hours pump was in use.
Figure 10a. Annual mean pumpage from selected wells.
Figure 10b. Monthly and annual mean pumpage from well 0901-01.

Figure 10c. Monthly and annual mean pumpage from well 0902-01.
Figure 12a. Monthly and annual mean water level from pumping well 0901-01.

Figure 12b. Monthly and annual mean water level from pumping well 0902-01.
Figure 10d. Monthly and annual mean pumpage from well 0801-01.

Figure 10e. Monthly and annual mean pumpage from well 0801-02.
Figure 11. Water levels from selected wells, 1938-92 (refer to table 3 for well characteristics and dates).
Table 4.--Well characteristics and water-level data from selected wells

<table>
<thead>
<tr>
<th>State</th>
<th>Local</th>
<th>Well characteristics</th>
<th>Water level</th>
<th>Date measured</th>
<th>Owner</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Top of casing</td>
<td>Bottom of hole</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maui Valley</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0855-01</td>
<td>W22</td>
<td>992</td>
<td>502</td>
<td>989</td>
<td>06-29-61</td>
</tr>
<tr>
<td>0855-02</td>
<td>W23</td>
<td>904</td>
<td>604</td>
<td>864</td>
<td>04-03-61</td>
</tr>
<tr>
<td>0855-03</td>
<td>W23</td>
<td>965</td>
<td>685</td>
<td>947</td>
<td>07-10-61</td>
</tr>
<tr>
<td>Kula area</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0700-01</td>
<td>W18</td>
<td>982</td>
<td>-101</td>
<td>6.1</td>
<td>06-23-82</td>
</tr>
<tr>
<td>0801-01</td>
<td>W16</td>
<td>1005</td>
<td>-90</td>
<td>10.7</td>
<td>03-11-49</td>
</tr>
<tr>
<td>0801-02</td>
<td>W16B</td>
<td>1011</td>
<td>-89</td>
<td>7.8</td>
<td>07-23-79</td>
</tr>
<tr>
<td>0801-03</td>
<td></td>
<td>1037</td>
<td>-99</td>
<td>11.7</td>
<td>07-27-87</td>
</tr>
<tr>
<td>0807-01</td>
<td></td>
<td>348</td>
<td>-47</td>
<td>3.0</td>
<td>11-03-75</td>
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<tr>
<td>0901-01</td>
<td>W17</td>
<td>981</td>
<td>-83</td>
<td>10.4</td>
<td>12-01-50</td>
</tr>
<tr>
<td>0902-01</td>
<td>W15</td>
<td>888</td>
<td>-78</td>
<td>10.5</td>
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</tr>
<tr>
<td>0905-01</td>
<td>T1</td>
<td>398</td>
<td>-17</td>
<td>5.0</td>
<td>11-15-38</td>
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<tr>
<td>South shore of East Molokai</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>0352-01</td>
<td>D42</td>
<td>43</td>
<td>3</td>
<td>4.7</td>
<td>03-23-57</td>
</tr>
<tr>
<td>0352-05</td>
<td>W31</td>
<td>213</td>
<td>-27</td>
<td>5.0</td>
<td>11-27-61</td>
</tr>
<tr>
<td>0449-01</td>
<td>S8</td>
<td>21</td>
<td>-2</td>
<td>4.5</td>
<td>10-21-91</td>
</tr>
<tr>
<td>0457-01</td>
<td>S4</td>
<td>37</td>
<td>-2</td>
<td>3.8</td>
<td>04-17-89</td>
</tr>
<tr>
<td>0501-04</td>
<td>S1</td>
<td>28</td>
<td>1</td>
<td>1.8</td>
<td>04-26-90</td>
</tr>
<tr>
<td>0501-05</td>
<td>T4</td>
<td>16</td>
<td>-6</td>
<td>2.5</td>
<td>11-12-53</td>
</tr>
<tr>
<td>0559-01</td>
<td>W19</td>
<td>273</td>
<td>-14</td>
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<td>07-03-67</td>
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<tr>
<td>0600-01</td>
<td>T2</td>
<td>314</td>
<td>-10</td>
<td>8.9</td>
<td>09-27-39</td>
</tr>
<tr>
<td>0601-01</td>
<td>W11</td>
<td>32</td>
<td>-8</td>
<td>2.5</td>
<td>09-08-86</td>
</tr>
<tr>
<td>0603-01</td>
<td>D14</td>
<td>18</td>
<td>-1</td>
<td>2.4</td>
<td>01-29-75</td>
</tr>
</tbody>
</table>
Figure 12c. Monthly and annual mean water level from observation well 0700-01.

Figure 12d. Monthly and annual mean water level from observation well 0905-01.
Figure 13e. Monthly and annual mean chloride concentration of water from pumping well 0801-01.

Figure 13f. Monthly and annual mean chloride concentration of water from pumping well 0801-02.
Figure 13c. Monthly and annual mean chloride concentration of water from pumping well 0901-01.

Figure 13h. Monthly and annual mean chloride concentration of water from pumping well 0902-01.
·- RESOWCE
. AGRICULTURAL

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Molokai Irrigation System

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Summary FY93

Summary FY93

Month

Water Sold
(Gallons)

Acreage
Served

Assessment
Charges

Water
Charges

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Month

278
278
278
278
280
280

$625.50
625.50
625.50
625.50
630.00
630.00

$4,720.48
5,139.68
3,360.96
4,363.52
2,614.40
1,524.96

280
280
280
280
280
2110

630.00
630.00
630.00
630.00
630.00
630.00

1,606.88
2,887.84
3,824.00
4,286.08
4,185.60
4,354.72

$7,542.00

$42,869.12

88,915,000
20,681,440
47,591,000
33,723,000
40,354,000
33,488,000

1,680
1,680
1,680
1,680
1,680
1,680

$1,848.00
1,848.00
1,848.00
1,848.00
1,848.00
1,848.00

$14,226.40
3,309.03
7,614.56
5,395.68
6.456.64
5,358.08

January
February
March
April
May
June

30,389,000
31,708,000
59,321,000
57,257,000
74,105,009
131,282,004

1,680
1,679
1,679
1,679
1,691
1,686

1,848.00
1,846.90
1,846.90
1,846.90
1,860.10
1,854.60

4,862.24
5,073.28
9,491.36
9161.12
11,856.80
21,005.12

January
February
March
April
May
June

10,043,000
18,049,000
23,900,000
26,788,000
26,160,000
27,217,000

Subtotal

648,814,453

20,174

$22,191.40 $103,810.31

Subtotal

267,932,000

Water
Charges

1993

NON-HOMESTEADERS

HAWAIIAN HOMES

1992

1992
73,020,000
78,625,000
58,351,000
46,379,000
65,243,000
64,293,000

10,764
10,764
10,764
10,801
10,764
10,801

$11,840.33
11,840.40
11,840.40
11,881.10
11,840.40
11,881.10

$11,683.20
12,580.00
9,336.16
7,420.64
10,438.88
10,286.88

January
February
March
April
May
June

41,503,000
58,404,000
77 ,856,000
102,339,000
80,001,000
60,634,000

10,851
10,741
10,741
10,741
10,851
10,901

11,936.10
11,815.10
11,815.10
11,815,10
11,936.10
11,991.10

6,640.48
9,344.64
12,456.96
16,374.24
12,800.16
9,701.44

Subtotal

806,648,000 129,484 $142,432.33 $129,063.68

TOTAL

1,455,462,453 149,658 $164,623.73 $232,873.99

July
August
September
October
November
December

~ ~

29,503,000
32,123,000
21,006,000
27,272,000
16,340,000
9,531,000

LALAMILO SECTION

1992

1993

1

Assessment
Charges

HAWAIIAN HOMESTEADERS (Hawaiian Home Lands)

July
August
September
October
November
December

,,' C

Acreage
Served

Water Sold
(Gallons)

1992
July
August
September
October
November
December

'

1993

1.108,000
940,000
565,000
1,763,000
652,000
545,000

97
97
97
97
97
97

$218.25
218.25
218.25
218.25
218.25
218.25

$177.28
150.40
90.40
282.08
104.32
87.20

January
February
March
April
May
June

752,000
1,496,000
1,012,000
975,000
810,000
940,000

97
97
97
100
100
100

218.25
218.25
218.25
225.00
225.00
225.00

120.32
239.36
161.92
156.00
129.60
150.40

Subtotal

11,558,000

$2,639.25

$1,849.28

July
August
September
October
November
December

1993

J>UUKAJ>U

1992
1,949,000
1,350,000
909,000
2,605,000
596,000
390,000

128
128
128
128
128
128

$288.00
288.00
288.00
288.00
288.00
288.00

$311.84
216.00
145.44
416.80
95.36
62.40

January
February
March
April
May
June

828,000
2,628,000
1.211,000
1,071,000
832,000
798,000

128
128
128
128
128
128

288.00
288.00
288.00
288.00
288.00
288.00

132.84
420.48
193.76
171.36
133.12
127.68

Subtotal

15,167,000

$3,456.00

$2,426.72

TOTAL

294,657,000

$13,644.00

$47,145.12

July
August
September
October
November
December

1993

24 ~

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MINUTES
FOR THE MEETING OF THE
COMMISSION ON WATER RESOURCE MANAGEMENT

DATE: January 12, 1994
TIME: 10:00 a.m.
PLACE: Hoolehua Recreation Center
Farrington Highway
Hoolehua, Molokai

ROLL CALL
Chairperson Ahue called the meeting of the Commission on Water Resource Management to order at 10:07 a.m.

The following were in attendance:

MEMBERS:
Mr. Keith Ahue
Mr. Richard Cox
Mr. Guy Fujimura
Mr. J. Douglas Ing

EXCUSED:
Dr. John L. Lewin
Mr. Robert Nakata

STAFF:
Ms. Rae Loui
Mr. Edwin Sakoda
Ms. Lenore Nakama
Ms. Sharon Kokubun

COUNSEL:
Mr. William Tam

OTHERS:
Sarah Sykes
Frank Kuamao
George Manintin
Paul Matsuo
Bill Lucas
DeGray Vanderbilt
Wayne Lee
Larry Jeffs
Michael Kolman
Tom Hill
Judy Caparida
Matthew Adolpho, Jr.
Halona Kaopuiki

All written testimonies submitted at the meeting are filed in the Commission office and are available for review by interested parties.

Chairperson Ahue noted an article in the "Dispatch" indicated that one of the items that would be taken up at the meeting would be the 24-inch pipeline. He stated that this was not an item on the agenda but if so desired, it could be taken up under "Other Business".

ITEM 1 MINUTES OF THE DECEMBER 8, 1993 MEETING
Unanimously approved (Cox/Ing).
Ms. Lenore Nakama submitted the following amended Recommendations:

"1. That the Commission approve the issuance of an interim water use permit to the State Department of Agriculture, Agriculture Resource Management Division, for the reasonable and beneficial use of 744,000 gallons per day subject to the standard water use permit conditions listed in Attachment B and the following special conditions:

a. The applicant may continue the use of ground water within the limits approved by the Commission, and any delay in receipt of the actual permit document shall not be a reason to interrupt the approved level of use.

b. That the applicant implement a biological and hydrologic 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 (Wells Nos. 0855-06, 05, & 04, respectively), which may be pumped within the approved limits, for monitoring and testing purposes. 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 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.

2. That the Commission defer existing uses in excess of 744,000 gallons per day pending the submittal of a petition to amend the interim instream flow standard for Waikolu Stream to allow for: 1) an increase in pumpage of 109,000 gallons per day to meet the current 12-month moving average withdrawal of 853,000 gallons per day and 2) the return of pumped ground water to Waikolu Stream via 3-inch bypass nipples on Wells #5 & #6. It is further recommended that the Commission give favorable consideration to this proposed amendment of the interim instream flow standard for Waikolu Stream for the following reasons:

a. To maintain a consistent hydrologic base for the duration of Anne Brasher's data collection effort, thereby avoiding the introduction of additional factors and uncertainties.

b. To avoid the economic hardship to existing MIS users that may result from constraints in the reservoir water supply, particularly during extended dry periods.

c. The increase in pumpage required to meet the existing demand is very small relative to the total diversion from the watershed.
3. That the Commission deny without prejudice future uses over 853,000 gallons per day from Wells #22-#24 & #4-#6 (Wells Nos. 0855-01 to 03 & 0855-06, 05, & 04) pending the results of the monitoring program and any further studies.

The following questions were brought up by the Commissioners:

1. Will the proposed 0.744 mgd pumpage put an economic hardship for the Department of Hawaiian Home Lands by cutting back their pumpage by approximately 0.1 mgd a day?

It may because the applicant has indicated that they plan to pump the ground water primarily during the summer months to maintain an operational water level in the reservoir. Therefore, it is an offset of the amount of use on a daily basis which will be supplemented by the ground water pumpage.

2. In terms of the reservoir capacity of the system, would it be possible to increase the pumping during the times of high flow and store water for the dry summer months?

This is the reason for recommending that the existing operational procedures be documented. The ideal situation would be to have enough water for both Waikolu Stream as well as the irrigation needs in Hoolehua by filling the reservoir with the rainy season's surface water flows. The operating plan should address both the surface water diversion as well as the ground water pumpage and seek to find the best possible means for managing the resource.

3. The pumps will obviously affect the stream flow, is there a time delay between the time of pumping vs. the reduction of flow?

Hopefully the two-year program will document what the impact of pumping will be.

4. Are certain recommendations from the Division of Aquatic Resources being handled by the CDUA permit?

The restoration of flows was a condition of the CDUA permit for temporary use of the well for testing. The Department of Agriculture (DOA) is complying with that condition through the use of the 3" bypass nipples or releases from the dam.

5. Is the usage of Wells #4-#6 restricted to monitoring and testing purposes only? Is it the understanding of the staff recommendation that they are not to be used for production purposes?

Yes, this recommendation is for testing of various surface waters.

There is a CDUA currently awarded to Wells #4, #5, and #6 that covers exploration and testing only. In order for those wells to be used on a permanent basis, there are several more permits that need to be obtained: 1) a pump installation permit from the Commission, 2) CDUA permit for a permanent installation for pumps for the wells from the BLNR, and 3) A SCAP to fulfill conditions in the temporary CDUA for a fish ladder and a pump test to determine the impact of Wells 4, 5, & 6 on the stream. Staff's recommendations are to tie to the water use permit for Wells 22, 23, & 24 a more detailed and definitive monitoring program (two year program) that goes beyond the length of time of the pump test to determine the impact of pumping on the stream.
Chairperson and Members  
Commission on Water Resource Management  
January 12, 1994

6. What is the status of the contested case request?

The Office of the Attorney General has advised that the petitioner lacks proper standing because they do not reside in the area and they have no property interest in fee. The concerns were addressed in the staff recommendations.

Paul Matsuo of DOA commented on the staff's recommendations.

1. Agreed with the monitoring program requested.

2. Monitoring and testing program will require additional funding, approximately $150,000. May need to go to the Legislature to request additional funding from the 1995 Legislature therefore the program may not start in the near future.

3. Allow the existing use as of 1/12/94 (quantity not known) rather than the moving average of 853,000 from November 1993.

4. Economic value may need to have a higher priority rather than the environmental concern to continue the Molokai agricultural economy. By Statute, DOA Irrigation System is required to reserve 2/3 of the water developed in Waikolu Valley for the Hawaiian Homesteaders.

5. DOA will quantify, record, and mitigate all programs so they can all effectively exist.

6. The Molokai Working Group has indicated that DOA water requirements by the year 2010 will increase and additional sources will need to be looked at. Discussions have begun with the Soil Conservation Service and approval has been granted to do a river basin study. The study will address the operational priorities, additional storage, and conservation of existing water uses.

7. If Waikolu source is not available, Pelekunu and Wailau will need to be looked at. Because of the environmental concerns, DOA would like to work with the environmental community and the Hawaiian Homesteaders so some kind of amicable agreement can be reached to serve the needs beyond the year 2010.

Mr. Cox asked if DOA is not able to get the funding until 1995, would the two year provision under the recommendations be too short to get the results of the monitoring program. Ms. Nakama stated that the two-year period would start after implementation of the program. Mr. Matsuo believed they would also be committed to a long-term program because they would need to come in for a pump installation permit and a stream channel alteration permit. At that time an EIS will need to be done.

Ms. Sarah Sykes provided testimony (see Commission file):

1. Asking that the Molokai Working Group (MWG) concerns for the northshore watershed stated in their final report be added to the decision making process of the Commission.

2. Would be willing to step back from her contested case request because most of her concerns have been addressed by staff and if the MWG were formally included.
Chairperson and Members
Commission on Water Resource Management

January 12, 1994

3. Did not want to see a change in the date or amount of water, but preferred the hard number of 744,000 gpd instead of 853,000 gpd because it could always be adjusted later.

4. Status of the permanent instream flow standards petition relative to this application.

Ms. Nakama explained that:
1. Request for amendment of permanent instream flow standards is being made so that the existing uses can be satisfied.
2. Results of the 2-year program will help to determine what that standard should be, currently it is not known what the flow requirement is.
3. Staff would be in receipt of the study results and data which could be made available to the MWG.

Mr. Bill Lucas asked if studies were done on the data and if it is comprehensive where answers will be given to find out why the streams have dried. Chairperson Ahue replied that this is the intent of the studies being proposed.

Mr. DeGray Vanderbilt stated that the Commission needs to be careful in determining the environmental vs. the economic values as requested by DOA.

Mr. Wayne Lee, a fourth generation homesteader, said they were farmers that were pushed out of business because the scales from the tilapia were clogging the sprinklers and the alfalfa crops could not be watered. Mr. Lee stated he "would not support working with the one-third and and increasing their water". This would be giving competition to the Hawaiian people. He felt he had more right to the water than the "one-third farmers" and that the water should be limited so the homesteaders can get the chance to farm too.

Chairperson Ahue clarified that the two-thirds/one-third formula cannot be changed. The study will show whether or not future pump installation and pumping will be allowed; there are no new pumps being approved now.

Mr. Cox asked if the Commission is getting pumping records and if they are being reviewed so the permittee is not pumping more than he is allowed. Ms. Nakama replied that 10 years of pumping data has been submitted by DOA and pumping will continue to be monitored. Ms. Loui added that all major users are reviewed, but there is not enough staff to look at all the users. A computer program is being looked at to do this automatically.

Mrs. Noelani Joy, Hoolehua Homestead farmer, had the following concerns on the recommendations:
1. Would prefer using the 853,000 gpd rather than the 744,000 gpd.
2. In favor of the study but there is an unknown factor of when it will occur.
3. Can Ann Brasher's (National Park Service) data be made available now to the Molokai public?

Mr. Peter Thompson of NPS stated it would be available same as any other scientific research but he could not give a commitment as to when it would be available.
Ms. Joy stated that if there is no real commitment to Molokai with the Brasher information, they will need an alternative source to get information. Ms. Nakama said Ann Brasher's data is seen as being vital to the two-year monitoring program being recommended. Staff will be following up to assure that the data is available because this will be providing baseline information. Mr. Thompson said it was discussed with Ms. Brasher to put together a public info meeting.

Additional testimony in support of DOA's request was submitted by Mr. Martin Kahae, Mr. Tom Hill, and Ms. Judy Caparida. A petition with approximately 90 names supporting the application was submitted (see Commission file). Ms. Caparida stated that as long as people do not get greedy there will be enough water for everyone. The data produced by the two-year study is needed.

Ms. Debra Kanawailwai and Mr. Matthew Adolfo opposed the application. Mr. Adolpho requested an explanation of the statute regarding the two-third/one-third water rights. Mr. Tam is to forward a copy of the act to Mr. Adolpho.

Discussion followed on the testimonies provided.

Motion was made by Douglas Ing to approve and accept amended staff recommendations with the following additional amendments:

1.b. That the applicant implement by December 31, 1995 a biological and hydrologic monitoring program for a minimum 2-year period...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....

2. ... the return of pumped ground water to Waikolu Stream via 3-inch bypass nipples on Wells #5 & #6 (which is part of the 853,000 gpd)...

4. Reconvene Molokai Working Group to review recommendations regarding Wells #22-24, #4, #5, and #6.

5. That the Commission deny the request for a contested case.

Unanimously approved as amended (Ing/Cox).

ITEM 3

EXTENSION: BIG ISLAND COUNTRY CLUB ESTATES, LIMITED PARTNERSHIP APPLICATION FOR A WELL CONSTRUCTION PERMIT. BIG ISLAND COUNTRY CLUB WELL NO. 2 (WELL NO. 4950-02). PUU ANAHULU, NORTH KONA, HAWAII

Unanimously approved (Cox/Fujimura).

ITEM 4

EXTENSION: PAUL AND SUSAN FISCHER APPLICATION FOR A WELL CONSTRUCTION/PUMP INSTALLATION PERMIT. WAIRA-FISCHER WELL (WELL NO. 6450-64). NORTH KOHALA, HAWAII

Unanimously approved (Fujimura/Cox).
ITEM 5  
DAN GORA, REQUEST FOR TRANSFER OF A WATER USE PERMIT, GORA WELL (WELL NO. 3406-08), WAIALUA GROUND WATER MANAGEMENT AREA, OAHU

Mr. Cox inquired if the applicant is not measuring the amount of use now, how can the Commission get them to measure. Mr. Fujimura suggested that a cease and desist be issued, two verbal request and a third written request.

Unanimously approved with the reminder to the applicant that that water use report must be made (Fujimura/Cox).

ITEM 6  
OTHER BUSINESS-24" Pipeline

Testimony was heard on the concerns regarding the 24" pipeline being built by Kukui Molokai. The Commission was asked for help in not letting the developer take any additional water.

Ms. Loui suggested that since Kukui Molokai submitted a permit request for Well 17, the Commission get some information in regards to the 24" pipeline.

ADJOURNMENT  
The meeting was adjourned at 2:15 p.m.

Respectfully submitted,

SHARON S. KOKUBUN  
Secretary

APPROVED AS SUBMITTED

RAE M. LOUI, Deputy Director
RECOMMENDATION

Staff recommends:

1. That the Commission approve the issuance of an interim water use permit to the State Department of Agriculture, Agriculture Resource Management Division, for the reasonable and beneficial use of 744,000 gallons per day subject to the standard water use permit conditions listed in Attachment B and the following special conditions:
   a. The applicant may continue the use of ground water within the limits approved by the Commission, and any delay in receipt of the actual permit document shall not be a reason to interrupt the approved level of use.
   b. That the applicant implement a biological and hydrologic 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. Further, semi-annual reports summarizing data and preliminary findings shall be submitted to the Commission. It is suggested that the Dept. 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 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.

2. That the Commission defer existing uses in excess of 744,000 gallons per day pending the submittal of a petition to amend to the interim instream flow standard for Waikolu Stream to allow for 1) an increase in pumpage of 109,000 gallons per day to meet the current 12-month moving average withdrawal of 853,000 gallons per day and 2) the return of pumped ground water to Waikolu Stream via 3-inch bypass nipples on Wells #5 & #6. It is further recommended that the Commission give favorable consideration to this proposed amendment of the interim instream flow standard for Waikolu Stream for the following reasons:
   a. To maintain a consistent hydrologic base for the duration of Anne Brasher’s data collection effort, thereby avoiding the introduction of additional factors and uncertainties.
   b. To avoid the economic hardship to existing MIS users that may result from constraints in the reservoir water supply, particularly during extended dry periods.
   c. The increase in pumpage required to meet the existing demand is very small relative to the total diversion from the watershed.

3. That the Commission deny without prejudice future uses over 853,000 gallons per day from Wells #22-#24 & #4-#6 (Well Nos. 0855-01 to 03 & 0855-06,05,04) pending the results of the monitoring program and any further studies.
Sawa- receive request O CC.H
- request much involvement (formal)
- Peter working 24/7.493 & 859. Salem time re-estimate.
- payment is intact?

Bill Law - oppose permit
- wants study
- more concerned about 24“ line

Be quarry - non-water users no 3rd party. Water lessens, not
controlled equally 1/3
- 24” line 8 to 10 mph under watered capacity, may be as high as
21 mph.

Wade Lee - underdeveloped homestead lot owner
- opposes 1/3 - 2/3 division.
- opposes new pumps, esp. for future use.
- breach of trust, buy stake
- add m 3rd party lease as 1/3 users
- wants to be incl. in study too.

Nakamai boy - pubs 0.353 mph for approval
Paul (cut 75 bwp in 1970)
- favor study, but wants form date for implementation
- vi: Anne Bowers, secure data now. For 2-yr study &
- incorporate all avail data.

Marti Kahne - homestead lot owner
- support for existing use
- does not support 2/3 right to non-water users.

Paul - we new meters for non-water being issued: being held in “reserve”.

Thomas Hille - Molokai Farm Bureau
- wants existing use of 0.353 mph until plan submitted.
- petition (100 signatures) support 75% permit.
- 3 non-water users incl. Hawaiian Homelands.

Capersi - sole source aquifer?
- lack of data it may affect other systems.
- action adequate with to api, but wanting vs. need
- oppose development.
- support study &
- get water from underlying aquifer.

Debra Keawaulana - cut 15“ acquring reservoir again
- petition 7/2, 1/3
- thinks problem w/distribution system, reservoir should be filled.

Adolfo, Sr.

Act of 1920
- wants Bill use to 75% for prute.
Serves add to our recommendations with:

Recommends that the Commission reconvene MWG prior to decision-making on future uses from wells 22-24 and 4-6.

Homesteader - oppose 24" pipeline
- oppose non-potable use of well

13-169-47-(3) - IF5 - stay of enforcement of IF5 temporarily.

Paul's best estimate of program implementation date 7/95.

1b. be given full 12/94
RESUBMITTAL
State of Hawaii, Dept. of Agriculture
Agriculture Resource Management Division
Application for a Water Use Permit
Wells #22-#24 & #6-#4 (Well Nos. 0855-01 to 06)
Waikolu Ground Water Management Area, Molokai

Applicant: State of Hawaii, Dept. of Agriculture
Agriculture Resource Management Division
P.O. Box 205
Hoolehua, HI 96829

Landowner: State of Hawaii, Dept. of Agriculture
Agriculture Resource Management Division
P.O. Box 205
Hoolehua, HI 96829

Background

This application for a water use permit was filed with the Commission on March 19, 1993 and completed by the applicant on June 8, 1993. This is the only permit application that has been filed to date for the Waikolu Aquifer System. Specific information regarding the source, use, notification, objections, and field investigation(s) are described in Attachment A and the attached exhibits.

On September 15, 1993, the Commission deferred action on the application and directed staff to initiate public hearing proceedings in response to objections filed by the Division of Aquatic Resources (DAR) and the National Park Service (NPS). The following analysis of the proposed water use has been made in light of verbal and written testimony gathered at the November 17, 1993 public hearing on Molokai.

Analysis & Issues

The application is for a total use of 3.36 million gallons per day (mgd) of potable water from the Waikolu Aquifer System from six existing sources located adjacent to Waikolu Stream (Exhibit 1). The water will be diverted to the 1.4 billion gallon Kualapuu Reservoir for agricultural irrigation use within the existing Molokai Irrigation System (MIS) service area. The water will be used to irrigate approximately 2,000 acres of agricultural land in Hoolehua via 203 service connections. The Dept. of Hawaiian Home Lands (DHHL) has priority usage of two-thirds of the established 7.5 mgd capacity of the existing MIS. Most of the water delivered to the reservoir is derived from surface water diversion sources in Waikolu Valley (Exhibit 2). Wells #4-#6 are new wells that have not been active to date. Wells #22-#24 have been used for the past 23 years to support the MIS. The applicant proposes to rotate operation of the six wells to allow greater recovery time for the dike-compartments tapped by the wells. The wells will be pumped primarily during the summer months to augment the supply of water stored in the reservoir.

The major issue regarding the proposed water use is the effect of ground water withdrawals on Waikolu Stream. The Division of Aquatic Resources (DAR) and the National Park Service (NPS) have objected to the proposed permit and commented that
existing diversions of surface and ground waters has dewatered a middle section of Waikolu Stream between the upper diversion at approximately 1,100 feet and a lower diversion at 730 feet. The concern is that any increase in pumping will result in further degradation of Waikolu Stream, which supports a notably large population of native fish species and macroinvertebrates. Restoration of the flow through the dewatered section is being addressed by conditions of the Conservation District Use Permit for the three new wells.

There appears to be general agreement that existing uses by homesteaders and non-DHHL users should continue. The applicant estimates the existing use from Wells #22-#24 is about 1.5 to 2.0 mgd. The Final Report from the Molokai Working Group (MWG) estimates the existing use is 1.13 mgd. From Exhibit 3, the 12-month moving average withdrawal was about 1.13 mgd for one period in 1991, but has been less than 0.9 mgd since 1986. The current 12-month moving average withdrawal of 0.853 mgd as of November 1993 appears to be a more reasonable estimate of actual needs.

Previous hydrologic studies have indicated that a large fraction of the ground water is discharged to Waikolu Stream and that a direct relationship may exist between ground water withdrawals and streamflow. This has prompted a recommendation from the MWG that a developable yield of 0.00 mgd be used for long-range water planning and management of the aquifer, although a sustainable yield of 5.0 mgd has been formally adopted by the Commission. Therefore, the interim instream flow standard for Waikolu Stream may be an issue.

The interim instream flow standard for Molokai streams, effective as of October 8, 1988, is "...that amount of water flowing in each stream on the effective date of this standard, and as that flow may naturally vary throughout the year and from year to year without further amounts of water being diverted offstream through new or expanded diversions, and under the stream conditions existing on the effective date of the standard...". Assuming a one-to-one relationship between ground and surface waters exists in the Waikolu Valley, an increase in usage above that experienced in 1988 should address potential effects on Waikolu Stream. This may be accomplished by a petition to amend the interim instream flow standard or the establishment of a permanent standard. The 12-month moving average withdrawal as of the effective date of the standard is about 0.744 mgd, which is relatively close to the existing use estimate of 0.853 mgd; differences in streamflow resulting from an increase in pumpage of 0.109 mgd are most likely unmeasurable. Further, average withdrawals from the system have been higher for previous periods. However, the most conservative approach would be to assume that average withdrawals exceeding 0.744 mgd are subject to an amendment of the interim instream flow standard for Waikolu Stream.

A final issue regarding the existing use portion of the total request is whether the new wells can be used to meet current needs. The applicant proposes to incorporate the three new wells, Wells #4-#6, to support future operations of the MIS. In most cases, distributing the pumpage over a larger area reduces the overall stress on the system and should be encouraged by the Commission. Use of additional sources to withdraw an equal amount of water should minimize any effects on ground water contributions to streamflow. However, concern has been expressed by members of the community that use of the new wells, even within the limits of the existing use, will result in further adverse impacts to Waikolu Stream. A contested case hearing has been requested if the new wells are approved for production purposes. The Office of the Attorney General has advised that the petitioner lacks proper standing to be admitted as a party in a contested case hearing. However, staff has attempted to address the concerns raised in the petition through the conditions within the staff recommendation.

There appears to be a justifiable need for further study and assessment of the resource, particularly in light of the proposed future expansion of the MIS, the provisions for DHHL water needs in the Hawaiian Homes Act and the State Water Code, and the
need to protect Waikolu Stream. As the largest user of water from this system, the DOA should be encouraged to address the need for baseline data and for an operating plan for these six existing sources that minimizes impact to the stream. Future uses should be denied until a study is completed that seeks to address the impact of operating alternatives on Waikolu Stream.

RECOMMENDATION

Staff recommends:

1. That the Commission approve the issuance of an interim water use permit to the State Department of Agriculture, Agriculture Resource Management Division, for the reasonable and beneficial use of 744,000 gallons per day of potable water for agricultural irrigation use by the Molokai Irrigation System from Wells #22-#24 (Well Nos. 0855-01 to 03), subject to the standard water use permit conditions listed in Attachment B and the following special conditions:

   a. The applicant may continue the use of ground water within the limits approved by the Commission, and any delay in receipt of the actual permit document shall not be a reason to interrupt the approved level of use.

   b. Implementation of a two-year biological and hydrologic monitoring program that seeks to identify the impacts of operating alternatives on Waikolu Stream and 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. Further, semi-annual reports summarizing data and preliminary findings shall be submitted to the Commission. It is suggested that the Dept. of Agriculture work with the State Division of Aquatic Resources, National Park Service, and U.S. Fish & Wildlife Service 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 NPS study by Anne Brasher. A draft of this plan shall be submitted to 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 the future use of the wells, and shall be made readily available to all interested parties.

2. That the Commission deny without prejudice future uses from Wells #22-#24 & #4-#6 (Well Nos. 0855-01 to 03 & 0855-06,05,&04) pending further studies.

Respectfully submitted,

RAE M. LOUI
Deputy Director

APPROVED FOR SUBMITTAL:

KEITH W. AHUE, Chairperson
WATER USE PERMIT DETAILED INFORMATION

Source Information

AQUIFER: Waikolu System, Northeast Sector, Molokai

Sustainable Yield: *5 mgd
Existing Water Use Permits: 0 mgd
Available Allocation: *5 mgd
Total of other pending allocations: 0 mgd

*Note: Molokai Working Group findings II C. says developable yield for this portion of the island is 0 mgd.

WELL: Waikolu Tunnel #22 Well (Well No. 0855-01)
Location: Waikolu Valley, Molokai, TMK:6-1-1:2
Year Drilled: 1961
Casing Diameter: 12 in.

Elevations (msl = 0 ft.)
- Water Level: 988 ft.
- Ground: 992 ft.
- Bottom of Solid Casing: 988 ft.
- Bottom of Perforated: 696 ft.
- Bottom of Open Hole: 592 ft.

Total Depth: 400 ft.
Grouted Annulus Depth: NA ft.

WELL: Waikolu #23 Well (Well No. 0855-02)
Location: Waikolu Valley, Molokai, TMK:6-1-1:2
Year Drilled: 1961
Casing Diameter: 12 in.

Elevations (msl = 0 ft.)
- Water Level: 866.5 ft.
- Ground: 904 ft.
- Bottom of Solid Casing: 804 ft.
- Bottom of Perforated: 604 ft.
- Bottom of Open Hole: 604 ft.

Total Depth: 300 ft.
Grouted Annulus Depth: NA ft.

WELL: Waikolu #24 Well (Well No. 0855-03)
Location: Waikolu Valley, Molokai, TMK:6-1-1:2
Year Drilled: 1961
Casing Diameter: 12 in.

Elevations (msl = 0 ft.)
- Water Level: 947 ft.
- Ground: 965 ft.
- Bottom of Solid Casing: 865 ft.
- Bottom of Perforated: 665 ft.
- Bottom of Open Hole: 665 ft.

Total Depth: 300 ft.
Grouted Annulus Depth: NA ft.

ATTACHMENT A
WELL: Waikolu #4 Well (Well No. 0855-06)  
Waikolu Valley, Molokai, TMK:6-1-1:2  
1988  
14 in.

<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Year Drilled: 1988</td>
<td>14 in.</td>
<td>14 in.</td>
<td></td>
</tr>
<tr>
<td>Casing Diameter: 14 in.</td>
<td>282 ft.</td>
<td>30 ft.</td>
<td></td>
</tr>
<tr>
<td>Elevations (msl = 0 ft.)</td>
<td>Elevations (msl = 0 ft.)</td>
<td>Elevations (msl = 0 ft.)</td>
<td>Elevations (msl = 0 ft.)</td>
</tr>
</tbody>
</table>

WELL: Waikolu #6 Well (Well No. 0855-04)  
Waikolu Valley, Molokai, TMK:6-1-1:2  
1988  
14 in.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Year Drilled: 1988</td>
<td>14 in.</td>
<td>14 in.</td>
<td></td>
</tr>
<tr>
<td>Casing Diameter: 14 in.</td>
<td>202 ft.</td>
<td>15 ft.</td>
<td></td>
</tr>
<tr>
<td>Elevations (msl = 0 ft.)</td>
<td>Elevations (msl = 0 ft.)</td>
<td>Elevations (msl = 0 ft.)</td>
<td>Elevations (msl = 0 ft.)</td>
</tr>
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</table>

ATTACHMENT A
Use Information

Quantity Requested: 3,360,000 gallons per day.
Existing Type of Water Use: Agricultural irrigation needs for MIS System
Place of Water Use: Total area in Hoolehua

*Reported Water Usage:
Nearby Similar Water Usage:
Waikolu Aquifer System
Current 12-Month Moving Average Withdrawal:

*Note: Total for Well Nos. 0855-01 to 03

Nearby Surrounding Wells and Other Registered Ground Water Use

There are no other wells within a mile of these wells (see Exhibit 1). The 1992 Draft of the Molokai Water Use and Development Plan did not estimate the existing withdrawals from the Waikolu Aquifer System. The Final Report of the Molokai Working Group Estimated the total actual use from the Waikolu Aquifer System to be 1.13 mgd.

Public Notice

In accordance with HAR §13-171-17, a public notice was published in the Star-Bulletin on August 6, 1993 and August 13, 1993 and copies of the notice were sent to the Mayor’s office and the Board of Water Supply. Additional notice copies were sent to the County Council and Department of Water Supply. Copies of the completed application were sent to the Department of Health, Department of Hawaiian Home Lands, Office of Hawaiian Affairs, Aquatic Resources & Historic Preservation Divisions of the Department of Land and Natural Resources, and other interested parties for comments. Written comments and objections to the proposed permit were to be submitted to the Commission by August 30, 1993.

Objections

The public notice specifies that an objector meet the following requirements: (1) state property or other interest in the matter; (2) set forth questions of procedure, fact, law, or policy, to which objections are taken; (3) state all grounds for objections to the proposed permits, (4) provide a copy of the objection letter(s) to the applicant, and (5) submit objections meeting the previous requirements to the Commission by August 30, 1993.
To the best of staff’s knowledge there are no objectors who have property interest within the WAIKOLU Aquifer System or who will be directly and immediately affected by the proposed water use. All objections and/or comments to the application are summarized as follows:

<table>
<thead>
<tr>
<th>Objector</th>
<th>Objection</th>
</tr>
</thead>
<tbody>
<tr>
<td>NHAC</td>
<td>General process of water use permit applications. Request that review period be extended to September 3, 1993. Refer to Attachment C for specific comments received on September 10, 1993.</td>
</tr>
<tr>
<td>DOFAW</td>
<td>No objections.</td>
</tr>
<tr>
<td>State Parks</td>
<td>No comments.</td>
</tr>
<tr>
<td>DAR</td>
<td>Refer to Attachment D.</td>
</tr>
<tr>
<td>NPS</td>
<td>Refer to Attachment E.</td>
</tr>
<tr>
<td>DOWALD</td>
<td>No comments.</td>
</tr>
<tr>
<td>Land Management</td>
<td>No objections.</td>
</tr>
<tr>
<td>OCEA</td>
<td>Wells #4-6 are located in Resource “R” subzone of the Conservation District and need CDUA approval.</td>
</tr>
<tr>
<td>OHA</td>
<td>Wells are located on ceded land. No objections provided that (i) DHHL’s priority for water usage is met, and (ii) water needs of Kuleana users are fully guaranteed.</td>
</tr>
<tr>
<td>HPD</td>
<td>No effect on historic sites.</td>
</tr>
<tr>
<td>DHHL</td>
<td>Strongly supports permit approval.</td>
</tr>
<tr>
<td>Maui DWS</td>
<td>No comments or objections.</td>
</tr>
</tbody>
</table>

**Briefs in Support**

Responses to objections, or briefs in support, regarding the application are required to be filed with the Commission ten (10) days after an objection is filed and, presumably, copies are served to the applicant.

<table>
<thead>
<tr>
<th>Supporter</th>
<th>Brief in Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOA</td>
<td>Refer to Attachment F.</td>
</tr>
</tbody>
</table>

**Field Investigation**

The water source and proposed / existing use was investigated on September 23, 1992. The investigation(s) verified the applicants request for water use permit.
STANDARD WATER USE PERMIT CONDITIONS

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

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

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

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

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

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

7. The water use permit application and staff submittal approved by the Commission at its January 12, 1994 meeting are incorporated into the permit by reference.

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

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

ATTACHMENT B
Chairperson and Members  
Commission on Water Resource Management  
January 12, 1994

**g.** Carry out such other necessary and proper exercise of the State’s and the Commission’s police powers under law as may be required.

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

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

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

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

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

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

15. The permittee shall comply with all applicable laws, rules, ordinances, and other agencies’ permits and conditions pertaining to water use or the water resource.

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

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

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

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

ATTACHMENT B
Objections to and Comments on Water Use Permit Applications

1. **GENERAL OBJECTIONS**

We reiterate our general objections to current COWRM water use permit application processing and decisionmaking practices as previously submitted on numerous occasions (10/12/92, 10/21/92, 12/1/92, 6/22/93, & 7/8/93).

**SPECIFIC OBJECTIONS**

NHAC represents water source registrants, water use declarants, water use permit applicants, and others with property interest in land within the hydrologic units of the sources of water supply who would be directly and immediately affected by the proposed water uses.

1. **Ulalapue Shaft 0449-0**

In its final report dated July 1993, the Molokai Working Group recommends that "... DHHL's demonstrable needs which are currently tied to lands at Hoolehua and Kalamaula through 2010, be reserved first."

Since reservations of water to Hawaiian Home Lands have not yet been accomplished, this application should be deferred until that time. Additionally, mechanisms for bulk allocation of water to the Maui Department of Water Supply, similar to those being developed for O'ahu, should be implemented, rather than processing each individual County source under separate water use permit applications.

14.(d) The Molokai Working Group recommends that "other rights which may exist pertaining to Hawaiians not residing on DHHL lands must also be honored" (Final Report page 6).

ATTACHMENT C
The proximity of the Ulupau shaft to shoreline fishponds and Loipunawai raises questions of its impacts upon groundwater flows which nourish these resources. Permitted use of the shaft should be restricted to avoid affecting subsurface flows required to maintain the productivity of nearby fishponds, Loipunawai, and nearshore ecosystems, and to honor the rights of Native Hawaiians to utilize these resources for traditional and customary practices.

2. Waikolu Wells 0085-01 to -06

The combined application for existing and proposed sources is confusing and requires further explanation before objections and comments can be completed. Specific items requiring clarification include:

1. SOURCE LOCATION

While wells 01-03 can be located using existing groundwater indices, new wells 04-06 cannot be located except within a 270' elevational range. In order to assess potential restrictions on use, more detailed locations for the new wells are required.

8. QUANTITY OF WATER REQUESTED

What is the quantity requested from each individual source? From the existing sources combined? From the new sources combined?

15.(a) Impact on sustainable yield

The entry of "7,488,000 GPD" on this line requires further explanation.

15.(b) Permanent or Interim Instream Flow Standards affected

Applicant should specify which sources affect which streams. Permitted use should be restricted to end and avoid any such effects.

15.(c) Hawaiian Home Lands uses affected

Operation of the Molokai Irrigation system was originally intended to be solely for the benefit of Molokai Hawaiian Home Lands. Subsequent State legislation which allowed 1/3 of the system capacity to be used for other purposes violates the spirit and intent of the original enacting federal legislation. Thus use of existing and new sources by the Department of Agriculture affects Hawaiian Home Lands uses, and permitted use should be restricted to avoid any such effects.
15. (d) Other existing legal uses affected

When instream flow standards are affected, other legal uses of streams are also affected. Permitted use should be restricted to end and avoid any such effects.

16. REMARKS, EXPLANATIONS

The Molokai Working Group recommends:

III.L. ... all additional water supply should first be sought in the sector for which it shall be used.

III.P. ... new water supplies should be sought first through conservation.

IV.A.1. The development of new water resources from the undeveloped portions of the Northeast Sector should be held in reserve to maintain the 39 mgd developable yield.

IV.A.3. Development beyond the existing water systems in the Northeast Sector should not be allowed, unless assessments indicate more water can be withdrawn without further impacts to the natural ecosystems.

NHAC believes that applicant's request for proposed new source does not follow the Molokai Working Group recommendations and thus should not be permitted. However, we defer our objections to those of Molokai Hawaiian Home Lands beneficiaries and of the Molokai Working Group.

3. Lale Water Co., Inc. Wells 3855-06 to 08 & 3956-03
Polyhnesian Cultural Center Lagoon Well 3855-09

NHAC supports the objections filed by Hui Malama 'Aina 'O'Lei'a on August 30, 1993.

4. Campbell Estate Well 3957-01

3.(a) EXISTING SOURCE NAME AND STATE NUMBER

The Public Notice only covers Well 01, while the completed application is for a battery of wells also including Well 02 and 04 to 06. It seems that the Commission must republish this notice with the complete information and allow additional time for objection and comment.

8. QUANTITY OF WATER REQUESTED

13. TOTAL ACRES PROPOSED FOR IRRIGATION AND TYPE OF CROP

One million gpd for 80 acres of various unspecified crops works out to 12,500 gpd. Without greater specification of the proposed crops, it is impossible to compare proposed use with Water Plan
MEMORANDUM

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

FROM: Henry Sakuda, Administrator  
Division of Aquatic Resources

SUBJECT: Comments on water use permit application for the State Department of  
Agriculture, Agriculture Resource Management Division for Well Nos.  
0855-01, 0855-02, 0855-03, 0855-04, and 0855-06 the the  
Waikolu Ground Water Management Area, Molokai

The application is for three existing wells and three new wells adjacent to the Waikolu Stream on north Molokai within the boundaries of the Kalapapa National Historical Site. Approximately 3,360,000 gallons of dike-confined water will be pumped per day and transferred to the Hoolehua area for irrigation use. The application characterizes the water quality as non-potable, but it seems likely that the source is actually potable. It was noted that the wells would reduce stream flows during dry periods.

The Waikolu Stream should rate as among the most pristine in Hawaii. It drains a large native forest watershed and flows through the Kalapapa National Historical Site. The State of Hawaii has retained water rights to the stream and diverts water to the dry south side of the island for irrigation use. Wells have also been drilled adjacent to the stream below the upper diversion to add ground water to the irrigation distribution system. The combination of diversion and dewatering attributable to ground water pumping has dried the middle reach of the stream, between the upper diversion at approximately 1,100 feet in elevation and a lower diversion at 730 feet.

Waikolu Stream supports large populations of all the native fishes and macroinvertebrates. Prior to the alterations which created the dewatered section of the stream, all of the native inland fish species and macroinvertebrates were abundant to the upper end of the stream. After the alterations, this diversity and abundance stopped at the point of dewatering. Only one of the gobies, Lentipes concolor, subsequently made it to the higher reaches through the dry section, migrating rapidly during periodic freshets, but its numbers were considerably reduced and its size frequency distribution was compressed towards the larger size range, reflecting diminished recruitment.

Additional pumps will probably worsen the situation. However, the Department of Agriculture recently stated a commitment to restore flows through the dry reach adequate to provide continuous habitat suitable for both occupation and migration by native aquatic species.

ATTACHMENT D
This commitment needs to become a condition of the permit, if the application is approved. Included with the condition should be a plan for defining how this flow restoration can be achieved.

In addition, DLNR's Division of Water and Land Development has completed a plan for modification of the upper diversion weir to improve the chances for successful immigration and emigration of native amphidromous species. At present the weir not only presents a barrier but actually represents a trap for these organisms. Completion of this modification should also be a condition of any approved permit.

We also believe that a long term biological monitoring program should be established for this stream to define the effectiveness of the mitigation measures recommended above and to determine whether additional steps, including modification of the mitigative flow regime, are needed. The Division of Aquatic Resources has data that can be applied to a baseline definition, and the National Park Service is presently engaged in studies of Waikolu Stream that can be applied to design the monitoring program once those studies are complete. It is possible that the Division of Aquatic Resources could conduct the monitoring program with logistic support from the Department of Agriculture.

We would prefer to see all diversions and pumps removed from Waikolu, given the biological value of the area, but recognize that agricultural demands have become dependent on this source of irrigation water. Nevertheless, serious attention should be given to the imposition of mitigation measures that can at least partially assure the perpetuation of the stream's suitability as habitat for native aquatic species.
Re: Objection to APPLICATION FOR WATER USE PERMIT by the State of Hawaii, Department of Agriculture, Agricultural Resource Management Division, for Ground Water Withdrawals in Waikolu Valley, Molokai

Dear Ms. Loui:

The National Park Service objects to the granting of the above-mentioned application (copy enclosed). The reasons for the objection are explained in the enclosed document.

Please inform me as to the next step for the National Park Service to follow. If you have any questions concerning this objection, please contact me or Jeff Hughes at (303) 225-3505 or (303) 225-3527 respectively.

Sincerely,

Owen R. Williams
Chief, Water Rights Branch

Enclosures

cc: (all w/enclosures)
PAAR - Harry
KALA - Superintendent
WR - Kolipinski
OBJECTION BY THE NATIONAL PARK SERVICE TO THE APPLICATION FOR WATER USE PERMIT BY THE STATE OF HAWAII, DEPARTMENT OF AGRICULTURE, AGRICULTURAL RESOURCE MANAGEMENT DIVISION TO DIVERT GROUND WATER FROM WAIKOLU STREAM, MOLOKAI

The National Park Service (NPS) objects to the APPLICATION FOR WATER USE PERMIT (Application) by the State of Hawaii, Department of Agriculture, Agricultural Resource Management Division (Department), to divert ground water from Waikolu Stream, Molokai, within Kalaupapa National Historical Park (Kalaupapa NHP). The notice for this Application appeared in the August, 1993, Water Resource BULLETIN, issued by the Commission on Water Resource Management (Commission). The NPS requests the Commission to deny this Application for the following reasons:

The mission of the NPS may be paraphrased from 16 U.S.C. 1, (39 Stat. 535) as conserving scenery, natural and historic objects, and wildlife, and providing for enjoyment of the same in such a manner and by such means as will leave them unimpaired for the enjoyment of future generations. The public interest will not be served if water and water-related resources in the nationally and internationally important Kalaupapa NHP are diminished or impaired as a result of the appropriation proposed by this application.

Kalaupapa NHP was created December 22, 1980, by Public Law 96-565 (94 Stat. 3322), "In order to provide for the preservation of the unique nationally and internationally significant cultural, historic, educational, and scenic resources of the Kalaupapa settlement...". Congress declared that the primary purposes for creating the park include "to preserve and protect the Kalaupapa settlement for the education and inspiration of present and future generations" and to train the patients and Native Hawaiians "in management and interpretation of the settlement's cultural, historical, educational, and scenic resources". These purposes will not be met if the water and water-related resources in Kalaupapa NHP are diminished or impaired as a result of the appropriation proposed by this Application.

The Department is presently operating a system of wells and surface water diversions within Kalaupapa NHP on Waikolu Stream. The Application by the Department is for ground water diversions for existing and new wells for agricultural irrigation uses. The present diversions greatly reduce flows in Waikolu Stream, especially during the drier summer months. At times, the stream bed is dry in sections from a point upstream of the upper surface water diversion to just below the pumphouse due to the diversions. The proposed diversions can only further decrease the amount of water flowing in the stream and possibly increase the length of the stream's dry portions, and possibly increase the duration of dewatering. The decrease in surface water flows adversely affect
the scenic, aquatic and historical (interpretive) resources within the Kalaupapa NHP. Decreasing the flows is not in the public interest.

As stated above, the altered stream flows will have detrimental effects on the aquatic species found in Waikolu Stream. Presently, the NPS is conducting studies to determine the impacts of the diversions on selected aquatic species within the stream. Aquatic macrofauna found in Waikolu Stream within Kalaupapa NHP include, but are not limited to:

'o'opu alamo'o (Lentipes concolor)
'o'opu nakea (Awaous stamineus)
'o'opu nopili (Sicyopterus stimpsoni)
'o'opu akua (Eleotris sandwicensis)
'opae kala 'ole (Atyoida bisulcata)
'opae 'oeha'a (Macrobrachium grandimanus)
hihiwai (Neritina granosa)

(A petition has been submitted to the U.S. Fish and Wildlife Service (September 28, 1989) to list 'o'opu alamo'o as a threatened species on Molokai.)

The NPS plans to reestablish native food crops and other plants important to Native Hawaiian culture and religion in Waikolu Valley. There will be appurtenant water rights along with traditional and customary rights associated with these uses as described in Chapter 174C-101 of the State Water Code. These Native Hawaiian Water Rights will be impaired as a result of the appropriation proposed by this Application.

An interim instream flow standard (adopted by the Commission on June 15, 1988) was established for all streams on Molokai, including Waikolu Stream, for "...that amount of water flowing in each stream on the effective date of this standard, and as that flow may naturally vary throughout the year and from year to year without further amounts of water being diverted offstream through new or expanded diversions, and under the stream conditions existing on the effective date of the standard,...".

The definition of "Instream flow standard" from the Hawaii revised Statutes (Chapter 13-169-2) is "...a quantity or flow of water or depth of water which is required to be present at a specific location in a stream system at certain specified times of the year to protect aquatic life, wildlife, recreational, aesthetic, scenic, and other beneficial instream uses". The definition of "Instream use" from the same chapter lists several beneficial instream uses including:"Maintenance of aquatic life and wildlife habitats; Outdoor recreational activities; Maintenance of ecosystems such as estuaries, wetlands, and stream vegetation; Aesthetic values such as waterfalls and scenic waterways; (and) The protection of
traditional and customary Hawaiian rights".

While the surface water diversions and three wells existed before this interim standard, ground water pumped from the three new wells in accordance with this Application would violate the purpose for which the interim standard was set. The Department admits this on the Application in response to question 15(b), where it claimed that the interim instream flow standards would be affected "during the summer when rainfall is less".

The application submitted by the Department is defective. For the response to question number 8, "QUANTITY OF WATER REQUESTED:", the Department answered "3,360,000 gallons per day (or 20 hours per day)". In response to Question 15 "(a) Impact on Sustainable yield (?)":, the Department answered "7,488,000 GPD". The answer to question 15(a) is over twice the amount claimed in response to question 8. The Application should be returned to the Department to clarify this important point.

In summary, the NPS objects to the proposed applications on the grounds that:

1 - The public interest would not be served if water and water related resources in the nationally and internationally important Kalaupapa NHP are diminished or impaired as a result of the diversion proposed by this Application.

2 - The appropriation proposed by this Application may adversely affect aquatic life within Waikolu Stream, including 'o'opu alamo'o, which has been proposed for listing as a threatened species by the U.S. Fish and Wildlife Service.

3 - The appropriation proposed by this Application will affect Native Hawaiian water rights when Native vegetation along with customs and religious ceremonies are reestablished in Waikolu Valley.

4 - The appropriation proposed by this Application would violate the interim instream flow standards for Molokai streams, as adopted by the Commission on June 15, 1988.

5 - The Application is defective.

Therefore, the NPS requests that the Commission deny this Application.
The Honorable Keith W. Ahue, Chairperson
Commission on Water Resource Management
Department of Land and Natural Resources
P. O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Ahue,

Waikolu Water Use Permit
Department of Agriculture

Thank you for the opportunity to provide testimony on the water use permit application for Waikolu wells. The Department of Hawaiian Home Lands strongly supports DoA's request for groundwater from the Waikolu wells to support continued operation of the Moloka'i Irrigation System (MIS).

It is our understanding that the requested use of existing and new wells will both assure reliable supply to the irrigation system and promote responsible stream management. By rotating the operation of only two wells at a time, the MIS will continue to provide for demands upon the system, while supplementing stream flows and allowing longer recharge of each groundwater compartment.

The MIS is vital to the future of homestead agriculture on this island. Constructed in the mid-1960's at a cost of $7.5 million, including a federal loan obtained through the Small Reclamation Projects Act, the maximum delivery capacity is nearly 7 Mgd. The current system-wide daily demand is about 3.8 MGD, of which 1.3 MGD is derived from groundwater sources pumped from the system's existing wells.

Two-thirds of the delivery capacity is reserved for use by our Hawaiian homestead lessees. The system currently provides irrigation water to about 145 homesteaders in the Hoolehua plain, and we are hopeful that the system can be extended to also provide service to Kalamaula and Palau. The Department is committed to assuring its lessees the amounts that are necessary.
We share the concerns of the Division of Aquatic Resources and the National Park Service regarding habitat protection, and while the recent combination of drought and loss of electrical service have resulted in unusual pumping requirements, it is our understanding that normal operations will actually improve the ability to maintain normal streamflows. We note also that the Department of Agriculture plans a sort of fish ladder for endangered species, and will supplement stream flows from its wells as part of a stream management program. We are confident that they will continue to work with DAR and the U.S. Fish and Wildlife Service to meet these environmental concerns.

The Department of Hawaiian Home Lands urges your approval of the requested permits.

Warmest aloha,

Hawaiian Homes Commission

HLD:BH/ci 1639.20
TO: Mr. Keith W. Ahue, Chairperson
Commission on Water Resource Management

FROM: Yukio Kitagawa, Chairperson
Board of Agriculture

SUBJECT: Water Use Permit, Waikolu Groundwater Management Area, Molokai

Attached is our written testimony for the November 17, 1993 public hearing. The testimony fully addresses the objections raised by all recorded objectors. Our representative will be present at the public hearing to answer questions or to give further information.

The Department of Agriculture asks that the Commission consider giving equal weight to economic benefits and values as you would to environmental benefits, that they must be balanced. All of the objections raised are based only on environmental benefits.

The Department makes one further request, that the water use permit be approved as submitted and that you take action on this permit today.

c: Molokai Water Users Advisory Board
Agricultural Resource Management Div.

ATTACHMENT F
Testimony of the Department of Agriculture for the Water Use Permit Waikolu Groundwater Management Area

Response to Division of Aquatic Resources (DAR) Concerns:

(1) The MIS will make allowances when operating the well pumps to restore stream flows through the dry reaches, when caused by our pumping. Our pump installation plans and specifications make provisions for a 3" bypass nipple pipe to feed pumped effluent into the stream bed (see engineering drawings marked exhibit A).

(2) The construction contract to make improvements to our diversion dam has been awarded; this project (see engineering drawings marked exhibit B) will provide a wetted channel (fish ladder) to allow immigration and emigration of the aquatic animals. This renovation has been approved by the biologist of the DAR.

(3) We are awaiting details for the monitoring program. This program was approved by and is being developed by Mr. Andy Yuen of the U. S. Fish & Wildlife Service, Mr. Bill Derrick of DAR and in consultation with Ms. Ann Brasher of the National Park Service; all are aquatic biologists familiar with Hawaiian stream conditions. The MIS is willing to provide the necessary logistic support, as our maintenance work requires visitation into Waikolu Valley on a regular basis.

(4) The MIS is not contemplating continuous pumping of all the wells simultaneously. We have programmed a pumping management scheme to allow these dike-confined compartments ample recovery periods. Our objective is to harvest the wet season flows for storage and do only water conservation pumping during dry season flows to maintain our storage reservoir at Kualapuu at operational level, which is keeping daily outflow equal to daily inflow.

Response to the Native Hawaiian Advisory Council (NHAC):

(1) A more detailed location of the wells is not available because of the remoteness of the site, and the wells are close together.
(2) Attached are the pumping capacities of each pump and the combinations (see exhibit C) as requested in your objections.

(3) The 7.4 MGD includes surface stream diversions combined in the permit requests.

(4) The only stream affected is Waikolu Stream as there are no other streams.

(5) The project wasn't restricted by such federal law as claimed; a special loan was obtained through the Bureau of Reclamation and involved both state and federal tax funds reflecting contributions by all citizens, not only Hawaiians.

(6) There are no other legal uses within Waikolu Valley at the present time.

(7) All of these items will be dealt with under the proposed River Basin Study by the USDA Soil Conservation Service.

(8) Lastly, NHAC states "... defers their objections if the HHL beneficiaries support the Permit." Attached is a petition from the Hoolehua homesteaders and their testimony today, which indicates full and unconditional support for the water use permit. Further, the Molokai Working Group in its report under Section IV (A) (2) specifically recommends that MIS existing water use is continued and is an essential part of their plan to meet the anticipated water requirements in the 5-10 year period.

Response to the National Park Service (NPS) objections:

(1) The enabling legislation which created this National Park deals only with the leprosy settlement proper. Records in the archives indicate the Kalaupapa leprosy colony was confined to the Kalawao Peninsula. Therefore, we question why the National Park Service is stretching its jurisdiction to a region not directly connected with the leprosy colony.
(2) The NPS is present at the invitation of the State of Hawaii, and should there be objections, a more reasonable approach would be for NPS to represent their objections through a state agency. Further, the two state agencies which have jurisdiction over the national park lands have explicitly reserved any management matters over Waikolu water and its water rights from the purview of the NPS (see attached Cooperative Agreement No. CA 8896-9-8004 and the lease with DHHL marked as exhibits D and E).

(3) In relation to their objections on the adverse effect on the aquatic stream life, the MIS is working with the U.S. Fish and Wildlife Service and the DAR to address the detrimental effects on aquatic animals. NPS, in attempting to develop their own program, hired mainland consultants unfamiliar with Hawaii's hydrogeology and climatic conditions. This unfamiliarity resulted in distorted data and conclusions such that the study methodology is not fully acceptable by the scientific community and lacks credibility. We already have the solutions to these concerns and are preparing to put them into action.

(4) The NPS indicates that they will reestablish Native Hawaiian culture and religion, but a check with OHA and DHHL shows no such proposal registered. Further, records indicate that Waikolu Valley, due to its remoteness and inaccessibility, did not support any native population, so we question the NPS claim to appurtenant water rights.

(5) We are bothered by the instream flow standard objection when, in fact, standards have not been established. We would like to state that existing irrigation use, which preceded the Water Code by 23 years, and agriculture should have equal protection rights to unrecorded instream use rights. The diversions and wells precede any instream use standards.

(6) We contend that the application is proper and in order, after having worked with the Water Commission staff to develop the application data. Among other items, we question NPS' understanding of the interrelationship between hydrogeology and surface hydrology. Had they checked with us, we could have explained that Waikolu Valley or any Hawaiian stream is influenced by the volcanic
regime such that the valley's groundwater is the result of dikes which are also the source of surface streams. In pumping the individual dike compartments, this will indirectly affect the entire yield within the valley's surface and groundwaters.

(7) In summary, we are at a loss as to why NPS would support a permit denial. Without this permit, MIS may not be able to adequately service the future irrigation needs it was intended to. We have had little discussion with NPS to resolve differences and, more importantly, to understand what options and alternatives they propose to mitigate this issue.

Closing arguments in support of the water use permit:

(1) The MIS requests the approval of the water use permit without any changes in the quantities requested. Basically, the three existing wells have been in operation for over twenty years without any adverse environmental impacts; and one of the wells - #22, which is located within the tunnel itself - does not influence surface flows as far as we can determine and, as such, should not be subjected to the objections raised.

(2) All of the objections raised are the same claims made when the MIS was under the jurisdiction of DLNR and are in the process of being mitigated during the CDUA permit process. The fish ladder, the dewatering of streambed replenishment during pumping, and the monitoring requirements are the result of the biologists' recommendations. The actual implementation of these mitigation measures is either included in construction drawings which are awarded, or, in the case of monitoring program, are awaiting the baseline data development.

(3) The MIS has the capability to manage the pumping through a newly installed telemetry and supervisory control system. We are in the process of developing a water source management plan, which will control dewatering of the Waikolu water by minimizing the withdrawal. The basic objective is to capture and store winter or high rainfall period flows, which is the 7.48 MGD requested, into our 1.4
billion gallon Kualapuu Reservoir and to pump the dike compartment wells (Wells 4, 5, 23 and 24) when surface diversions cannot maintain the daily usage outflow, which is 3.84 MGD, during summer or low rainfall periods. Another reason we are forced into this management plan is that Maui Electric has indicated that they will not be able to supply our electric power needs to operate all six pumps. This means that we need to program our pumping schedule to adapt to the power that can be supplied by Maui Electric, and as of now it would be high unlikely that we could operate more than two pumps at a time over a sustained period during the low demand period. We also are developing an educational program to make water use conservation an important tool to preserve our water source. Presently, the MIS does maintain a plan to maximize the available water source through low water restriction notices, water usage monitoring, leak detection with rapid response to correct, encouraging efficient irrigation methods, keeping water conveyance devices (such as meters, reducers, valves, etc.) in good working condition with periodic maintenance, and minimizing evaporation from our reservoir surface by attempting to reduce wind exposure.

(4) In closing I need to emphasize the importance of this permit, as it is the major source of irrigation water to the major farming region of Molokai. Should the Commission diminish or reduce the requested water quantity, then there will be more frequent SHUT DOWNS of the system during dry weather. Without the assurance of water for agriculture, the industry in all likelihood will not be able to expand much more than what it is today. I want to make it very clear that: (a) we will never intentionally dewater the stream; (b) now with the telemetry control system, we can monitor and manage our pumping for a balanced flow regime throughout the watershed; and (c) we are aware of the importance of this water source to our mission and would never intentionally cause it to deteriorate or be destroyed, but would do our utmost to preserve it for the benefit of Molokai’s economy.
Thank you for the opportunity of allowing me to respond to those objections and to make clear our position in support of the water use permit for the MIS. I will be available at the public hearing for any questions.

Respectfully submitted,

[Signature]

PAUL T. MATSUO
Administrator-Chief Engineer
Agricultural Resource Management Division

IRRA:1466
COOPERATIVE AGREEMENT
BETWEEN
NATIONAL PARK SERVICE
AND
STATE OF HAWAII
BOARD OF LAND AND NATURAL RESOURCES

TITLE: PRESERVATION OF NATURAL AND CULTURAL RESOURCES, KALAUPAPA

(see pg 3)

"EXHIBIT D"
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**ATTACHMENT A GENERAL PROVISIONS**
3. That annual progress reports regarding the work of the Service at the Park will be provided the Board.

4. That nothing in this Agreement shall be done in violation of specific provisions of State laws, administrative rules or regulations of the Board.

5. That subject to applicable approvals of the State of Hawaii Director of Health, the Board and the public shall have the right of access at reasonable times to public portions of the property for interpretive and other program management purposes.

C. It Is Mutually Understood and Agreed:

1. That the Service and the Board shall consider jointly, at such places and at such intervals as may be agreed upon by both parties hereto, subjects of mutual interest or concern relating to the operation, preservation, and protection of the Park.

2. That no changes or alterations shall be made in the property or in the use of the property which is the subject of the Agreement without mutual agreement of the Service and the Board.

3. That nothing in this agreement shall be interpreted to convey or impair the Board's jurisdiction over fishing or other management of streams, and stream and near-shore resources and waters, including diversions of Waikolu Valley waters. Further that all discussions, actions, or activities related to water and aquatic resources within the park are beyond the purview of this Cooperative Agreement.

4. That so long as the resident patients remain at Kalaupapa, the Service and the Board, in cooperation with the State Department of Health, will assist each other in protecting their current lifestyle, rights, and individual privacy.

5. That the two existing Memorandums of Understanding between the Service and the Board regarding wayside exhibits in Palaau State Park executed in March 1985 and for mutual aid in fire control executed in August 1985 are hereby reaffirmed without change.

ARTICLE III. TERM OF AGREEMENT

This agreement shall become effective upon the date of final signature and, in accordance with the requirements of Section 105(b)(2) of the Act, shall remain in effect for a period of 20 years and may be extended and amended by mutual agreement at any time. Upon expiration the agreement shall be reviewed to determine if it should be renewed, modified, or terminated.

ARTICLE IV. KEY OFFICIALS

1. The key official for this agreement on behalf of the Service is: Director, Pacific Area, 300 Ala Moana Boulevard, Box 50165, Honolulu, Hawaii 96850, who shall act in the Service's behalf as Government Technical Representative.

2. The key official for this agreement on behalf of the Board is: Chairperson of the Board, P. O. Box 621, Honolulu, Hawaii 96809.
ARTICLE V. AWARD (NON-FINANCIAL)

1. The Service shall furnish personnel, facilities, supplies, materials, and services as delineated in Article II, Statement of Work, subject to the availability of appropriations.

2. This is a non-financial agreement and nothing contained herein authorizes the Board to incur any costs.

3. Nothing herein shall be construed as obligating either the Service or the Board to expend or involve either party in any contract or other obligation for the future in excess of appropriations authorized by law and administratively allocated for the work.

ARTICLE VI. PRIOR APPROVAL

Both parties agree to secure the necessary licenses, permits, and approvals before undertaking any regulated activities, including but not limited to the following:

a. Conservation District Use Applications for any new, change in existing, or, expansion of land use within the Conservation District in accordance with Chapter 183-41 Hawaii Revised Statutes, as amended, and Title 13, Chapter 2 - Administrative Rules of the Department of Land and Natural Resources.

b. Well Drilling or Modification Permits.

c. Construction or installation of any capital improvements.

d. Licenses and special permits for the hunting or otherwise controlling animals doing damage in accordance with Title 13, Chapter 123.

e. Special use permits to conduct activities otherwise prohibited within the Puu Alii Natural Area Reserve in accordance with Title 13, Chapter 209.

f. Scientific collecting permits, on a project-by-project basis, to engage in collecting or research activities which would otherwise be unlawful.

ARTICLE VII. REPORTS

Other than the progress reports described in Article II, there are no reports required in connection with this agreement.

All correspondence and/or copies of all written notices between the Service and the Board shall be sent to the following addresses:

National Park Service
Pacific Area Office
300 Ala Moana Boulevard
Suite 6305, Box 50165
Honolulu, Hawaii 96850

Attention: Government Technical Representative
ARTICLE VIII. PROPERTY UTILIZATION AND DISPOSITION

No property is being furnished as part of this agreement; therefore, this Article is not applicable.

ARTICLE IX. TERMINATION PRIOR TO NATURAL EXPIRATION

This agreement may be terminated by either party with 60 days' notice to the other. The Service may unilaterally terminate the agreement in accordance with Circulars A-102/110 (see attached General Provisions, Part 14).

IN WITNESS HEREOF, the parties hereto have signed their names and executed this agreement.

Cooperative Agreement No: CA 3896-9-8004

To continue for 20 years from effective date below.

TITLE: Preservation of Natural and Cultural Resources, Kalaupapa

STATE OF HAWAII

BOARD OF LAND AND NATURAL RESOURCES

NAME:  
TITLE: Chairperson of the Board 
DATE: August 4, 1989

APPROVED AS TO FORM

Deputy Attorney General, State of Hawaii 
July 27, 1989
We hereby certify that this is a true copy of the original filed as Land Court Document No. and / or recorded in the Bureau of Conveyances as Document No. on November 4, 2002 at 5:45 o'clock A.M.

TITLE GUARANTY OF HAWAII, INCORPORATED

After Recordation Return by: Mail (x) Pickup ( )
National Park Service, Western Region
Division of Land Resources
600 Harrison Street, Suite 600
San Francisco, California 94107-1372

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
GENERAL LEASE NO. 231
between
STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
and
THE UNITED STATES OF AMERICA
DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
Covering
HAWAIIAN HOME LANDS
Situate at
Kalaupapa, County of Kalawao, Molokai
Tax Map Key No. 6-1-01:01

COPY "EXHIBIT E"
LESSOR relating to any accrued back rentals due from the use of the demised premises.

   a. Any future appraisal conducted for the purpose of a land exchange authorized by Section 104 of Public Law 96-565, shall be based on the demised premises being vacant and available for development to its highest and best use, without regard to the provisions of Public Law 96-565, as amended.
   b. If there is no longer a patient residing at said premises, the fair market rental shall be reopened and redetermined based on the demised premises being vacant and available for development to its highest and best use, without regard to the provisions of Public Law 96-565, as amended.
   c. The parties understand and agree that if funds are not appropriated by the date lease rental is due, any outstanding balance owed the LESSOR shall accrue interest at the rate allowed by federal law, which interest will be payable when authorized by Congress.

ARTICLE ONE

RESERVING UNTO THE LESSOR THE FOLLOWING:

1. Minerals and waters.
   a. All minerals as hereinafter defined, in, on, or under the demised premises, and the right, on its own behalf or through persons authorized by it, to prospect for, mine and remove such minerals and to occupy and use so much of the surface of the ground as may be required for all purposes reasonably extending to the mining and removal of such minerals by any means whatsoever, including strip mining. "Minerals," as used herein, shall mean any or all oil, gas, coal, phosphate, sodium, sulphur, iron, titanium, gold, silver, bauxite, bauxitic clay, diasporc, boehmite, laterite, gibbsite, alumina, all ores of...
aluminum and, without limitation thereon, all other minerals substances and ore deposits, whether solid, gaseous or liquid, including all geothermal resources, in, on, or under the land; provided, that "minerals" shall not include sand, gravel, rock, or other material suitable for use and when used in road construction in furtherance of the LESSEE's permitted activities on the demised premises and not for sale to others.

b. All surface waters, ground waters, and water systems appurtenant to the demised land and the right on its own behalf or through persons authorized by it, to capture, divert, or impound the same and to occupy and use so much of the demised premises as may be required in the exercise of this right reserved.

c. As a condition precedent to the exercise by the LESSOR of any rights reserved in this paragraph 1, just compensation shall be paid to the LESSOR for any of the LESSOR's improvements taken which amount is to be determined in the manner set forth in paragraph 3, and, if only a portion of the land leased is withdrawn, the rental will be reduced in proportion to the rental value of the land withdrawn.

2. Prehistoric and historic remains. All prehistoric and historic remains found on the demised premises.

3. Withdrawal. Pursuant to Section 204(a)(2) of the Hawaiian Homes Commission Act, 1920, as amended, the LESSOR shall have the right to withdraw from the operation of this lease all or any portion of the demised land for the purposes of the Hawaiian Homes Commission Act. The LESSOR shall not be entitled to any compensation for improvements, if any, already erected on the lands hereby demised. The LESSEE shall be entitled to compensation for those improvements hereafter made by the LESSEE which have been approved by the LESSOR, in accordance with Article Two, Paragraph 7, titled Improvements, of this agreement on any land withdrawn, in an amount equal to the proportionate value of the LESSEE'S improvements so withdrawn in the proportion that it bears to the unexpired term of the lease; provided, that the LESSEE may, in the alternative,
from amounts otherwise due under this lease or other consideration, the full amount of such commission, brokerage, percentage, or contingent fee.

9. **Benefit.** No member of Congress or Resident Commission shall be admitted to any share or part of this lease, or to any benefit to arise therefrom. Nothing, however, herein contained, shall be construed to extend to any incorporated company if the lease be for the general benefit of such corporation or company.

**IN WITNESS WHEREOF,** the parties hereto have caused these presents to be executed as of the day and year first above written.

---

**STATE OF HAWAII**
**DEPARTMENT OF HAWAIIAN HOME LANDS**

By

[Signature]
H. L. Drake, Chairman
Hawaiian Homes Commission

**UNITED STATES OF AMERICA**
**DEPARTMENT OF THE INTERIOR**
**NATIONAL PARK SERVICE**

By

[Signature]
Edward R. Haberlin, Chief
Division of Land Resources
Western Region

---

**APPROVED AS TO FORM AND LEGALITY:**

[Signature]
Deputy Attorney General
State of Hawaii

Dated 9/8/92
MIS Ground & Surface Diversions
Annual Averages

Interim Instream Flow Standards Established
Grandfathered Diversions

MWG Ground Water Est. = 1.13 mgd

* NOTE: Long-term ave flow of Waikolu Stream = 8.815 mgd
(based on 26 years of data from West Portal and 20 years of
USGS Stage Station 4055)

EXHIBIT 2
MOLOKAI IRRIGATION SYSTEM PUMPAGE
WELLS #22, 23, 24 (Well No. 0855-01, 02, 03)

DATE (Latest Data 11/93)

MONTHLY PUMPAGE  12-MAV  REQUESTED AMOUNT
Molokai Water Working Group Members  
(List of Members Attached)  

Dear Members:

Enclosed is an excerpt from the Biological and Hydrological Monitoring Study done by the Department of Agriculture/Molokai Irrigation System to support its request for Water Use Permits for Waikolu Wells 5 & 6. The Commission required this study out of concern for the impact on instream resources of the requested pumping levels.

Now that the study is done, we will be taking the results back to the Commission in October or November, and we would like to have your review. We are scheduling a presentation by the Department of Agriculture and their consultants to the Working Group for Monday, September 25, 2000, 7:00 p.m. at the Department of Hawaiian Home Lands' conference room, Kulana 'Oiwi in Kalamaula.

Please join us for presentation and discussion on the impacts of pumping on the instream resources of Waikolu. This will help us prepare for the Commission presentation in October or November when the Commission comes to Molokai.

If you have any questions, please call Charley Ice at 587-0251 or toll free at 1-800-468-4644, extension 70251.

Sincerely,

LINNEL T. NISHIOKA  
Deputy Director

Cc:ss  
Enclosure
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<th>Name</th>
<th>Address 1</th>
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The Molokai Irrigation System

The west portal of the tunnel (see picture above, center) is at an elevation of 970 feet.

The Molokai Tunnel

Telemetry antenna at the MIS headquarters

Kalaupapa Peninsula

Waikolu Valley Diversion System.
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Figure

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2. General Layout of Waikolu Valley Diversions and Study Sections
3. The Tunnel and East Portal
4. The Upper Dams (#1, #2, and #3)
5. The Pump Station and Lower Dam (Dam #4)
6. The Valley and Tunnel Wells
7. Native Macrofauna in Waikolu Stream
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10. Plan and Profile of Waikolu Stream Between Dams #1 and #4
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APPENDICES

Appendix

D. Graphs of Density of Waikolu Macrofauna
E. Graphs of Size (Lengths) of Waikolu Macrofauna
F. Graphs of Habitats of Waikolu Macrofauna
G. Data Tables for Waikolu Macrofauna
H. Waikolu Stream, Molokai, Biological Monitoring by Pacific Aquatic Environmental (bound separately)
EXECUTIVE SUMMARY

Background

In June 1995, the Department of Agriculture engaged Water Resource Associates to conduct a two-year biological and hydrological monitoring study of a 3,000 ft. (approximate) stretch of Waikolu Stream diverted by the Molokai Irrigation System (MIS). The monitoring study was a requirement arising from the Commission on Water Resource Management's March 14, 1995 approval of an interim instream flow standard amendment which allowed the interim water use of 853,000 gpd from Wells 22, 23, and 24 and the conduct of the monitoring study, both conditions of an interim well construction permit previously approved by the Commission on January 12, 1994. A plan of study was approved by CWRM and site visitations in Waikolu Valley began in October 1995 and ended in February 1998. A total of 22 visitations were completed.

The objectives of the monitoring study, as outlined on pages 3 and 4 of the report, were successfully accomplished.

Aquatic Macrofauna and Environmental Concern

Waikolu is a perennial stream whose low flows during dry periods are sustained by ground water discharge from a series of transversely oriented dike compartments. The stream is a typical Hawaii stream facing the northeast Tradewinds and having an abundant native aquatic macrofauna: 'o'opu (goby), 'opae (shrimp), and hihiwai (snail). These native freshwater macrofauna (see Figure 7) require movement to and return from the sea to complete their life cycle. In
1986, the Hawaii Division of Aquatic Resources reported that short segments of Waikolu Stream between 730 and 1,000 ft. elevations (MIS lower and upper dams, respectively) were intermittent and possible affecting the ocean/land migration and densities of aquatic macrofauna in the upper reaches of Waikolu Stream above elevation 1,000 ft.

**Initial Mitigative Measures**

Recognizing that intermittent flow conditions were occurring, the Hawaii Department of Agriculture, in cooperation with the Hawaii Department of Land and Natural Resources, the National Park Service, and the U.S. Fish and Wildlife Service, agreed to implement the following mitigative measures as conditions of the interim instream flow standard amendment approved by the Commission on Water Resource Management on March 14, 1995:

1. Install a low-flow weir plate assembly and fish ladder on the main dam (see Figure 4).

2. Install three-inch discharge outlets on Wells 5 and 6 (see Figure 6).

3. Conduct a two-year biological and hydrological monitoring study of Waikolu Stream between the upper and lower MIS dams.

**Results of Mitigative Measures**

1. A steel weir plate assembly was installed in late 1995 on top of the intake grating of the main dam to allow approximately 0.5 mgd to flow over the face of the dam. In June 1997 and several other occasions, young ‘o’opu alamo’o recruits were observed upstream of the main dam, proving the
success of the weir assembly in allowing upstream migration of young ‘o’opu over the main dam by climbing up the now permanently wet face of the dam.

2. Although three-inch discharge pipes were installed on Wells 5 and 6, the two-year monitoring effort confirmed that they are not needed because Waikolu Stream downstream of the wells is perennial due to Napuleloa spring and tributary which joins Waikolu Stream opposite Well 5. The spring is a perennial perched water source that is unaffected by pumping. An additional attempt to restore a minimal flow in the intermittent segment of Waikolu Stream was made by installing a two-inch discharge outlet on Well 24’s discharge line at the East Portal. After a two-month period, the released water failed to restore flow in the stream channel because it percolated rapidly down into the coarse alluvium and underlying dike water compartment. However, the released water did create and maintain several isolated pools of water about 50 feet downstream of the outlet.

Study Sections

In order to effectively monitor and study the effects of diverting Waikolu Stream between the lower and upper dams, five sections (see Figure 4) were established on the basis of having distinct biological and hydrological characteristics, as follows (distances are approximate):

Section I (2,600 lineal feet) — Below the lower dam (Dam #4), a section that has perennial flows and a normal complement of native aquatic macrofauna: unaffected by the Molokai Irrigation System.

Section II (890 lineal feet) — Immediately upstream of Section I (see Figure 10), from the lower dam, upstream to Napuleloa tributary and Well 5, a section with perennial flows and a full, but less dense complement of native aquatic macrofauna.
Section III (1,860 lineal feet) — Immediately upstream of Section II, from Napuleloa tributary, upstream to the pipeline trestle at the East Portal, a section that has intermittent flows and no sustained complement of native aquatic macrofauna.

Section IV (390 lineal feet) — Immediately upstream of Section III, from the pipeline trestle upstream to the main dam (Dam #1), a section that has intermittent flows or standing pools of water more frequently than Section III, but also with no sustained complement of native aquatic macrofauna.

Effects of Pumping on Waikolu Stream

1. Pumping existing Wells 23 and 24 in the valley causes Section III and eventually Section IV to become intermittently dry, except during the rainy Winter–Spring months of the year. Anecdotal data indicates that it takes about 30 days of pumping Well 23 to dry up Section III and about 45–60 days of pumping Well 24 to dry up Section IV.

2. Pumping new Wells 5 and 6 in the valley will cause some reduction in flow in Section II as dike water is withdrawn, but Section II is expected to remain perennial, because it is fed by Napuleloa spring, a perennial perched water source that is unaffected by pumping of dike water.

3. Pumping Well 22 in the tunnel has no discernible effect on flow in Section III. This is because Well 22 pumps from separate dike compartments and is located about a half mile away from Waikolu Stream. Based upon dike orientation, pumping Well 22 continuously for a month or so may have a discernible effect on flow in Section IV, but not cause it to dry up.

4. Pumping the lower pump station (Dam #4) boosts diverted surface water up to the East Portal and does not involve groundwater withdrawal. Therefore,
the perennial flow in Waikolu Stream is not affected below the pump station dam.

5. Pumping Wells 23 and 24 has not affected the perennial nature of Waikolu Stream below Napuleloa tributary (Sections I and II), nor above the main dam (Section V).

6. Pumping Wells 5 and 6 is expected to have no effect on the perennial nature of Waikolu Stream below the pump station dam. This is because the dam sits on a dike, separating downstream dike-fed perennial flows from the dike water tapped by Wells 5 and 6.

Effects of Pumping on Waikolu Macrofauna

1. Pumping Wells 23 and 24 has not affected the perennial nature and habitat of Waikolu Stream below Napuleloa tributary (Sections I and II) and observations have confirmed that the stream has an abundance of native aquatic macrofauna there.

2. Pumping Wells 22, 23, and 24 has not affected the perennial nature and habitat of Waikolu Stream above the main dam (Section V). However, the macrofauna above the main dam has been affected, primarily due to the intermittency of Sections III and IV interrupting and limiting the normal movement of native aquatic macrofauna.

3. Pumping Wells 23 and 24 results in periodic dewatering of a segment of Waikolu Stream (Sections III and IV), which may leave little (only standing pools and trickling flow) or no habitat for native aquatic macrofauna to survive. Pumping Wells 5 and 6 will cause some reduction of flow in Sections II and III, but Section II is expected to remain perennial because the section is fed by perennial Napuleloa spring which is unaffected by pumping.
4. ‘O’opu alamo’o (goby) and hihiwai (snail) in Section V are larger in size and fewer in number than in Section I below the pump station dam. ‘O’opu nopili and nakea were observed occasionally and apparently they are few in number. 'Opae are more abundant and larger than in Section I.

Optimum Pumping Schedule

1. The MIS pumping schedule (see page 16) gives first priority to use of the most economical water source—diverted flows. Thus, no wells are pumped when the diverted flow at the east portal reaches 19 mgd or more, at the east portal.

2. When the diverted flow at the east portal falls below 13 mgd, the wells are brought on line in the following sequence: first, Well 24 followed downstream by Wells 23, 22, 5, and 6. The addition of Wells 5 and 6 allows overall pumping to be spatially spread out and allows more time for the recovery of the dike water compartments.

3. During the late Summer 1996 drought in Waikolu Valley, the worst in memory, Wells 22, 23, and 24 had to be pumped at full capacity 24 hours per day toward the end of the drought in November 1996 (see Figure 15) because Kualapuu reservoir levels were dangerously low. Yet, when the rainy months returned, freshet flows were able to restore both groundwater levels and perennial flow in Sections III and IV: sufficient to allow young ‘o’opu alamo’o to migrate upstream above the main dam. The conclusion is that pumping the MIS wells can be done during drought periods as well as during the wet, rainy periods without causing any permanent stoppage of ‘o’opu migration upstream above the main dam. The installation of the weir plate assembly on top of the main dam is believed to be largely responsible for the successful movement of young ‘o’opu alamo’o (recruits) to the upper reaches of Waikolu Stream.
4. The existing pumping schedule of the MIS wells is effective in utilizing groundwater withdrawal to supplement the diverted water supply in the most economical manner (pumping wells with the least pumping cost first). No changes in the pumping sequence or schedule will significantly improve the existing condition of Waikolu Stream’s native aquatic macrofauna.

Alternatives

The existing condition of Waikolu Stream, as documented in this report, represents a good compromise. Farmers have water for irrigating their crops, and the native aquatic macrofauna are able to thrive and complete their life cycle in much of Waikolu Stream, although their population is reduced above the main dam. Therefore, maintaining status quo, or the continued diversion and pumping in Waikolu Stream, is a viable alternative for Molokai’s economy, existing farmers, and native aquatic macrofauna population which does not depend upon Waikolu Stream for survival because ‘o’opu are known to migrate and re-populate other streams. ‘O’opu in Waikolu Stream are abundant and thrive below an elevation of 730 ft. (lower dam). Although there is degradation of habitat in Sections III and IV and a reduction in density of native stream macrofauna above the main dam, a perennial water corridor is not necessary to maintain the viable complement of native riparian organisms that currently exist in Waikolu Stream.

The addition of the weir plate assembly on the main dam has proven to be effective for ‘o’opu alamo‘o migration and should remain in place. Restocking the upper reach of Waikolu Stream with young ‘o’opu (recruits) would serve no beneficial purpose.
Section I: Always flowing and teeming with life all the way to the sea.
Section II: Always flowing as a result of perennial flow from the Napuleloa tributary, fed by the spring of the same name. Much aquatic life traverse the Lower Dam and live in this section.
Section III: Intermittent throughout most of the year, except during heavy and/or extended rainy periods, when flow is complete.
Section IV: Intermittent with scattered pools. Like Section III, flow occurs during periods of heavy or extended rain.
Section V: Always flowing because of water supplied from the headwaters. Fish are always present, albeit in smaller numbers than downstream. Shrimp however, are more abundant here than in any other part of the stream.
A footbridge runs from the base of the tunnel, across the stream, to Dam #2. Water is piped along the bridge from Dam #2 to the tunnel. This is a view of the tunnel portal from the footbridge. Dam #2 is higher than the tunnel portal. Water flows naturally through the pipes.

Wires, cables, and pipes run along the tunnel ceiling. The left and right walls of the concrete waterway can be seen. The Jeep's radio antenna is on the left.
Not shown here, are the pipes which divert the water from Dam #3 to Dam #1. This diverted water joins the water diverted from Dam #1 and flows downhill through a pipe to the tunnel portal.

This walkway leads away from Dam #2. The tunnel portal is visible in the upper right.

A cascade is diverted by Dam #2. Although not visible here, this cascade is part of a series of waterfalls, which runs up the steep wall of the valley.

The Weir Assembly over the grating on Dam #1. As on all of the diversion dams, the downward-sloping grating is at the top of the spillway.
Water ponds above the lower dam. Some water is diverted as it enters the grating, the rest flows over the dam. All of the diversion dams divert water by this method.

Watercress grows on the Lower Dam in front of the Pump Station.

Napuleloa Tributary, shown flowing into Waikolu Stream, (see photo at right) flows perennially. It is fed by Napuleloa Spring and it keeps Section II flowing all year.

This is a view downstream of the Lower Dam, taken from atop the dam. From here down to the sea, aquatic life flourishes throughout the year.

Inside the Pump Station, the pumps send water diverted from the Lower Dam up to the tunnel portal, which is located uphill.

Hawaii Department of Agriculture

The Pump Station and Lower Dam (Dam #4)

BIOLOGICAL FINDINGS

Study Period and Objectives

The biological and hydrological monitoring was planned as a two-year study which began in October 1995 with the first biological survey (consisting of three days in the field) conducted on October 21st and which concluded in November 1997. Extra field surveys were conducted in January/February 1998.

The objectives of the biological monitoring were to develop baseline data for native fish, crustaceans and mollusks in Waikolu Stream, and to document their occurrence, condition, and possibly their migration below, within, and above the 2900± ft. stretch of Waikolu Stream being diverted between the main dam (Dam #1) and lower pump station dam (Dam #4).

Methodology

Sampling was conducted to conform with the Hawaii Division of Aquatic Resources (HDAR) native fish sampling guidelines (Baker and Foster 1992). Densities of ‘o’opu, hihiwai, ‘opae kuahiwi, and non-native Tahitian prawns were determined by snorkeling using to the standard quadrat point-count method of HDAR. This method consists of randomly selecting quadrats along the stream channel and performing total counts of aquatic macrofauna within these quadrats. Sampling points were selected by using a random number table. A combination of two random numbers was used to determine a longitudinal (distance upstream) and transverse (distance from the left bank) position in the stream. For example, if the
random numbers were 12 and 6, the first snorkeler would walk 12 paces upstream and conduct the count at 0.6 the distance from the left stream bank. The second snorkeler (up to four persons participated on any given sampling trip) would determine his point-count position, beginning at the location of the previous snorkeler’s position point. This method would be continued by "leap-frogging" upstream until all counts were completed for a given study section. This method reduces bias in selecting sampling locations and, with a sufficient number of counts, habitats are sampled in proportion to their abundance. Stream elevations (except for known dam elevations) were taken with a hand-held altimeter, and should be considered approximate.

Depending upon habitat and substrate characteristics, the sampling quadrats ranged in size from about 0.3 to 1.0 m². Total length for all organisms was estimated except for hiihiwai (because of their sedentary nature) and were accurately measured. Data collected at each sampling point included the name of the snorkeler, substrate composition, habitat type, quadrat size, water column depth, date, and observation time. Identical methods were applied during all quarterly monitoring events so data are temporally as well as spatially comparable.

Differences in the density of ‘o’opu, hiihiwai, and ‘opae among the different stream study sections and sampling periods were evaluated with analysis of variance and paired t-tests.

Consultation and assistance from Bill Puleloa, HDAR biologist, helped ensure that sampling methods conformed to that used previously in Waikolu Stream by HDAR personnel (Puleloa 1991). Because data were collected by the same personnel throughout the study (Ron Englund, Randall Filbert, Pat Hart, and Bill Puleloa), variation in results due to observer bias was minimized.
Stream Conditions

Flow in Waikolu Stream varied throughout the study primarily as a function of rainfall.

In October 1996, water was flowing over the weir plate and down the face of the main dam (Dam #1). As in August, this resulted in a deep (1 m) pool at the base of the dam in Section IV. The 3-m section of stream below this pool was again dry. Flow then resurfaced and continued downstream to the trestle. Most of Section III was flowing during October, but a 100 m portion from the confluence of Napuleloa tributary upstream to about 50 m below the lower road crossing was dry. Standing pools up to 1 m deep were found in Section III.

In April 1997, Section III contained flowing water for the first time since the study began in October 1995. However, much of the section was still dry. The stream was still not continuous between Dam #1 and Dam #4. However, freshet flows appeared to have connected previously dry Sections III and IV for short periods during February and March 1997.

In addition to increased rainfall, flow in Section III increased because of decreased groundwater pumping. Pumping had ceased temporarily in early March 1997 due to budget constraints and this led to the reappearance of stream flow in Section III.

Above average rainfall continued through June 1997. When we arrived on June 16, 1997, Waikolu Stream was flowing at both road crossings in Section III. Flow was low, but heavy rainfall for the next three days (June 17-19, 1997) increased flow dramatically. On June 16th the channel was dry in a 40 m section downstream of Dam #2 (at pipeline trestle). This previously dry upstream part of Section III appeared to be an obstacle to the upstream migration of fish. However, by June 18th this section below the trestle was flowing. Flow on June 18th was 15.9 mgd according to the gauge at the east portal of the Waikolu Tunnel.
Flow in Section III created some high-quality aquatic habitat. Plunge pools up to 40 in depth were observed. This was prior to the rain-induced increases in flow from June 17 to 19. All habitat types were present including pools, riffles and runs.

In August 1997 most of Section III contained flow. A 100-m dry section was located immediately downstream of the pipeline-trestle crossing. A small section (3 m) of dry channel was also found in Section IV immediately downstream of the pool at the base of Dam #1 (upstream dam). Downstream of the pool, the stream flowed beneath the substrate for about 3 m. Downstream from this point, flow was continuous to just below the trestle crossing. The weir plate installed on the top of Dam #1 continued to maintain a minimum flow over the face of the dam. Although rainfall had decreased by this time, electrical problems precluded groundwater pumping during the August 1997 quarterly monitoring. In August conditions in Sections III and IV were similar to June. High-quality pools up to 1 m deep that contained several species of algae was observed.

By October 1997, flow in Waikolu Stream had decreased. This was primarily the result of decreases in precipitation during the summer. A one-inch rain on October 12, 1997, one day prior to our arrival, temporarily increased flow in Sections III and IV. The stream was flowing at both road crossings on October 13th, but by October 15th flow at the lower crossing had ceased. Ground water was pumped during the October monitoring period, which was the first time pumping had occurred since the December 1996 trip. In October 1997, stream flow was lower downstream of Dam #4 than during the other sampling periods of 1997.

Precipitation was low for most of the winter of 1997, and by February 1998, flow in much of Waikolu Stream was lower than during the previous monitoring period. Flow remained present, however, through much of Sections III and IV. Water flowed over both road crossings even though ground water was being pumped. Water flowed over the metal grate and down the face of Dam #1 and maintained the deep pool at the base of the dam. Flow characteristics in Section IV were the same as during the previous trip.
Densities of Aquatic Macrofauna

Except for 'opae kuahiwi, densities (abundance) of native aquatic macrofauna were substantially lower in sections upstream of Section II, or Napuleloa tributary (see graphs in Appendix D and data tables in Appendix G). For example, in October 1995 'o'opu alamo'o (hi'ukole) densities were 11.8/m² and 13.9/m² in Sections I and II, respectively. However, in the largely dewatered Section IV and in Section V, '0'opu alamo'o (hi'ukole) densities were only 2.8/m² and 0.4/m², respectively. For all monitoring periods combined for this study, densities of 'o'opu alamo'o (hi'ukole) were significantly different between Section I (9.6/m²) and Section V (0.91/m²) (t=27.53, P=<0.001). A similar pattern was observed for 'o'opu nopili and 'o'opu nakea.

The effects of pumping Wells 23 and 24 to the extent of causing Sections III and IV to become intermittent on native aquatic macrofauna would be obvious to an observer snorkeling in Section I (below Dam #4) and in Section V (above Dam #1) Densities of hihiwai and 'o'opu alamo'o (hi'ukole) are much lower in Section V, whereas native stream fish such as 'o'opu nakea and 'o'opu nopili are entirely absent. However, the intermittence of Sections III and IV appear to have no adverse effect on the native shrimp ('opae kuahiwi), as their densities are normal or greater than that of unaffected Section I (see graphs in Appendix D).

Not only are the densities of hihiwai and 'o'opu alamo'o (hi'ukole) much lower in Section V than in Section I, but these macrofauna are also significantly larger in size (see graphs in Appendices D and E). Animal densities in Section I are much greater, and competition for resources likely leads to smaller average sizes. The limited number of hihiwai and 'o'opu alamo'o (hi'ukole) in Section V that have migrated upstream across intermittent Sections III and IV during freshet flows apparently find optimum growing conditions with more food and growing space available. On the other hand, the hihiwai and 'o'opu alamo'o are of smaller average size in Section I below Dam #4 than in Section V, probably because of increased competition for food and growing space among a much higher overall density of macrofauna.
Lengths of Aquatic Macrofauna

The length (size) of ‘o’opu were recorded as total lengths during point counts and, like densities, the lengths of ‘o’opu varied in the different study sections. For example, in Section I and II, ‘o’opu alamo’o (hi’ukole) ranged in sizes from small to large (52.1mm average), whereas in Section V they were singularly large (75.3mm average), indicating that recruitment from the ocean occurred infrequently. ‘O’opu nopili was observed in Section V in October 1995, December 1995, April 1996, August 1996, and April 1997. ‘O’opu nakea was observed in Section V only in the October 1995 survey.

Hihiwai and ’opae kuahiwi also were observed to have a wide range of sizes in Sections I and II, indicating normal recruitment from the ocean. On the other hand, Section V was observed to have only large hihiwai and ’opae kuahiwi, suggesting their infrequent recruitment from the ocean. Similar to ‘o’opu alamo’o, hihiwai and ’opae kuahiwi were on average larger (39.8 mm and 41.4 mm, respectively) in Section V, than in Section I and II (16.1 mm and 27.4 mm, respectively).

‘O’opu Migration Above Main Dam

Normally, recruits, or young postlarvae ‘o’opu, average between 15 to 25 mm in length when they enter the mouth of a stream from the ocean. However, by the time ‘o’opu have traversed up to the study area (middle reach of Waikolu Stream), they have become much larger in size (<40 mm), and it is these larger-size ‘o’opu which have reached Section I (600–930 ft. elevation) that are defined in this monitoring study as "recruits", or the smallest size found in the study area.

One of the objectives of the monitoring study was to determine the efficacy of proposed mitigation measures to restore or improve the connection for recruits of
native aquatic macrofauna to migrate upstream from Section I (below Dam #4), across intermittent Sections III and IV, to Section V (above Dam #1). The most obvious means would be the confirmed presence of recruits in Section V.

Thus, in December 1996, the first, single recruit of ‘o’opu alamo’o (hi’ukole) was observed in Section V. Then, again four months later in April 1997, two recruits (35 mm) of ‘o’opu alamo’o were observed in Section V. Due to the light body coloration and slender width, it was obvious that these fish were recent recruits and not small stunted adults. Due to rainy weather the previous two months, intermittent Sections III and IV had days of perennial flows. Finding these recruits was significant because they were the first recent post-larval recruits to be seen in Section V. The 1997 Spring-time freshet flows in Waikolu Stream apparently induced and made possible upstream migration through Sections III and IV.

Two months later, in June 1997, six recruits (<30 mm) of ‘o’opu alamo’o (hi’ukole) were observed in Section V point counts. In addition, more recruits of ‘o’opu alamo’o were observed outside of the quadrat sampling areas in Section V. This June 1997 observation confirmed ‘o’opu alamo’o migration upstream through intermittent Sections III and IV and over the face of Dam #1 (the main MIS dam). The effectiveness of the weir assembly that had been installed on Dam #1 in late 1995 at the beginning of the study was apparent because no water flowed over the face of Dam #1, except that provided by the weir assembly on top of the dam (see Figure 4). This may be one of the first documented success of a fish passage device for a Hawaii stream.

No recruits of ‘o’opu nopili, ‘o’opu nakea, or hiihiwai were observed in Section V during the survey period October 1995 to February 1998. However, small to medium recruits of ’opae kuahiwi were commonly found in Section V throughout the study period.
Previous Studies

In 1991, the Hawaii Division of Aquatic Resources (HDAR) conducted a biological survey of Waikolu Stream (Puleloa, 1991). Density estimates from their study were similar to those reported in this study, for all species, except 'o'opu nopili. Puleloa (1991) reported much higher densities of 'o'opu nopili in all habitats than in this report; however, comparison is not possible because samplings were conducted in two different sections of Waikolu Stream. The HDAR study was conducted between sea level and approximately 350 ft. elevation, whereas the present study was conducted from 600 to 1,300 ft. approximate elevations. A possible conclusion from the HDAR study and this study is that densities of 'o'opu alamo'o have remained relatively stable in Waikolu Stream since 1991. The higher density of 'o'opu nopili observed in the HDAR study probably reflects the commonly observed greater abundance of 'o'opu nopili in the lower reach of Hawaii streams.

One of the objectives of this study was to analyze and incorporate data from a recent biological study of Waikolu Stream by the National Park Service (Brasher, 1997). Not only was a comparison of results not possible due largely to difficulty in interpreting data presented in graphical, rather than in tabular form, and to a difference in selected study sections of Waikolu Stream. A full discussion is presented in Appendix H.

Water Quality

Temperatures in the study area ranged from 64.6°F to 72.3°F (Table 2). Temperatures in April 1997 were cool (64.8–65.7°F in Sections III to V) due to the many weeks of wet and cloudy weather preceding sampling. The pH ranged from a low of 6.5 (Section III in April 1997) to 8.4 (Section V in December 1995). The low pH (6.6) observed in Section IV (October 1995) was likely the result of organic compounds that originated in the tributary behind Dam #3. This tributary drains the
ridge and contains surface runoff that is high in organics as evidenced by the tannin-stained water. The low pH found in Section III in April 1999 was likely the result of ground water emerging from dike compartments. Turbidity was low throughout the study area ranging from 0.2 (Section III) to 0.0 NTU (Section IV). Turbidity in Section III remained low even during the rainstorms of June 1997. This may have been due to groundwater input (ground water typically contains fewer suspended particles than surface runoff).

Conductivity ranged from a low of 42.5 µS/cm in Section IV in February 1998 to a high of 105.4 µS/cm in Section I in August 1996. Again, higher conductivity in some sections likely reflects a greater proportion of ground water. Dissolved oxygen values ranged from a low of 6.4 mg/L in April 1997 (Section IV) to a high of 9.7 mg/L in March/April 1996 in Section V. Dissolved oxygen was not measured in December 1995 because of a problem with instrument calibration. The unusually low conductivity (71.8 µS/cm) and pH (6.5) readings found in Section III was unexpected because much of the flow in Section III originated as ground water, probably coming from recently filled dikes. Since the water had a very short residence time in the dikes, the water chemistry appeared to be closer to that of rainwater than of stored ground water.
HYDROLOGICAL FINDINGS

Geological Setting and Stream Characteristics

Waikolu is a perennial stream whose flow is sustained by drainage of ground water into the stream channel from transversely oriented compartments of dike-confined ground water. Geologically, the stream is in a youthful stage of development and cuts a steep profile in a narrow V-shaped valley carved into dike-intruded permeable basalt lava flows. The Molokai Irrigation System diverts surface water from an approximately 3,000 ft. stretch of Waikolu Stream between elevations 730 ft. (lower "pump station" dam) and 990 ft. (upper "main" dam). The stream is in a geologically youthful stage of development, characterized by its occurrence in a "V" shaped valley by its steep non-meandering course, and by its narrow valley floor consisting mostly of loose unconsolidated coarse alluvium. This particular stretch lies in the middle reach of Waikolu Stream and comprises Sections II, III, and IV of the monitoring study.

Waikolu Stream drains northward to the ocean and cuts deep into permeable basalt lava flows that have been intruded by transversely occurring low permeability dikes oriented in a somewhat east-west direction (see Figure 10). This geological setting in an area of high rainfall on the northern slopes of East Molokai give rise to a typical Hawaii stream facing northeasterly Tradewinds—one having streamflow of a very flashy nature.

The combination of a steep stream profile, a series of transversely oriented dike compartments, and a high annual rainfall results in Waikolu Stream having a characteristic two-component flow characteristic—a baseflow component and a freshet flow component. The baseflow component comes from drainage of ground water stored in a series of dike water compartments (see Figure 10), is perennial,
exhibits modest variations between dry and wet periods, and increases in amount downstream as successive dike compartments are drained by the stream channel. On the other hand, the freshet component of natural streamflow consists predominantly of direct surface runoff from each rainfall event, exhibits swift and extreme changes in volume in a matter of hours, lasts a few days, comprises a small fraction of the total annual volume of streamflow, and largely cannot be captured and utilized by diversion dams.

Rainfall in Waikolu Valley

Annual Rainfall

Waikolu Valley receives a median annual rainfall ranging from 75 inches at its mouth to approximately 125 inches at its head, 3.5 miles inland. The median annual rainfall in the study area is approximately 100 inches.

Seasonal Rainfall

Seasonally, the dry months of the year in the study area are June through October, based upon three years of data from the MIS raingage at the East Portal (see Figure 11). The wet months are November through May. Typically, monthly rainfall during June to October is approximately five inches, whereas during November to May, monthly rainfall ranges between 10 and 25 inches. As might be expected, this same seasonal wet and dry month periods also occur in the headwater region of Waikolu Valley, based upon Raingage No. 540 located at the western top edge of the valley at elevation 3,380 ft. (see Figure 12) However, comparing Figures 11 and 12, monthly rainfall in the headwater region averages slightly less than that at the East Portal.
Daily Rainfall

During the study period 1995-1997, daily rainfall at the East Portal ranged between 0.5 and 13.6 inches during the wet Winter-Spring months, November to May, and less than 0.5 inch during the dry Summer months, June to October (see Figure 12). The daily rainfall averaged over each month for the period 1995 to 1997 is shown in Figure 14. As can be seen in Figure 14, daily rainfall averages about 0.4 inch during the wet months and less than 0.17 inch during the dry months.

1996 Drought in Waikolu Valley

One of the worst droughts in memory to hit the Waikolu watershed and directly affect the Molokai Irrigation System (based upon anecdotal data) occurred during August–November 1996. The monitoring study afforded the rare opportunity to collect definitive data on the extreme effects of pumpage on streamflow, groundwater levels, and native aquatic macrofauna in the study area. An overview of the effects on pumpage and stream and groundwater levels are shown in Figure 15.

At the beginning of July 1996, prior to the drought in the following four months, August to November, the Kualapuu Reservoir level stood at 16.0 ft. However, reservoir levels: (1) declined gradually to 12.6 ft. by the end of July and to 8.6 ft. by the end of August, (2) held steady in the range of 9.0 ft. during September, and (3) declined precipitously to 4.0 ft. during late October. Consequently, Wells 22, 23, and 24 were pumped almost around-the-clock during late October to mid-November when the MIS operating funds ran out and the wells had to be reduced to minimum pump-maintenance levels. Section III became dry first, followed by Section IV. Groundwater levels in monitor Well 4 (located in Section III) declined 25 feet, from 45 ft. below the top of casing to about 70 ft. below the top of casing (see Figure 15).
Fortunately, a rainy period began about mid-November in Waikolu Valley and as the rains continued off and on into March 1997 (see Figure 15), Kualapuu reservoir levels recovered to 20–22 ft., less than half of the reservoir’s maximum capacity of approximately 50 ft.

Post Drought Period

With the return of rainfall and the abatement of maximum pumping in November 1996, streamflow was observed to have returned to some parts of Section III by April 1997. Intermittently heavy rains and resulting freshet flows appear to have restored the perennial nature of Section III and IV for brief periods of time during February and March 1997.

Most significantly, in the June 1997 biological survey, six small (less than 30 mm) ‘o’opu Alamo’o (hi’ukole) were observed in Section V, indicating that young ‘o’opu (recruits) were able to migrate upstream through Sections III and IV and climb over the face of the main dam (Dam #4) into Section V.

Trend Analysis

Overview

Section III, the segment of Waikolu Stream most affected by pumping Wells 23 and 24, was monitored on a daily basis by the MIS telemetry data system (rainfall and well pumpage) and on a 15-minute interval basis by a solar-powered data logging system (stream level and groundwater level). An overview of this data is presented graphically in Figure 15.

Figure 15 documents that rainfall in Waikolu Valley causes a rapid response in streamflow and dike water recharge in Section III and that well pumpage, even
though heavy, does not prevent perennial flows from occurring in Section III during rainy periods.

Annotated Trend Analysis

The hydrological data is presented graphically in Figure 16 on a daily basis, by months, for detailed analysis of trends and effects. The trend graphs are presented for each month for the period, April 1996 to October 1997 and are annotated with both hydrological and biological observations.

Synopsis

A synopsis of the important hydrological and biological findings that occurred in the 19-month period are presented below:

1. During rainy periods, pumping Wells 22, 23, and 24 at their maximum level has no effect on intermittently occurring perennial flow in Sections III and IV (see Figure 15). Perennial flows lasting two to three days occurred three to four times during each month of November 1996, December 1996, and January 1997.

2. In December 1996, the first recruit of ‘o’opu Alamo’o (hi’ukole) was observed upstream in Section V, above the main dam. ‘Opae kuahiwi recruits were also observed, as they were throughout the period October 1995 to February 1998. However, recruits of ‘o’opu nopili, ‘o’opu nakea and hiihiwai were not found in Section V during the study period (‘o’opu nakea normally thrive in the lower reaches of a stream).

3. Following rainy periods during March 1997, two small recruits of ‘o’opu alamo’o (35 mm) were observed again in Section V. Apparently sufficient perennial flows occurred in intermittent Sections III and IV to provide upstream movement of post-larval ‘o’opu alamo’o.
4. Following rainy periods during May 1997, six small recruits of ‘o’opu alamo’o (less than 30 mm) were observed in Section V point counts and more outside of designated point count sampling Areas. The only observed flow over the main dam (Dam #1) occurred over the steel weir plate installed in early 1996.

5. During the rainy periods mentioned above, pumping of wells 23 and 24 made effective use of ground water stored below stream level in dike compartments, while at the same time allowing freshet flows to recharge depleted groundwater storage. This conclusion is based upon the groundwater levels observed in monitor Well 4.

6. Data from Well 4 demonstrate that groundwater levels in the dike compartments are almost instantaneously recharged by freshet flows.

7. In August 1997, only one ‘o’opu alamo’o recruit (compared to 12 in June 1997) was observed in perennial Section I, suggesting that a large recruitment pulse had occurred in June 1997, presumably due to the heavy rains that occurred during the preceding Winter and Spring.

8. In October 1997, ‘o’opu alamo’o recruits were not observed in Section V, indicating that recruitment of ‘o’opu alamo’o probably occurs only during rainy periods similar to those of Spring 1997.
OVERALL CONCLUSIONS

Biological

1. Below the lower dam, the perennial nature of Waikolu Stream and its native aquatic macrofauna are intact and unaffected by upstream diversions and groundwater withdrawal.

2. During rainy periods and times of good flow, native aquatic macrofauna are able to migrate an intermittent segment (Sections III and IV) of Waikolu Stream. This has been confirmed by observation of juvenile ‘o’opu alamo’o above the main dam in Section V, which in turn proves that the steel weir plate assembly installed is effective in permitting ‘o’opu migration over the main dam. In time, the weir plate assembly may result in an increase in the population of macrofauna above the main dam.

3. Above the main dam, the native aquatic macrofauna are larger in size and less dense in population than normal.

4. A 2,200 ft. segment of Waikolu Stream is dewatered at times by groundwater pumping of valley Wells 23 and 24, leaving little or no habitat for native aquatic species to survive.

5. Accepting the existing condition of diverted and upper stretches of Waikolu Stream is a good compromise. Farmers will have their water for irrigating their agricultural crops and the native aquatic macrofauna are able to survive and complete their life cycle. The populations of stream biota, both above and below the diversions were found to be relatively stable although a segment of Waikolu Stream is intermittent. Continuation of diversion and
groundwater withdrawal with the added weir plate assembly on the main dam will likely maintain macrofauna populations similar to current levels. Lower numbers and larger sizes (compared to below the diversions) of ‘o’opu alamo’o and hihiwai will continue to thrive above the main dam.

6. ‘O’opu are clearly impacted by the intermittent segment of Waikolu Stream caused by MIS groundwater pumping in the valley. However, studies of ‘o’opu clearly indicate that ‘o’opu are not in any danger of extinction because they, unlike salmon, may migrate and re-populate other streams rather than instinctively returning to their birth stream.

Hydrological

1. Pumping Wells 23 and 24 in the valley causes Section III and eventually Section IV to become intermittently dry, except during the rainy Winter-Spring months of the year (see Figure 11, 12, and 13).

2. Preliminary tests indicate that pumping new Wells 5 and 6 in the valley will cause some reduction in flow in Section II as dike water is withdrawn, but Section II probably will remain perennial being fed by Napuleloa spring, a perennial perched water source unaffected by pumping of dike water.

3. Pumping the valley wells (5, 6, 23, and 24) allows freshet flows to recharge depleted groundwater storage in the dike compartments, effectively capturing a portion of freshet flows that otherwise would quickly discharge into the ocean.

4. Pumping Well 22 in the tunnel has no discernible effect on Section III. This is because Well 22 develops ground water from different dike compartments. Based upon orientation of the dikes and distance from Waikolu Stream, any effect on streamflow will occur in Section IV, if at all.
5. Releasing a portion of water back into the stream channel from Wells 5 and 6 is not necessary because the perennial flow immediately downstream of the wells is maintained by Napuleloa Springs, a perched water source that is unaffected by pumping.

6. Releasing a portion of water back into the stream channel from Wells 23 or 24 cannot restore perennial flow in Waikolu Stream. This is because larger volumes of water from freshet flows rapidly sink below the stream channel, recharging the underlying dike water compartments.

7. The steel weir plate assembly which was installed on top of the main dam intake grating in late 1995 has proven successful in allowing upstream migration by the observation of recruits (juveniles) of ‘o’opu alamo’o in study Section V above the main dam on three separate occasions. These observations also prove that construction of a fish ladder on the main dam is not necessary.

8. Construction of a fish ladder on the face of the main dam is not necessary. It was conjectured beforehand and verified during the two-year monitoring study that ‘o’opu can climb up the face of the dam kept perennially wet by flow over the newly installed steel weir plate assembly.

9. Pumping Wells 5 and 6 is expected to have little, if any, effect on the perennial nature of Waikolu Stream below the lower pump station dam. This is because the dam sits on a dike, separating downstream dike-fed perennial flows from the dike compartments tapped by Wells 5 and 6.

Operational (Pumping)

1. Pumping any of the MIS wells makes effective use of groundwater storage and ensures a reliable water supply for the Molokai Irrigation System.
2. Depleted groundwater storage is readily replenished by freshet flows, reducing flows that otherwise would reach the ocean. A portion of freshet flows that otherwise would discharge into the ocean. Data from observation Well 4 shows that groundwater levels below stream level are rapidly restored by freshet flows.

3. The Molokai Irrigation System cannot meet the irrigation water needs of its customers without pumping ground water from its wells.

4. The Molokai Irrigation System, on average during the period October 1, 1995 to November 30, 1997, obtained 54% of its water supply from surface water diversions in Waikolu Valley, 28% from a groundwater well and seepage in the tunnel, and 18% from groundwater wells in the valley.

5. The Molokai Irrigation System has in place an optimized groundwater withdrawal plan that provides a reliable, cost effective water supply for irrigation purposes and at the same time minimizes the impact on Waikolu Stream. This plan is accomplished with a SCADA (supervisory control and data acquisition) system with telemetered remote control from MIS headquarters at Kualapuu. A programmed pumping sequence (see Pumping Sequence, pg. 16) spreads out groundwater withdrawals to the different wells in a pattern that is hydrological and economically and environmentally optimized. Existing withdrawals are spread out in the different dike compartments and with the addition of Well 5 and 6, groundwater withdrawal and recharge will be more spread out within the diverted section of the stream.
Plan and Profile of Waikolu Stream Between Dams #1 and #4
Overview of Trend Analysis

Figure 16

--- Rainfall (-5 in.) --- Pumpage --- Stream Level --- Groundwater Level
900' E1. (in) Well 23 & 24 (mgd) (x1/15 ft) Well 4 (ft)

Water Resource Associates
All Data5
Monthly Rainfall in Waikolu Valley (at East Portal)
1995-1997

Data source: MIS Telemetry Data

Rain gauge is down from 8/25/97 to 9/15/97, 11/26/97 to 12/31/97

Monthly Rainfall in Headwater Region of Waikolu Valley
Raingage 540 (Sta. I.D. 9404), Elev. 3,350 ft.

31-year Average is for period 1965-1995

Water Resource Associates
Daily Rainfall in Waikolu Valley (at East Portal)

1995

Inches

Jan 1 Feb 1 Mar 1 Apr 1 May 1 Jun 1 Jul 1 Aug 1 Sep 1 Oct 1 Nov 1 Dec 1

Daily Rainfall in Waikolu Valley (at East Portal)

1996

Inches

Jan 1 Feb 1 Mar 1 Apr 1 May 1 Jun 1 Jul 1 Aug 1 Sep 1 Oct 1 Nov 1 Dec 1

Daily Rainfall in Waikolu Valley (at East Portal)

1997

Inches

Jan 1 Feb 1 Mar 1 Apr 1 May 1 Jun 1 Jul 1 Aug 1 Sep 1 Oct 1 Nov 1 Dec 1

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<th>Ground Water Level in Well 4** (ft)</th>
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* Referenced to low point of concrete ford
** Depth to water below top of casing

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* Referenced to low point of concrete ford
**Depth to water below top of casing

Appendix C
Observed Shrimp Density per Study Section: Opaee Kuahiwi

Study Sections of Waikolu Stream

Water Resource Associates
# Observed Snail Density per Study Section: Hihiwai

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- **Snails per Square Meter**
- **Appendix D**
- Water Resource Associates
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Study Sections of Waikolu Stream

Water Resource Associates
Observed Fish Density per Study Section: O'opu Nopili

Study Sections of Waikolu Stream

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**Fish per Square Meter**

Appendix F

Water Resource Associates
### Observed Habitat: O'opu Nopili

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**Fish per Square Meter**

**Habitat**

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Snails per Square Meter

Habitat

Water Resource Associates
Molokai Water Working Group Members

**Name & Address**

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**Governor's Molokai Visit (21 Oct 96)**

**Water Availability:**

1. status report on water issues at each public mtg

   availability analyzed by non-biased agency

2. expedite decision/appeal process for "Mol Ranch permit" (?)

3. repair of Waihanau intake, connection to MIS

**Colette Machado**
HCO 1 Box 741
Kaunakakai, Hawai'i 96748

**Thomas Matayoshi, Manager**
Moloka'i Irrigation System
Department of Agriculture
P.O.Box 205
Ho'olehua, Hawai'i 96729

**Wayne Meyer**
P.O.Box 454
Kaunakakai, Hawai'i 96748

**Ed Misaki**
Moloka'i Preserves
The Nature Conservancy
1116 Smith Street 201
Honolulu, Hawai'i 96813

**Ed Misaki**
also invite:

**Malcolm Davis**
Glen Davis

**Alan Holt**
Volunteerism
Children's Center
Kaunakakai 96748

**William Pfeil**
P.O.Box 317
Kaunakakai, Hawai'i 96748

**Glenn Ioane Teves**
Puakala Farms
P.O.Box 261
Kualapuu, Hawai'i 96797

**DeGray Vanderbilt**
P.O.Box 1348
Kaunakakai, Hawai'i 96748

**Wren Wescoatt, Chair**
Moloka'i Planning Commission
P.O.Box 81
Kaunakakai, Hawai'i 96748

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1. status report on water issues at each public mtg

   availability analyzed by non-biased agency

2. expedite decision/appeal process for "Mol Ranch permit" (?)

3. repair of Waihanau intake, connection to MIS
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Gill Waikolu

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I wonder if sufficient to set IF5.
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original - fax is going around.
TO: Honorable Timothy Johns, Chair
Commission on Water Resource Management

FROM: James J. Nakatani
Chairperson, Board of Agriculture

SUBJECT: Emergency Pump Replacements, Waikolu Valley, Molokai Irrigation System

This is to inform you that the Department of Agriculture will be conducting pump repairs and replacements for our wells in Waikolu Valley shortly and although we do not believe pump installation permits are required, please review the work described below for conformance with the water code.

The Molokai Irrigation System (MIS) has experienced pump and motor failure at both Well Nos. 22 and 23. Well No. 24's pump is operating but needs to be repaired. Due to the loss of pumping capacity and the prolonged drought on Molokai, our Kualapuu Reservoir has approached a critical depth of 13 feet. With the summer weather forecast indicating no or little rainfall, the MIS is in grave danger of running out of water.

The Department has recently declared an emergency pursuant to section 3-122-89, HAR, and requested the Governor for release of emergency CIP funds to repair the three pumps. The work will consist of removing each submersible pump and motor and either repair or replace each pump and motor together with appurtenant works.

If you have any questions or if more information is required, please contact me at 973-9551 or have your staff contact Paul T. Matsuo, Administrator and Chief Engineer of the Agricultural Resource Management Division, at 973-9473.
Over the past five months (November 1999 to present), the Molokai Irrigation System has experienced drought conditions and our principal water source, the Waikolu Stream, has now reached a critical stage with no surface flows entering into our system.

Further, the weather forecast for the foreseeable future issued by the National Weather Service (see attached letter dated 3/13/00) indicates that worsening drought conditions will continue into the spring and summer. The Mayor of Maui issued a drought emergency declaration last week (3/13/00) for the County of Maui.

For the past three years, the Molokai Irrigation System has been heavily pumping the dike-confined waters through wells in the Waikolu Valley floor. However, the existing pumps are beginning to experience fatigue and wear and tear from the continuous use. Two of the pumps have various mechanical breakdowns and another is barely operating; all three pumps need to be replaced. We are now in the process of obtaining estimates for a major overhaul/replacement of these three pumps and motors.

A combination of the above outlined conditions and breakdowns will severely impact the Molokai Irrigation System's ability to meet irrigation water demands over the coming months. This will cause a major economic impact to the fragile farming community because most crops will be lost without irrigation water and farms will have to shut down and lay off employees (see attached letters from Molokai water users). I am proclaiming an emergency condition due to a natural drought disaster pursuant to section 3-122-89, HAR.
The Department has evaluated its options to correct this situation and would like to initiate the following:

1. Replace the worn out Waikolu Valley pumps. We plan to submit a request to the Governor for approval to transfer unrequired balances (estimated at $300,000 out of a $600,000 appropriation) from the Maunawili Ditch Improvement CIP Project, Act 116, Item A-9B, SLH 1998, to Miscellaneous Health, Safety, Code, and Other Requirements, Statewide CIP Project, Act 328, Item A-11, SLH 1997.

Due to concerns expressed by the Waimanalo community regarding the Kailua Reservoir Breach Project, the Department will defer the project. Instead, we will use $300,000 of the appropriated $600,000 in construction funds to complete drainage improvements to upper portions of the Maunawili Ditch System.

The Department would like to use the remaining balance of $300,000 to replace the three Waikolu Valley pumps. Since there is no current authorized CIP appropriation for the Molokai Irrigation System to transfer funds into, the Department plans to utilize another Department CIP project, Miscellaneous Health, Safety, Code, & Other Requirements, Statewide CIP Project, to initiate the Waikolu pump replacement work before the June 30, 2000, lapsing deadline. The transfer is allowable in accordance with the provisions of Act 328, SLH 1997; special provisions section 192, SLH 1997; and the Governor’s project adjustment fund authority under Act 328, special provisions section 186, SLH 1997.

2. The State Procurement Administrative Rules, pursuant to section 3-122-89, HAR, allows the head of a purchasing agency to proclaim the existence of an emergency condition arising by reason of a major natural disaster which creates a threat to public health, welfare, or safety. Upon the proclamation of an "emergency condition" by the Chairperson, the Department plans to request from the State Chief Procurement Officer authority for emergency procurement under Chapter 3-122, Subchapter 10, of the State Procurement Code’s HAR.
This allows the direct award of a contract to a qualified contractor without regard to public notice and bidding requirements.

3. Obtain firm estimates on the scope of work from qualified contractors to determine the exact funding amount to be encumbered.

4. Request an allotment of the transferred amounts for the project through the normal process from the Governor with the necessary and required documents to conform with Governor’s Executive Memorandum No.97-07.

If you have any questions, please contact me at 973-9551.

Attachments

/ c: CWRM (L. Nishioka)
Honorable Benjamin J. Cayetano  
Governor of Hawai‘i  
Executive Chambers  
Hawai‘i State Capitol  
Honolulu, HI 96813  

Dear Governor Cayetano:  

The National Oceanic and Atmospheric Administration (NOAA) today announced that the United States is in the midst of a worsening drought following the warmest winter on record. While Hawai‘i is not specifically mentioned in the attached official press release, portions of the state are suffering from a period of prolonged dryness dating back to late 1997 and early 1998. Areas most seriously affected include the leeward areas of the Big Island and Maui as well as the islands of Moloka‘i and Lana‘i. Several climate monitoring rain gages within these areas show the period from January 1997 through December 1999 to be the driest two-year period on record.

The abnormally dry conditions affecting the island chain are occurring despite the presence of a La Niña in the Pacific. Although a La Niña event is loosely linked to greater than normal winter rainfall in the Hawaiian islands, records indicate that rainfall can be quite variable. The outlook for drought recovery in the most seriously affected areas of the Hawaiian Islands is not promising. With the warm summer months approaching, the prospect for substantial rainfall over most of the drought-stricken areas is diminishing. Furthermore, higher temperatures during the summer will place additional stresses on agriculture and higher demands for water from human consumers.

If you have any questions or wish to have a briefing concerning the ongoing drought, please do not hesitate to contact the Honolulu Forecast Office at (808)973-5272.

Sincerely,

[Signature]

James C. Weyman  
Area Manager, State of Hawai‘i  
National Weather Service

Enclosure

cc: State Adjutant General  
Vice-Director, Hawai‘i Civil Defense  
Chairperson, Board of Land and Natural Resources
DROUGHT GRIPS NEARLY HALF OF U.S.

According to NOAA's National Weather Service, the United States is in the midst of a worsening drought, following the warmest winter on record. This threat to individuals, agriculture, and industry throughout the country brought together representatives of the U.S. Department of Commerce, U.S. Department of Agriculture, and U.S. Department of Interior, as the federal government issued its first spring drought forecast.

"The news is not good," declared Secretary William Daley of the U.S. Department of Commerce. "The drought of 1999 remains with us in the new century—and our data indicate drought conditions are probably going to get worse before they get better."

Several southern states experienced their driest February on record; and the spring drought outlook released today appears bleak.

"The La Niña pattern which has dominated the United States for the past two years has created a serious moisture deficit in many areas. This could seriously affect farmers, water resource managers, navigation interests and the tourism industry. Forewarned is forearmed," said NOAA Administrator D. James Baker.

The spring drought forecast says the drought is going to persist and intensify. Hardest hit will be southern Arizona, Texas, Louisiana, Arkansas, Alabama, Tennessee, Florida and Georgia in the south, and Illinois and Indiana in the north central U.S.

Secretary Dan Glickman of the U.S. Department of Agriculture last summer just what a drought can do to farmers. Looking to the be ahead of the curve, prepared for dry weather when it comes ar
mechanisms that will protect farmers and prevent widespread losses.*

-Drought is a serious threat to the health, well-being and economy of the nation, causing economic and social losses comparable to that of major hurricanes. Louisiana, Mississippi and Alabama all experienced their driest February in 106 years. Already this year wildfires have claimed 208,000 acres – nearly four times the losses at this time last year. The areas impacted by the drought of 2000, according to NOAA, parallel the drought of 1988, which was the most costly weather disaster in history with an estimated $40 billion in losses. The average annual cost of droughts is over $6 billion.

Last year’s NWS climate forecast anticipated drier conditions in the southern U.S. According to Jack Kelly, Director of the National Weather Service, “This year, for the first time, we are issuing a drought forecast. We are able to do this because of the advances made by the climate research community.”

NOAA scientists also point out drier than normal conditions mean a reduced possibility of significant river flooding this spring. However, Kelly cautions communities to be on guard against severe weather and flash flooding.

U.S. Geological Survey Director Charles G. Groat noted, “Based on data from the USGS’s nationwide stream gage network, there are some areas of the country – particularly east of the Mississippi River – where streamflows are well below normal for this time of year. “Think of it as not having enough money in the bank. We have not had enough water during our normally wet winter to put in our groundwater bank for our normally dry summer and fall. We anticipate additional drought problems in the months ahead based on the below normal streamflows and groundwater levels we’re seeing now.”

The drought is expected to continue through spring.

The National Weather Service is an agency of the Commerce Department’s National Oceanic and Atmospheric Administration, dedicated to protecting lives and property through the timely issuance of weather, water and climate forecasts and warnings. Complete information is available at http://www.nws.noaa.gov.

- 30 -
March 29, 2000

Dr. Robert M. Granger, Chairperson
Molokai Irrigation System
Water Users Advisory Board
P. O. Box 371
Kaunakakai, HI 96748

Dear Mr. Granger:

Thank you for your March 10, 2000 letter regarding the status of the water levels and system capabilities of the Molokai Irrigation System. However, due to the drought conditions that prevailed during the winter of 1999 to 2000, water levels were not replenished as expected. We are told by the National Weather Service Forecast Office that the drought may extend into spring and possibly through summer. Water users of the system should plan their plantings and irrigation schedules to meet the anticipated potential water reduction.

We are aware that the three pumps in Waikolu Valley need to be replaced and have begun evaluating our options to effectuate this. We need to first obtain a firm estimate of the costs so we may determine how much funding and from where such funding can be acquired.

Notices to water users will be scheduled to explain the water shortage situation in the next billing and the existing conservation restriction will be increased to 25%. Kukui Molokai has already been requested to pump their Well No. 17 and cut back on the irrigation of their golf course.

The installation of a new pump at Kukui Molokai's Kakalahale Well is problematic as it will involve approvals and permits that require the Commission on Water Resource Management to hold public hearings before any work can begin. These permit proceedings can take up to three years, especially for Molokai.
We are working to improve the maintenance of the system’s mechanical equipment and provide the proper maintenance schedule for optimum effectiveness.

We will keep you informed on any actions taken to avert a disaster to the Molokai Irrigation System. At the present time, we are trying to put a plan into place and are in the process of obtaining the necessary approvals.

Sincerely,

JAMES J. NAKATANI
Chairperson, Board of Agriculture

c: S. Callejo
T. Matayoshi
Mr. James Nakatani, Chairman
Hawaii State, Department of Agriculture
1428 South King Street
Honolulu, Hawaii 96814

Dear Mr. Nakatani:

The MIS Advisory Board held a special meeting yesterday to assess the current status of the MIS with regards to determining near future water levels and system capabilities. It appears we are facing an emergency situation. This letter will summarize the system capabilities, conditions and secondly, recommendations to possibly avert a disaster.

System:
- Present usable level is 7 feet compared to 19 feet this time last year.
- Waikolu valley wells 22, and 24 are not operating due to various problems. Well 23 is running but in serious need of repair.
- Present input is a meager 100,000 to 200,000 a day over demand. Based on previous pattern history, demands will soon start to increase as summer approaches. Without serious rains, the system will be without water before the end of May.

Recommendations:
- To avert the possibility of an economic disaster for Molokai, it is advised that emergency funds be found for the purpose of repairing wells 22, 23 and 24 and that these 3 wells be online by June 1, 2000. The exact cost of this operation is unknown at this time but rough estimates are in the $120,000 range.
- That all users be notified of the situation and asked to conserve use, especially for leaks and be conscious of over-watering possibilities. Kalua Koi should be required to pump 150% of their daily use for the duration of the crises.
- That the DOA consider installing a pump on the Kalua Koi/Molokai Ranch well near the West Portal and seek emergency allocations from the Commission on Water Resource Management. Cost in the $100,000 to $300,000 range.
- That a maintenance system be implemented to avoid such deterioration of equipment in the future. It is obvious that the system has had minimum monies spent on maintenance and that increased demand, on this poorly maintained equipment, has contributed to the emergency.

With these measures and some rain, we may avert a crises. Without steps to restore these wells, we will surely face economic disaster for many Molokai farmers and jeopardize over 200 agricultural jobs.

Respectfully submitted by:

Robert M. Granger, Chair
MIS Advisory Board
cc. Paul Matsuo
Benjamin J. Cayetano, Governor
March 15, 2000

Mr. Peter H. Eichhorn, General Manager
Hawaiian Research, Ltd.
P. O. Box 40
Kaunakakai, HI 96748-0040

Dear Mr. Eichhorn:

This is in response to your March 10, 2000 letter concerning the Molokai Irrigation System (MIS). As you are aware, there has been very little opportunity to store up our reservoir due to the low rainfall winter season and the financial condition of Kukui Molokai has not provided adequate revenue for the program. We are working with Kukui Molokai to arrange for payment and injection of water into the MIS.

As for repair of the pumps, we have one pump (Well No. 24) temporarily back on line. We are in the process of obtaining estimates to permanently repair our pumps. Two contractors, Roscoe Moss Hawaii Inc. and Mel’s Water Works Hawaii Incorporated, are scheduled to visit the pumps, and one consultant has been engaged to prepare drawings for the bids on Well No. 22. Estimates indicate the cost of repair at $50,000.

The source of funds for the repairs will be determined after a firm estimate is obtained. One source of funds would be the lump sum payment by Kukui Molokai on their delinquency.

We appreciate the efforts and sacrifices which the Molokai farmers are making; however, unless we get some fairly heavy rainstorms, even the dikes will not provide adequate pump water. We believe that we are approaching the water level as we have been pumping those dikes very heavily for over three years (going on four years).

Sincerely,

PAUL T. MATSUO, P.E.
Administrator and Chief Engineer
Agricultural Resource Management
Division

C: MIS Water Users Advisory Board (R. Granger)
Chairperson, Board of Agriculture
T. Matayoshi
March 10, 2000

Paul T. Matsuo
State of Hawaii
Department of Agriculture
1428 South King Street
Honolulu, HI 96814-2512

Dear Mr. Matsuo,

A disturbing situation has developed on Molokai with the Molokai Irrigation System. As of March 10, 2000 the Molokai Irrigation System (which serves 90% of Molokai’s Agriculture) was down to 7’ of usable water. This is 15’ less than we had last year at this time.

Until Molokai can receive some normal rainfall to relieve irrigation pressures and give some much needed natural inflow into the reservoir, we need to be sure all possible sources of water are being utilized and all users are trying to conserve as best they can.

Apparently the Molokai Irrigation System currently has 3 pumps offline because of mechanical or electrical breakdowns. I would like to ask for your support in getting at least two of these pumps on line immediately and trying your best to make funding available to be sure they can be operated to their maximum.

Kaluakoi needs to be encouraged to pump water to their maximum output. Any breakdown of their system while pulling water out of the reservoir can be devastating to the reservoir level. Any pressure you can exert on them to ensure that their system is operating dependably would be helpful.

The major water users on Molokai have tried very hard to conserve and reduce water usage. Molokai Hay has taken a drastic reduction in yield in their attempt to cut water use. George Mokuau has suffered through reduced sweet potato yields and has cut his acreage to drop his water usage. Cargill Seeds has converted 100% of their fields to drip and has increased use of their brackish well water to further reduce the demand on the Molokai Irrigation System. Coffees of Hawaii has stopped irrigating their windbreaks and have cut back on irrigating the coffee trees to the point of losing valuable yields. At Hawaiian Research, we have moved 55 acres (25% of our Molokai Irrigation System served acreage) to Oahu and have converted our entire farm to drip irrigation. Everyone, at great expense of infrastructure and yields have reduced water usage and really can’t squeeze much more and stay in business.
I'm sure you are aware of all the jobs on Molokai that are dependent on agriculture and how severely a failure to deliver water to the farmers would affect Molokai's economy. Please be assured Molokai's farmers will continue to do our best to conserve water and we hope the State will give the Molokai Irrigation System the needed funding to meet our needs.

Sincerely,

Peter H. Eichhorn
General Manager

PHE/vde

cc. Gov. Benjamin Cayetano
    James Nakatani
    Thomas Matayoshi
March 20, 2000

Paul T. Matsui, Administrator
Agricultural Resource Management Division
Department of Agriculture
P. O. Box 22159
Honolulu, Hawaii 96823

Dear Paul:

Please find enclosed a copy of the Waikolu Stream Biological and Hydrological Monitoring Study which is being returned as requested. I was pleased with the report’s conclusion indicating that continued pumping of your well system should not adversely affect the biota in the Waikolu Stream.

I look forward to your continuing efforts to expand the availability of water for the agricultural community on Molokai.

Sincerely,

Harold Edwards
Senior Vice President
Community Division

HE/ts
Enclosure
<table>
<thead>
<tr>
<th>TO</th>
<th>INIT.</th>
<th>TO</th>
<th>INIT.</th>
<th>FOR</th>
<th>PLEASE</th>
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<td>FUJII, N.</td>
<td>✔</td>
<td>NAKANO, D.</td>
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<td>Signature</td>
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<td>JINNAI, R.</td>
<td></td>
<td>YODA, K.</td>
<td></td>
<td></td>
<td>Xerox copies</td>
</tr>
</tbody>
</table>
Dear Member,

Waikolu Hydrological and Biological Studies

We understand that you have been sent a copy of the Hydrological and Biological Monitoring Report which the Department of Agriculture used in preparing its comments for managing the Waikolu Wells serving the Moloka'i Irrigation System. It was sent to you at our request, for your review, anticipating the Commission's consideration of an amendment to the interim Water Use Permit #220. The amendment to this water use permit will also consider permanent pump installation permits for Waikolu Wells #5 & 6 (Well Nos. 0855-04 & 05), which were used in the course of this study as a special condition of their interim permit.

Our specific request for your review is to help us prepare the Moloka'i Water Working Group for a presentation by the Department of Agriculture and its consultants to the group. Such a presentation will be scheduled prior to the Commission's consideration of the deferred portions of the original Department of Agriculture's request for additional amounts from these wells.

For your information, the twelve-month moving average for daily pumpage from the existing Waikolu Wells is shown below:

<table>
<thead>
<tr>
<th>Well</th>
<th>Pumpage (mgd)</th>
</tr>
</thead>
<tbody>
<tr>
<td>#22 (0855-01, within the Moloka'i Tunnel)</td>
<td>0.000</td>
</tr>
<tr>
<td>#23 (0855-02, below upper stream diversions)</td>
<td>0.110</td>
</tr>
<tr>
<td>#24 (0855-03, near upper stream diversion)</td>
<td>0.116</td>
</tr>
<tr>
<td>Add in stream diversions:</td>
<td></td>
</tr>
<tr>
<td>Diversion #1 (upper dam)</td>
<td>0.000 mgd</td>
</tr>
<tr>
<td>Diversion #2 (side waterfall dam)</td>
<td>0.000 mgd</td>
</tr>
<tr>
<td>Diversion #3 (lower dam)</td>
<td>0.000 mgd</td>
</tr>
<tr>
<td>Additional water harvested from the transmission tunnel</td>
<td>0.000*mgd</td>
</tr>
<tr>
<td>Total delivered to Moloka'i Irrigation System (MIS)</td>
<td>0.226*mgd</td>
</tr>
</tbody>
</table>

*amounts from the tunnel itself are not being reported

If you have any questions, please call Charley Ice at 587-0251 or toll-free at 984-2400 extension 70251.

Sincerely,

Harold Edwards
Collette Machado
Sarah Sykes
Mahealani Davis
Moloka'i Water Working Group
EVERY MONDAY MORNING

Date: 03/20/00

From: Tom Matayoshi
Division/Branch: Molokai Irrigation System

Weekly Report on MIS Water Status

Remarks:

Waikolu Valley rainfall (week) 0 inches
Inflow 35.33 MGD (irr.)
Outflow 30.06 MGD (agr.)
Reservoir Depth 8.06 feet
Kukui (Molokai) Inc. pump 97.68 hours

Post-H Fax Note 7671

If you do not receive the total number of pages noted above and/or have problems with our transmission, please contact the sender at (808) 973-9473 (Laura).
March 24, 2000

FAX MEMORANDUM

TO: Charlie Ice
FROM: Dan Lum
SUBJECT: MIS Records


Other data that may be of interest to you is in Appendix C, "Daily Rainfall, Stream and Groundwater Levels, and Pumpage in Waikolu Section III (Oct. 1995 – Nov. 1997)."

The above data was compiled from MIS records. In Appendix B, the "intake" water is represented by the last column, entitled "Diverted Surface Water" and is a calculated value obtained by subtracting the In-Tunnel Ground Water and the Valley Ground Water from the West Portal water.

If you have any questions, please call me.

DAN LUM

c: Paul Matsuo
Overview of Trend Analysis

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Water Resource Associates
All Data5
Weekly Report on MIS Water Status

Waikolu Valley rainfall (week)         0" inches
Inflow                                           35.33 MGD 667
Outflow                                          30.06 MGD 657
Reservoir depth                                 8.03 feet
Kukui (Molokai) Inc. pump                      97.68 hours
Plan and Profile of Waikolu Stream Between Dams #1 and #4
SUMMARY OF IRRIGATION SOURCES OF SUPPLY AND USES (IN MGD)

<table>
<thead>
<tr>
<th>ITEM</th>
<th>EXISTING</th>
<th>PROPOSED EXPANSION</th>
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</thead>
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<tr>
<td>EXISTING SOURCES: MIS IN WAIKOLU VALLEY</td>
<td>4.0</td>
<td>0.5</td>
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<tr>
<td>: MRL MOUNTAIN SYSTEM</td>
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<tr>
<td>NEW SOURCES: MIS WELLS IN WAIKOLU VALLEY</td>
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<td></td>
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<tr>
<td>: DHHL'S WAIHANAU INTAKE</td>
<td></td>
<td></td>
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<tr>
<td>: EXPANSION OF MRL SYSTEM</td>
<td></td>
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<tr>
<td>TOTAL SOURCES OF SUPPLY</td>
<td>4.5</td>
<td>3.8</td>
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<tr>
<td>EXISTING USES: LOSSES FROM KUALAPUU RESERVOIR</td>
<td></td>
<td></td>
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<tr>
<td>: EXISTING MIS CUSTOMERS</td>
<td>3.5</td>
<td>0.5</td>
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<tr>
<td>: MRL'S EXISTING USES</td>
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<td></td>
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<tr>
<td>NEW USES: MIS CUSTOMERS W/ DHHL PREFERENCE</td>
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<tr>
<td>: MIS CUSTOMERS W/O DHHL PREFERENCE</td>
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</tr>
<tr>
<td>TOTAL USES</td>
<td>4.5</td>
<td>3.8</td>
</tr>
</tbody>
</table>

NOTE:
In accordance with Section 168-4 of the HRS, DHHL Homesteaders have a prior right to 2/3 of the MIS supply from Waikolu stream and wells.

PRESENT STATUS OF IRRIGATION WATER SOURCES IN CENTRAL MOLOKAI & PROPOSED EXPANSION
### Surface Intake Expansion of MIS System

<table>
<thead>
<tr>
<th>Yield (GPD)</th>
<th>Source</th>
<th>Cost ($1,000)</th>
<th>Annual Labor Cost ($1,000)</th>
<th>Annual Equipment Maint. ($1,000)</th>
<th>Power Cost Per 1000 gal. ($1,000)</th>
<th>Assumed Annual Cost ($1,000)</th>
<th>Total Annual Cost ($1,000)</th>
<th>Total Cost Per 1000 gal. ($1,000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>900,000</td>
<td>Rehab/Restore DHHL Waihanau Intake</td>
<td>1,375,000</td>
<td>15,000</td>
<td>5,000</td>
<td>0.00</td>
<td>0.00</td>
<td>20,000</td>
<td>0.061</td>
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<tr>
<td>600,000</td>
<td>Raise East Kawela Dam &amp; Add Transmission Capacity</td>
<td>2,225,000</td>
<td>20,000</td>
<td>10,000</td>
<td>0.00</td>
<td>0.00</td>
<td>30,000</td>
<td>0.137</td>
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<tr>
<td>200,000</td>
<td>Expand Kaliihi/Lualalohe System</td>
<td>300,000</td>
<td>10,000</td>
<td>2,000</td>
<td>0.00</td>
<td>0.00</td>
<td>12,000</td>
<td>0.164</td>
</tr>
<tr>
<td>90,000</td>
<td>Connect East Kaunakakai Gulch</td>
<td>100,000</td>
<td>5,000</td>
<td>2,000</td>
<td>0.00</td>
<td>0.00</td>
<td>7,000</td>
<td>0.213</td>
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<tr>
<td>1,790,000</td>
<td></td>
<td>4,000,000</td>
<td>50,000</td>
<td>19,000</td>
<td>0.00</td>
<td>0.00</td>
<td>69,000</td>
<td>0.380</td>
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### Expansion of MIS System with Waikolu Valley Well Improvements

<table>
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<tr>
<th>Yield (GPD)</th>
<th>Source</th>
<th>Capital Cost ($1,000)</th>
<th>Annual Labor Cost ($1,000)</th>
<th>Annual Equipment Maint. ($1,000)</th>
<th>Power Cost Per 1000 gal. ($1,000)</th>
<th>Assumed Annual Cost ($1,000)</th>
<th>Total Annual Cost ($1,000)</th>
<th>Total Cost Per 1000 gal. ($1,000)</th>
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</thead>
<tbody>
<tr>
<td>750,000 **</td>
<td>Operate Well # 5</td>
<td>0</td>
<td>10,000</td>
<td>10,000</td>
<td>0.15</td>
<td>20,531</td>
<td>40,531</td>
<td>0.226</td>
</tr>
<tr>
<td>750,000 **</td>
<td>Operate Well # 6</td>
<td>0</td>
<td>10,000</td>
<td>10,000</td>
<td>0.15</td>
<td>20,531</td>
<td>40,531</td>
<td>0.226</td>
</tr>
<tr>
<td>500,000 **</td>
<td>Convert Existing Monitoring Well to Production</td>
<td>500,000</td>
<td>10,000</td>
<td>10,000</td>
<td>0.15</td>
<td>13,888</td>
<td>33,888</td>
<td>0.309</td>
</tr>
<tr>
<td>2,000,000</td>
<td></td>
<td>500,000</td>
<td>30,000</td>
<td>30,000</td>
<td>0.15</td>
<td>13,888</td>
<td>114,750</td>
<td>6.409</td>
</tr>
</tbody>
</table>

3,790,000 Total Yield (GPD)  
Total Initial Cost $4,500,000

### Operation of Existing MIS System (Rough estimate for comparison purposes only)

<table>
<thead>
<tr>
<th>Yield (GPD)</th>
<th>Source</th>
<th>Capital Cost ($1,000)</th>
<th>Annual Labor Cost ($1,000)</th>
<th>Annual Equipment Maint. ($1,000)</th>
<th>Power Cost Per 1000 gal. ($1,000)</th>
<th>Assumed Annual Cost ($1,000)</th>
<th>Total Annual Cost ($1,000)</th>
<th>Total Cost Per 1000 gal. ($1,000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3,500,000</td>
<td>Existing System As Historically Operated</td>
<td>N/A</td>
<td>150,000</td>
<td>24,000</td>
<td>0.169</td>
<td>216,000</td>
<td>390,000</td>
<td>0.305</td>
</tr>
</tbody>
</table>

* Assumes pumps are operated at 50% of their yield.  
** Dept. of Ag. estimate

### MIS Expansion

<table>
<thead>
<tr>
<th>Item</th>
<th>Use</th>
<th>Cost ($1,000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Emergency Pumping (1 MGD for 2 Years)</td>
<td>600,000</td>
</tr>
<tr>
<td>2</td>
<td>Engineering</td>
<td>250,000</td>
</tr>
<tr>
<td>3</td>
<td>Permitting, Legal</td>
<td>750,000</td>
</tr>
<tr>
<td>4</td>
<td>Direct Construction</td>
<td>4,500,000</td>
</tr>
<tr>
<td>5</td>
<td>Project Management</td>
<td>500,000</td>
</tr>
<tr>
<td>6</td>
<td>Contingency</td>
<td>400,000</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>7,000,000</td>
</tr>
</tbody>
</table>
## Monthly Ground Water Use Report

### Molokai Irrigation System
P.O. Box 205
Ho'olehua, Moloka'i, Hawaii 96729

Month of ________, 19__

**INSTRUCTIONS:** Please TYPE OR PRINT CLEARLY. Complete this form to report total monthly ground water use, and, if required, other information from each of your well sources. Mail to: Commission on Water Resource Management, P.O. Box 621, Honolulu HI 96809. For assistance, please call 587-0265 (Oahu only) or 1-800-468-4644 (neighbor islands).

<table>
<thead>
<tr>
<th>State Well No.</th>
<th>Well Name</th>
<th>Measurement End Date (mm/dd/yy)</th>
<th>Quantity Pumped (gallons)</th>
<th>Method of Measurement</th>
<th>Chloride (mg/l)***</th>
<th>Temp. (°F)</th>
<th>Lowest Pumping Water Level (ft. above msl)</th>
<th>Highest Non-Pumping Water Level (ft. above msl)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0855-01</td>
<td>&quot;Well 22&quot; (Moloka'i Tunnel)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0855-02</td>
<td>&quot;Well 23&quot; (opposite west tributary)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0855-03</td>
<td>&quot;Well 24&quot; (below Dam 2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0855-06</td>
<td>&quot;Well 5&quot; (opposite Napulehoa tributary)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0855-04</td>
<td>&quot;Well 6&quot; (above lower dam &quot;Dam 4&quot;)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Dam 1 (Upper)**
- **Dam 3 (upper east tributary)**
- **Dam 2 (lower east tributary)**
- **Dam 4 (Lower)**

**INSTRUCTIONS:**
- Flow meter, electrical consumption, weir of flume, not metered (estimated)
- Indicate how long pump was on or off when chloride sample taken
- Minimum time between pump/well turned off and water level measurement must be at least 24 hours; if pumping schedule did not allow for at least 24 hour rest during the month please indicate amount of hours pump was off before this measurement

Other comments or additional information (e.g. - date and method of chloride measurement; how pumpage amounts are estimated; etc...):

Submitted by (print) ________________________________  Title ________________________________

Signature ______________________________________  Date ________________________________
Chairperson and Members
Commission on Water Resource Management
State of Hawaii
Honolulu, Hawaii

Gentlemen:

RESUBMITTAL
State of Hawaii, Dept. of Agriculture
Agriculture Resource Management Division
Application for a Water Use Permit
Wells #22-#24 & #6-#4 (Well Nos. 0855-01 to 06)
Waikolu Ground Water Management Area, Molokai

Applicant: State of Hawaii, Dept.
Agriculture Resource Management Division
P.O. Box 205
Hoolehua, HI 96829

Landowner: Same

Background

This application for a water use permit was filed with the Commission on March 19, 1993 and completed by the applicant on June 8, 1993. This is the only permit application that has been filed to date for the Waikolu Aquifer System. Specific information regarding the source, use, notification, objections, and field investigation(s) are described in Attachment A and the attached exhibits.

On September 15, 1993, the Commission deferred action on the application and directed staff to initiate public hearing proceedings in response to objections filed by the Division of Aquatic Resources (DAR) and the National Park Service (NPS). The following analysis of the proposed water use has been made in light of verbal and written testimony gathered at the November 17, 1993 public hearing on Molokai.

Analysis & Issues

The application is for a total use of 3.36 million gallons per day (mgd) of potable water from the Waikolu Aquifer System from six existing sources located adjacent to Waikolu Stream (Exhibit 1). The water will be diverted to the 1.4 billion gallon Kualapuu Reservoir for agricultural irrigation use within the existing Molokai Irrigation System (MIS) service area. The water will be used to irrigate approximately 2,000 acres of agricultural land in Hoolehua via 203 service connections. The Dept. of Hawaiian Home Lands (DHHL) has priority usage of two-thirds of the established 7.5 mgd capacity of the existing MIS. Most of the water delivered to the reservoir is derived from surface water diversion sources in Waikolu Valley (Exhibit 2). Wells #4-#6 are new wells that have not been active to date. Wells #22-#24 have been used for the past 23 years to support the MIS. The applicant proposes to rotate operation of the six wells to allow greater recovery time for the dike-compartmented wells of the reservoir.

The major issue regarding the proposed water use is the effect of ground water withdrawals on Waikolu Stream. The Division of Aquatic Resources (DAR) and the National Park Service (NPS) have objected to the proposed permit and commented that...
existing diversions of surface and ground waters has dewatered a middle section of Waikolu Stream between the upper diversion at approximately 1,100 feet and a lower diversion at 730 feet. The concern is that any increase in pumping will result in further degradation of Waikolu Stream, which supports a notably large population of native fish species and macroinvertebrates. Restoration of the flow through the dewatered section is being addressed by conditions of the Conservation District Use Permit for the three new wells.

There appears to be general agreement that existing uses by homesteaders and non-DHHL users should continue. The applicant estimates the existing use from Wells #22-#24 is about 1.5 to 2.0 mgd. The Final Report from the Molokai Working Group (MWG) estimates the existing use is 1.13 mgd. From Exhibit 3, the 12-month moving average withdrawal was about 1.13 mgd for one period in 1991, but has been less than 0.9 mgd since 1986. The current 12-month moving average withdrawal of 0.853 mgd as of November 1993 appears to be a more reasonable estimate of actual needs.

Previous hydrologic studies have indicated that a large fraction of the ground water is discharged to Waikolu Stream and that a direct relationship may exist between ground water withdrawals and streamflow. This has prompted a recommendation from the MWG that a developable yield of 0.00 mgd be used for long-range water planning and management of the aquifer, although a sustainable yield of 5.0 mgd has been formally adopted by the Commission. Therefore, the interim instream flow standard for Waikolu Stream may be an issue.

The interim instream flow standard for Molokai streams, effective as of October 8, 1988, is "...that amount of water flowing in each stream on the effective date of this standard, and as that flow may naturally vary throughout the year and from year to year without further amounts of water being diverted offstream through new or expanded diversions, and under the stream conditions existing on the effective date of the standard...". Assuming a one-to-one relationship between ground and surface waters exists in the Waikolu Valley, an increase in usage above that experienced in 1988 should address potential effects on Waikolu Stream. This may be accomplished by a petition to amend the interim instream flow standard or the establishment of a permanent standard. The 12-month moving average withdrawal as of the effective date of the standard is about 0.744 mgd, which is relatively close to the existing use estimate of 0.853 mgd; differences in streamflow resulting from an increase in pumpage of 0.109 mgd are most likely unmeasurable. Further, average withdrawals from the system have been higher for previous periods. However, the most conservative approach would be to assume that average withdrawals exceeding 0.744 mgd are subject to an amendment of the interim instream flow standard for Waikolu Stream.

A final issue regarding the existing use portion of the total request is whether the new wells can be used to meet current needs. The applicant proposes to incorporate the three new wells, Wells #4-#6, to support future operations of the MIS. In most cases, distributing the pumpage over a larger area reduces the overall stress on the system and should be encouraged by the Commission. Use of additional sources to withdraw an equal amount of water should minimize any effects on ground water contributions to streamflow. However, concern has been expressed by members of the community that use of the new wells, even within the limits of the existing use, will result in further adverse impacts to Waikolu Stream. A contested case hearing has been requested if the new wells are approved for production purposes. The Office of the Attorney General has advised that the petitioner lacks proper standing to be admitted as a party in a contested case hearing. However, staff has attempted to address the concerns raised in the petition through the conditions within the staff recommendation.

There appears to be a justifiable need for further study and assessment of the resource, particularly in light of the proposed future expansion of the MIS, the provisions for DHHL water needs in the Hawaiian Homes Act and the State Water Code, and the
need to protect Waikolu Stream. As the largest user of water from this system, the DOA should be encouraged to address the need for baseline data and for an operating plan for these six existing sources that minimizes impact to the stream. Future uses should be denied until a study is completed that seeks to address the impact of operating alternatives on Waikolu Stream.

RECOMMENDATION

Staff recommends:

1. That the Commission approve the issuance of an interim water use permit to the State Department of Agriculture, Agriculture Resource Management Division, for the reasonable and beneficial use of 744,000 gallons per day of potable water for agricultural irrigation use by the Molokai Irrigation System from Wells #22-#24 (Well Nos. 0855-01 to 03), subject to the standard water use permit conditions listed in Attachment B and the following special conditions:
   a. The applicant may continue the use of ground water within the limits approved by the Commission, and any delay in receipt of the actual permit document shall not be a reason to interrupt the approved level of use.
   b. Implementation of a two-year biological and hydrologic monitoring program that seeks to identify the impacts of pump operating alternatives on Waikolu Stream and 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. Further, semi-annual reports summarizing data and preliminary findings shall be submitted to the Commission. It is suggested that the Dept. of Agriculture work with the State Division of Aquatic Resources, National Park Service, and U.S. Fish & Wildlife Service 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 NPS study by Anne Brasher. A draft of this plan shall be submitted to 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 the future use of the wells, and shall be made readily available to all interested parties.

2. That the Commission deny without prejudice future uses from Wells #22-#24 & #4-#6 (Well Nos. 0855-01 to 03 & 0855-06,05,04) pending further studies.

Respectfully submitted,

RAE M. LOUI
Deputy Director

Attach.

APPROVED FOR SUBMITTAL:

KEITH W. AHUE, Chairperson
Mr. Paul Matsuo  
Department of Agriculture  
Agricultural Resources Management Division  
1428 S. King Street  
Honolulu, HI 96814

Dear Mr. Matsuo:

Pump Installation Permit Applications  
Waikolu Wells #5 & #4 (Well Nos. 0855-05 & 06)

We acknowledge receipt, on November 29, 1994, of pump installation permit applications for two new wells in Waikolu Valley (Well Nos. 0855-05 & 06).

At the Commission on Water Resource Management (Commission) meeting on January 12, 1994, your application to use these wells for production purposes was denied without prejudice pending the completion of a minimum two-year hydrologic and biologic study of Waikolu Stream. The new wells are to be used in the study for monitoring and testing purposes only. Please be advised that the two-year study may proceed using the temporary pumps that are currently installed in the wells. No permit is required to re-install motors on the temporary pumps. A copy of the conditions approved by the Commission is attached.

In addition to the requirement for a two-year study, permits to install permanent pumps in the subject wells may not be issued until the environmental review process has been completed and a Conservation District Use Permit has been approved for the permanent pumps.

As such, we are returning your original pump installation permit applications. We request that you resubmit these applications upon completion of the two-year study and that the study results be included as part of your application.

We are still not in receipt of a draft plan for the two-year study. We understand that you are currently in the process of hiring a consultant to develop and implement the monitoring program. Please be aware that a detailed description of the methodology and approach must be submitted to the Commission for approval prior to implementation of the program.

Lastly, with regard to the transmission tunnel in Waikolu Valley, we have been informed that up to one (1) million gallons per day of water may be developed in the tunnel. If the tunnel is also a groundwater development tunnel, you must apply for a water use permit from the Commission pursuant to Section 174C-51, HRS.

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

Sincerely,

[Signature]

for: RAE M. LOUI  
Deputy Director

LN:ss  
Attachments
Chairperson and Members
Commission on Water Resource Management
State of Hawaii

Gentlemen:

Department of Agriculture
Application for a Stream Channel Alteration Permit
Application for a Stream Diversion Works Modification Permit
Petition to Amend the Interim Instream Flow Standard
Waikolu Stream, Molokai (TMK: 6-1-01:02)

Applicant:  
Department of Agriculture  
1428 S. King St.  
Honolulu, HI 96814

Landowner:  
Department of Health  
1250 Punchbowl St.  
Honolulu, HI 96813

BACKGROUND

In January 1994, the Commission approved an interim water use permit for Wells #22, #23, and #24 of the Molokai Irrigation System (MIS) with special conditions (Exhibit A).

The applicant is requesting four (4) actions of the Commission.

Action A is to amend the interim instream flow standard to allow for the 12-month average withdrawal of 853,000 gallons per day as of January 1994. This is pursuant to the interim water use permit conditions.

Actions B, C, and D are to allow the applicant to partially restore the flows from Diversion Dam Number 1 back into Waikolu Stream. This will allow the applicant to comply with Special Condition number 1(b) of the water use permit for wells #22, #23, and #24 that was approved by Commission action on January 12, 1994. The water use permit includes a requirement for a biological and hydrologic monitoring program that documents the existing operating procedure, seeks to identify the impacts of all operating alternatives on Waikolu Stream, and seeks to identify effectiveness of weir modifications on Diversion Dam Number 1 (See Exhibit A).

A. Amend the interim instream flow standard to allow Wells 22 & 24 to pump 853,000 gallons per day (gpd), the 12-month moving average withdrawal as of January 1994.

B. Approve a stream channel alteration permit for the alteration of the Waikolu Stream channel to modify the weir at Diversion Dam Number 1.

C. Approve a stream diversion works modification permit to allow the installation of a metal plate over the existing diversion grate enabling a partial restoration of flow back into Waikolu Stream at Diversion Dam Number 1.

D. Amend the interim instream flow standard to allow a partial restoration of flow downstream of the fish ladder on Diversion Dam Number 1.
DESCRIPTION

The Department of Agriculture (DOA) operates the Molokai Irrigation System which obtains its water from diversion dams and wells in Waikolu Valley (See Exhibits B and C). Wells #22, #23 and #24 have been in operation for the last 23 years. Two additional wells, wells #5 and #6 were drilled and pump tested by the DOA but have not received approvals for permanent pumps and motors. Well #4 will be used as a monitoring well.

The Commission recognizes the fact that groundwater withdrawals at the existing well sites in Waikolu Valley result in diminished streamflow.

On May 8, 1988, the interim instream flow standard adopted by the Commission for all streams on Molokai became effective. The 12-month moving average withdrawal on that date was 744,000 gpd. However, the current withdrawal to the MIS for the three operating wells (#22, #23, and #24) was computed to be 853,000 gpd as of January 12, 1994.

When the Commission took action on the interim water use permit for the Waikolu Wells, the Commission deferred existing uses in excess of 744,000 gpd until the interim instream flow standard is formally amended to reflect the difference between the amount of water withdrawal from May 1988 to January 1994. Action A would allow the applicant to withdraw the January 12, 1994 amount of 853,000 gpd.

With regards to the stream channel alteration permit and the stream diversion works permit, the applicant proposes to replace a 23" portion of existing steel diversion grate across Diversion Dam Number 1 with a 3/8" inch steel plate (See Exhibit D). This would restore approximately 0.89 cubic feet per second flow back into Waikolu Stream. The restoration of this flow would allow the Department of Agriculture to proceed with complying with condition 1(b) which requires a biological and hydrologic study for a minimum period of two years to assess the pumping practices of the wells in Waikolu Valley. The Department of Agriculture has obtained funding for the study and is currently in the process of procuring services necessary to do the study.

ANALYSIS

We have not received any objections to the petitions to amend the interim instream flow standards, or the stream channel alteration and stream diversion works modification permits.

The Division of Aquatic resources indicates that they support the petition and permits with the understanding that the biological and hydrological monitoring program is implemented and that the monitoring results may be applied to future management protocols such as shifts in scheduling of pumping and operation only during rainy periods to maintain native stream biota.

The U. S. Army Corps of Engineers has indicated that the applicant may be required to obtain a permit if any activity occurs in rivers, streams, wetlands, or other waters of the U. S. The staff has included a special condition requiring the applicant to obtain a written determination from the U. S. Army Corps of Engineers on the applicability of the Corps' permits.

RECOMMENDATIONS

1. That the Commission amend the interim instream flow standard and the interim water use permit for wells #22, #23, and #24 for Waikolu Stream from 744,000 gpd to 853,000 to be consistent with condition 2(a) of its action on January 12, 1994. That the Commission amend the interim instream flow standard for Waikolu Stream by allowing a release of approximately 0.89 cubic feet per second from Dam Number 1 for the purpose of a biological and hydrologic monitoring study consistent with condition number 1(b) of the Interim Well Construction Permit approved by the Commission at their meeting of January 12, 1994.
2. That the Commission amend the interim instream flow standard for Waikolu Stream by allowing a release of approximately 0.89 cubic feet per second from Dam Number 1 for the purpose of a biological and hydrological monitoring study consistent with condition number 1(b) of the Interim Well Construction Permit approved by the Commission at their meeting of January 12, 1994.

3. That the Commission approve a stream channel alteration permit, and a stream diversion works modification permit to modify Dam Number 1 at Waikolu Stream TMK: 6-1-01:02, Kalawao, Molokai, to comply with condition 1(b) of the Commission action on January 12, 1994 relating to the interim water use permit for Waikolu Wells #23, #24 and #25. This permit shall be valid for a period of two years subject to the following conditions:

1. The Permit application and staff submittal approved by the Commission at its meeting on March 14, 1995, shall be incorporated herein by reference.

2. The applicant shall comply with all other applicable statutes, ordinances, and regulations of the Federal, State and County Maui, and County of Kalawao governments.

3. The applicant, his successors, assigns, officers, employees, contractors, agents, and representatives, shall indemnify, defend, and hold the State of Hawaii harmless from and against any claim or demand for loss, liability, or damage including claims for property damage, personal injury, or death arising out of any act or omission of the applicant or his successors, assigns, officers, employees, contractors, and agents under this permit or related to the granting of this permit

4. The applicant shall notify the Commission, by letter, of the actual dates of project initiation and completion. The applicant shall submit a set of as-built plans to the Commission upon completion of this project. This permit may be revoked if work is not started within one (1) year after the date of issuance or if work is suspended or abandoned for one (1) year, unless otherwise specified. The work proposed under this permit shall be completed within two (2) years from the date of permit approval, unless otherwise specified. The permit may be extended by the Commission upon showing of good cause and good-faith performance. A request to extend the permit shall be submitted to the Commission no later than three (3) months prior to the date the permit expires. If the commencement or completion date is not met, the Commission may revoke the permit after giving the permittee notice of the proposed action and an opportunity to be heard.

5. Before proceeding with any work authorized by the Commission, the applicant shall submit one set of construction plans and specifications to determine consistency with the conditions of the permit and the declarations set forth in the permit application.

6. The applicant shall utilize appropriate erosion control measures during construction, and shall perform construction activities only during periods of low stream flow. The applicant shall prevent debris and construction materials, including cement, petroleum products, and other pollutants, from entering the stream. Wash and dust control water shall be properly disposed.

7. In the event that subsurface cultural remains such as artifacts, burials or deposits of shells or charcoal are encountered during excavation work, the applicant shall stop work in the area of the find and contact the Department’s Historic Preservation Division (587-0045) immediately.
8. Within sixty (60) of the approval of this permit application, the applicant shall submit to the Commission a written determination as to whether this project is subject to permits administered by the U. S. Army Corps of Engineers.

Respectfully submitted,

RAE M. LOUI
Deputy Director

Attachments

APPROVED FOR SUBMITTAL:

MICHAEL D. WILSON, Chairperson
March 13, 2000

CERTIFIED MAIL

Ms. Collette Machado
HC-01 Box 741
Kaunakakai, HI 96748

Dear Ms. Machado:

Waikolu Stream Biological and Hydrological Monitoring Study

As requested by the Commission on Water Resource Management (see attached memo), enclosed is a copy of the report, "Waikolu Stream Biological and Hydrological Monitoring Study."

When your review is completed, please return the report to Mr. Paul Matsuo; a self-addressed, stamped envelope is enclosed for your use.

Sincerely,

DAN LUM

Enc.
c: Ms. Linnel Nishioka
Mr. Paul Matsuo
March 13, 2000

CERTIFIED MAIL

Mr. Harold Edwards
Molokai Ranch
55 Merchant Street, #2000
Honolulu, Hawaii 96813

Dear Mr. Edwards:

Waikolu Stream Biological and Hydrological Monitoring Study

As requested by the Commission on Water Resource Management (see attached memo), enclosed is a copy of the report, “Waikolu Stream Biological and Hydrological Monitoring Study.”

When your review is completed, please return the report to Mr. Paul Matsuo; a self-addressed, stamped envelope is enclosed for your use.

Sincerely,

DAN LUM

Enc.

C: Ms. Linnel Nishioka
Mr. Paul Matsuo
March 13, 2000

CERTIFIED MAIL

Ms. Sarah Sykes
P.O. Box 370
Kaunakakai, HI 96748

Dear Ms. Sykes:

Waikolu Stream Biological and Hydrological Monitoring Study

As requested by the Commission on Water Resource Management (see attached memo), enclosed is a copy of the report, “Waikolu Stream Biological and Hydrological Monitoring Study.”

When your review is completed, please return the report to Mr. Paul Matsuo; a self-addressed, stamped envelope is enclosed for your use.

Sincerely,

DAN LUM

Enc.
c: Ms. Linnel Nishioka /
Mr. Paul Matsuo
March 13, 2000

CERTIFIED MAIL

Ms. Mahealani Davis
Queen Liliuokalani Children’s Center
P.O. Box 55
Kaunakakai, HI 96748

Dear Ms. Davis:

Waikolu Stream Biological and Hydrological Monitoring Study

As requested by the Commission on Water Resource Management (see attached memo), enclosed is a copy of the report, “Waikolu Stream Biological and Hydrological Monitoring Study.”

When your review is completed, please return the report to Mr. Paul Matsuo; a self-addressed, stamped envelope is enclosed for your use.

Sincerely,

DAN LUM

Enc.
c: Ms. Linnel Nishioka
   Mr. Paul Matsuo
March 13, 2000

CERTIFIED MAIL

Ms. Sri Ten Cate
Molokai Public Library
P.O. Box 395
Kaunakakai, HI 96748

Dear Ms. Cate:

Waikolu Stream Biological and Hydrological Monitoring Study

As requested by the Commission on Water Resource Management (see attached memo), enclosed is a copy of the report, "Waikolu Stream Biological and Hydrological Monitoring Study."

Sincerely,

DAN LUM

Enc.
c: Ms. Linnel Nishioka
Mr. Paul Matsuo
TO: Paul T. Matsuo, P.E.
Administrator-Chief Engineer
Agricultural Resource Management Division

FROM: Linnel Nishioka
Deputy Director
Commission on Water Resource Management

SUBJECT: Waikolu Valley Biological and Hydrological Study
Special Condition for Water Use Permit No. 220

We wish to proceed to action on Water Use Permits for "Wells 5 & 6" (Well Nos. 0855-04 & 05) as soon as possible. Our strategy for moving forward is to afford the Molokaʻi Water Working Group the opportunity to review your findings and conclusions compiled in "Waikolu Stream Biological and Hydrological Monitoring Study". In preparation for that, we understand that six copies of the rather large report were printed, and we wish to have them distributed to key members of the Working Group. They in turn will help us determine how to share the study with other members of the group prior to getting a presentation from you and the consultants.

Please distribute copies to the following parties at your earliest convenience:

Sri Ten Cate
Molokaʻi Public Library
P.O.Box 395
Kaunakakai 96748

Harold Edwards
Molokaʻi Ranch
55 Merchant Street 2000
Honolulu 96813

Sarah Sykes
P.O.Box 370
Kaunakakai 96748

Mahealani Davis
Liliʻuokalani Children’s Center
Kalamaula

Collette Machado
HC-01 Box 741
Kaunakakai 96748

Please notify us of the distribution schedule so that we can schedule further distribution of materials and a meeting for your presentation.

If you have any questions, please call Charley Ice at 587-0251 or toll-free at 984-2400 extension 70251.

Sincerely,

LINNEL T. NISHIOKA
Deputy Director

omitted from transmitted to CWRM
1. "endangered species" should be changed to "endangered fauna".
2. Does this constitute sufficient information to get permanent status? Yes.
TO: Paul T. Matsuo, Administrator  
Agricultural Resource Management Division  
Department of Agriculture

FROM: Linnel T. Nishioka, Deputy Director  
Commission on Water Resource Management

SUBJECT: Waikolu Valley Biological and Hydrological Study  
Special Condition for Water Use Permit No. 220

We wish to proceed to action on Water Use Permits for "Wells 5 & 6" (Well Nos. 0855-04 & 05) as soon as possible. Our strategy for moving forward is to afford the Molokai Water Working Group (MWWG) the opportunity to review your findings and conclusions compiled in "Waikolu Stream Biological and Hydrological Monitoring Study". In preparation for that, we understand that six copies of the rather large report were printed, and we wish to have them distributed to key members of the MWWG. They in turn will help us determine how to share the study with other members of the group prior to getting a presentation from you and the consultants.

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Ms. Sri Ten Cate  
Molokai Public Library  
P.O. Box 395  
Kaunakakai, HI 96748

Ms. Mahealani Davis  
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P.O. Box 55  
Kaunakakai, HI 96748

Mr. Harold Edwards  
Molokai Ranch  
55 Merchant Street, #2000  
Honolulu, HI 96813

Ms. Collette Machado  
HC-01 Box 741  
Kaunakakai, HI 96748

Ms. Sarah Sykes  
P.O. Box 370  
Kaunakakai, HI 96748

Please notify us of the distribution schedule so that we can schedule further distribution of materials and a meeting for your presentation.

If you have any questions, please call Charley Ice at 587-0251.

Ci:ss
MEMO To: Harold Edwards, Rebecca Alaka'i, Sarah Sykes, Mahealani Davis, Collette Machado
From: Charley Ice

Waikolu Stream Biological and Hydrological Monitoring Study
MIS Water Use Application

By separate transmittal from the consultants to the Department of Agriculture, you should be receiving a copy of the captioned study, recently completed and transmitted to our office. The study was done to support the application for a water use permit for two additional wells in Waikolu Valley to serve the Moloka'i Irrigation System. Action on that application was deferred by the Commission in 1995 pending this study.

We are at step 1 in this sequence of events:
1. Members of MWWG have agreed to review this entire (very large) study to recommend which portions should be copied for the full group.
2. The MWWG has about sixty days to familiarize themselves with the study before hearing the presentation. Four full copies will be available at the Public Library in Kaunakakai and at the MIS Office.
3. DoA/consultants present the study to the MWWG for its recommendations on how to present it most effectively to the larger community. Tentative date: April 12, 2000; place and time to be announced.
4. DoA/consultants present the study at a community meeting.
5. Water Use Permit Application for two new wells in Waikolu goes to the Commission. The study is part of the staff report; testimony from the community follows.

We really appreciate your time and effort in getting the ball rolling on this. If you have any questions, please call Charley Ice at 587-0251 or toll-free at 984-2400 extension 70251.

Sincerely,

LINNEL T. NISHIOKA
Deputy Director

Cl: ss
c: Department of Agriculture/Resource Management
MEMO To: Moloka‘i Water Working Group Members
From: Charley Ice, Water Commission

Waikolu Stream Biological and Hydrological Monitoring Study
MIS Water Use Application

We are happy to announce that the Department of Agriculture has completed the Waikolu Stream Biological and Hydrological Monitoring Study, in support of its application for an allocation of water for the Moloka‘i Irrigation System. In response to community testimony in January 1994, the Commission approved the application for three existing wells but deferred action on two new wells, pending completion of this study. The Commission wishes for the community to make a full review of the information developed in this study before we again address the issue of making a water use allocation to the MIS from Waikolu.

We are at step 2 in the following process:

1. Members of MWWG have agreed to review this entire (very large) study to recommend which portions should be copied for the full group.

2. The MWWG has about sixty days to familiarize themselves with the study before hearing the DoAlconsultant presentation. Four full copies are available on Moloka‘i, two at the Public Library in Kaunakakai and two at the MIS Office.

3. DoA/consultants present the study to the MWWG for its recommendations on how to present it most effectively to the larger community. Tentative date: April 12, 2000; place and time to be announced.

4. DoA/consultants present the study at a community meeting.

5. Water Use Permit Application for two new wells in Waikolu goes to the Commission. The study is part of the staff report; testimony from the community follows.

If it is now necessary to decline or change your membership in the Moloka‘i Water Working Group, please contact DLNR Chairperson Timothy E. Johns. Members were officially appointed by the Chairperson Michael D. Wilson in 1996.

If you have any questions, please call Charley Ice at 587-0251 or toll-free at 984-2400 extension 70251.

Sincerely,

LINNEL T. NISHIOKA
Deputy Director

CI:ss
c: Department of Agriculture/Resource Management
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**COMMISSION ON WATER RESOURCE MANAGEMENT**

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1) KML's 12 - MAY would not be adversely affected if they could match these promises my actions.

2) The MLS source in Wai`koa will finally get a hearing for a WWP, now that a bio-hydro study has been completed and delivered. My proposal - present to the Molokai Working Group for their ideas on how to present to the larger community.

3) O&H is actively pursuing alternatives for supplying Wai`koa water to MLS, including directly injecting at Ho`olehua beyond the reservoir.
November 9, 1999

The Honorable Benjamin Cayetano
Governor,
Hawaii State Capitol
Honolulu, Hawaii 96813

Dear Governor Cayetano:

Thank you for taking the time to meet with us regarding the dire situation with the Molokai Irrigation System. We were pleased with your understanding of the relevance and impact this problem has on the economy of Molokai. This concern on your part was quickly relayed to the proper Department Head and actions have already started to show positive results.

Secondly we also appreciate your willingness to consider both short term as well as long term solutions to the ever-changing problem of irrigation water for Molokai.

We will take the liberty here to summarize the points we covered that day at the Capitol.

Short term considerations:
- Pump 24 hours with all available pumps of the MIS system
- Encourage and force Kaunakakai to repair their pump and pump 24 hrs.
- Repair pump on well 22 of the MIS.

Intermediate considerations:
- Place a pump and motor on the Kakanalala well near the west portal of the MIS and incorporate this slightly brackish water into the MIS reservoir.
- Repair the old DHHL surface domestic water source (now abandoned) and feed this water into the MIS. This will deliver up to 0.75 mgd by gravity alone.
- Study prospect of reducing MIS system losses by other means, such as the possibility of planting wind brakes around the reservoir.
- Study possibility of repairing the Kamiloloa gully dam, the former domestic source now abandoned which could deliver up to 0.3 mgd by gravity alone.
- Examine feasibility of converting from Maui Electric to self-generated electric for pumping needs, thus eliminating the MIS demand charge.
- Consider alternative management systems for the different State’s irrigation systems, like “Water Districts” or stand alone systems that pay their own way.

Long term considerations:
- Construct phase two and phase three of the original MIS proposal into Punalu‘u Valley. This would resolve all domestic as well as irrigation needs for Molokai, well into the future.
- Construct low-level earth dam in the Manawaiwaii gully to retain water during high flow. This would have two benefits, reduce erosion and flooding and add water to the MIS reservoir (would have to be pumped back into reservoir).

Conclusion

The farmers of Molokai are grateful for your willingness to help “fix our problem”. Your commitment to the short-term solution and to the long term for filling the reservoir will add confidence to our ability to continue to add to the island’s economy. We realize that the government cannot “be all things to all people” and true democracy is government and people working together. The farmers of Molokai are committed. We want to regain the status of Bread Basket.

Aloha and best regards.

Farmers of Molokai

cc: Clayton Hae, OHA Trustee, Sam Callejo, Adm. Assistant,
Jimmi Nakastani, DOA, Beverly Moore, Molokai
Farmers of Moloka‘i  
c/o Coffees of Hawaii  
P. O. Box 160  
Kualapuu, HI 96757

Gentlemen:

Thank you for your letter of November 9, 1999 regarding the Moloka‘i Irrigation System (MIS). I agree that activity must commence for both short and long-term solutions in order to alleviate the ever-changing problem of agricultural water for Moloka‘i.

I have instructed the departments that would be affected to begin considering their plan of action. I will discuss this matter at future directors’ meetings as opportunity presents itself.

The Department of Agriculture has been asked to explore all of the potential considerations listed in your letter. It has, to date, conducted the following activities:

1. Held discussions with Mr. Buddy Reed of Kukui Molokai, Inc. regarding his plans for Well 17. He has given the department assurance that he will pump the well 120 hours per week and is in the process of acquiring another motor as a standby.

2. Operating the MIS’s pumps on a 24-hour rotation between Wells 23, 24, 5, and 6 in Waikolu Valley. The stream intakes are constantly monitored to prevent debris from accumulating in order to maximize the amount of water being diverted.

3. Monitoring the system closely for leaks and blockages. Water related cleaning work has been delayed until the reservoir level returns to a normal operating depth of 35 feet.

4. Has begun discussions regarding a potential connection of the Waianae Stream water source into the MIS with the Department of Hawaiian Home Lands. A tentative plan of action is under consideration.

Several of the intermediate and long-term proposals listed in your letter, e.g. the Makalapua well pump, reduction of reservoir evaporation, replacement of electric power, and exploration of brackish water wells, are already in the department’s planning program and are awaiting either funding or negotiations with the landowners or owners of the resources.

With warmest personal regards,

Aloha,

[Signature]

BENJAMIN J. CAYETANO

C: Clayton Hee (OHA)  
Beverly Moore

bc: Hon. James J. Nakatani, DOA
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WUP No. 280 right now. NGL = 0.853.

1. Need to fill out updated WUP application - especially Table 1.

Wrote up Daniel on this to determine if report is acceptable or to specify what is lacking.
TO: Honorable Timothy Johns  
Chairperson, Commission on Water Resource Management

FROM: James J. Nakatani  
Chairperson, Board of Agriculture

SUBJECT: Re-application for Water Use Permit, Molokai Irrigation System, Molokai

The Commission on Water Resource Management (CWRM) denied without prejudice the original water use permit on January 12, 1994 and ordered (among other terms) the Molokai Irrigation System (MIS) to conduct a biological and hydrological study of the Waikolu Stream which will determine any impact to the native aquatic habitat. It further directed the MIS to install a "fish ladder" plate over the existing stream diversion and a 3-inch effluent pipe from Well Numbers 5 and 6.

The study, as requested, has been completed and is enclosed. The reasons for the delay (the study was for a two-year period) follow:

1. The "fish ladder" required an interim instream use standard amendment from the CWRM and was issued February 28, 1996. Permits from the U.S. Army Corps of Engineers and Department of Health were issued June 16, 1996. This delayed the beginning of our field data collection as the surface flows would be subject to indeterminate fluctuations.

2. Inability to obtain data from Ms. Anne Brasher's biological study results which were not made readily available until our consultant acquired a copy of the study from an outside source in early 1998. The CWRM mandated that our study incorporate data from Ms.
Brasher's report. It was difficult to conduct our studies without Ms. Brasher's results. It was finally decided to conduct our study independently and compare results later (see Appendix H).

3. Drought conditions drastically altered the surface water flow patterns of Waikolu Stream, beginning in October 1995. Drought effects continued into the spring of 1996 reducing the aquatic animal habitat and adversely affecting study results.

We feel we have complied with the CWRM's January 12, 1994 terms and conditions. We respectfully request approval of the water use permits for Well Numbers 5 and 6. An application is enclosed.

If you have any questions, please contact me at 973-9551 or have your staff contact Mr. Paul T. Matsuo, Administrator and Chief Engineer of the Agricultural Resource Management Division, at 973-9473.

Enclosures

c: R. Granger, MIS Water Users Advisory Board (w/o attachments)
   T. Matayoshi, MIS (w/o attachments)
APPLICATION FOR WATER USE PERMIT

PERMITTEE INFORMATION
1. (a) APPLICANT
   Firm/Name: Agricultural Resource Mgmt. Div.
   Contact Person: Thomas Matsuyoshi
   Address: PO Box 205, Hoolooha, Holokai, HI 96729
   Phone: 567-6891 Fax: 567-9014

2. SOURCE INFORMATION
   2.1 WATER MANAGEMENT AREA: WAIKOLOU VALLEY-POOLUHA
   2.2 ISLAND: MOLOKAI
   2.3 (a) EXISTING WELL/DIVERSION NAME AND STATE NUMBER: WAIKOLU VALLEY BETWEEN ISLAND: MOLOKAI
   2.4 (b) PROPOSED (NEW) WELL/DIVERSION NAME: ISLAND: MOLOKAI
   2.5 (c) LOCATION: Address: 3670-7A, 1, 000 PERMIT (see attached map/Map Key)
   2.6 (d) METHOD OF TAKING WATER: (check one): WAIKOLU VALLEY BETWEEN ISLAND: MOLOKAI
   2.7 (e) SOURCE TYPE (check one): Stream Other (explain)
   2.8 (f) METHOD OF TAKING WATER (check one): Artesian Pump Other (explain)

3. USE INFORMATION
   3.1 LOCATION OF PROPOSED WATER USE: (If possible, show on same maps as source location. Otherwise, attach similar maps)
   3.2 (a) PUC-Regulated System Intended Dedication to Dept/Board of Water Supply Non-PUC-Regulated Private System
   3.3 (b) Proposed use of water is: Existing New Both existing & new uses
   3.4 (c) Tax Map Key: [ ] Proposed (if location of use is over multiple TMKs, please complete Table 1 on back of application)
   3.5 (d) Address: Total area in Hoolehua
   3.6 (e) Current State Land Use District(s): Urban Agriculture Conservation Rural
   3.7 (f) Current County Zoning District(s): Urban Agriculture Conservation Rural

4. QUANTITY OF WATER REQUESTED: 3,360,000 gallons per day (averaged over 1 year)

5. QUALITY OF WATER REQUESTED: Flowmeter Open-pipe Well Office Other (explain)

6. METHOD OF MEASUREMENT: Flowmeter Open-pipe Weir Office Other (explain)

7. QUALITY OF WATER REQUESTED: Fresh Brackish Salt Potable Non-Potable

8. PROPOSED USE: Municipal (including hotels, stores, etc.) Individual Domestic Irrigation Other (explain)
   8.1 Industrial Other (explain)

9. PROPOSED TIME OF WATER WITHDRAWAL OR DIVERSION: Daily irrigation

10. For questions 11 & 12: If multiple TMKs are involved where water is to be used, please complete Table 1 on back of application.
11. TOTAL NUMBER OF RESIDENCES TO BE SERVED: 234 meter customers as of 6/30/99
12. TOTAL ACRES TO BE IRRIGATED AND TYPE OF CROP: 5,000 acres (see attached map/diversified truck)
13. PROPOSED TIME OF WATER WITHDRAWAL OR DIVERSION: Daily irrigation

14. APPLICANT MUST ESTABLISH THAT THE PROPOSED USE OF WATER:
   (a) Can be accommodated with the available water source.
   (b) Is a reasonable-beneficial use as defined in section 13-171-2, HAR. (see backside of this application)
   (c) Will not interfere with any existing legal use.
   (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 general policies.

15. REMARKS, EXPLANATIONS: (see backside of this application)

NOTE: Signing below indicates that the signatories understand and swear that: 1) The information provided on this application is accurate and true to the best of their knowledge; 2) Item 14 is the responsibility of the applicant prior to Commission approval; 3) If necessary, further information may be required before the application is considered complete; 4) If a water use permit is granted by the Commission, this permit is subject to prior existing permitted uses, changes in sustainable yields and instream flow standards, reserved uses as defined by the Commission, and Hawaiian Home Lands future uses; and 5) Upon permit approval, a water shortage plan must be submitted by the applicant to the Commission.

STATE OF HAWAI, DEPT. OF AGRICULTURE
Applicant (print) Agricultural Resource Mgmt. Div.
Signature: Date: DEC 16 1999

STATE OF HAWAI
Landowner (print) DEPT. OF AGRICULTURE
Signature: Date: DEC 16 1999
"Reasonable-beneficial use" means the use of water in such a quantity as is necessary for economic and efficient utilization, for a purpose, and in a manner which is not wasteful and is both reasonable and consistent with the state and county land use plans and the public interest.

15. REMARKS, EXPLANATIONS (cont'd):

________________________________________________________________________
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TABLE 1. MULTIPLE TMKs TO USE REQUESTED WATER

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For Official Use Only:
Date Received_________________________ Hydrologic Unit No._________________________
Date Accepted_________________________ Application No._____________________________
State Well No._________________________
01/09/96 WUPA Form
Waikolu Stream Study

Linear Distances

Measured by Hip Chain

By Dan Lum (3/8/46)
WAIKOLOA STREAM STUDY
LINEAR DISTANCES
MEASURED BY HIP CHAIN
BY DAN LUM (3/8/96)
Waikolu Stream Study

Linear Distances

Measured by Hip Chain

By Dan Lum (3/8/96)
MEETING NOTICE AND AGENDA

MOLOKAI IRRIGATION SYSTEM WATER USERS ADVISORY BOARD

DATE: Thursday, June 27, 1996
TIME: 8:30 A.M.
PLACE: Molokai Irrigation System Conference Room
Puu Ka Peelua Avenue
Hoolehua, Molokai, Hawaii

I. Call to Order

II. Approval of Agenda

III. Approval of Minutes as Circulated

IV. Field Manager's Report

V. Old Business:
   A. Kaluakoi Contract
   B. Molokai Ranch Use
   C. Status of Possible Water Rate Increase
      1. Purpose of acreage fees
      2. Water charges only
   D. Legislative Update

VI. New Business:
   A. Possible Affects of the Third Party Issue
      1. Impact on M.I.S. revenues
      2. Take out acreage without loss of meter
   B. Update of M.I.S. Water Use Declaration with CWRM

VII. Announcements

   A. Any upcoming meeting
   B. Set next meeting date

VIII. Adjournment
DEPARTMENT OF AGRICULTURE

State of Hawaii
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF WATER AND LAND DEVELOPMENT
Honolulu, Hawaii

BOARD OF LAND AND NATURAL RESOURCES

William W. Paty
Chairperson and Member

CONTRACT SPECIFICATIONS AND PLANS

Job No. 3-9W-J
WAIKOLU STREAM DIVERSION DAM IMPROVEMENTS
MOLOKAI IRRIGATION SYSTEM
KALAWAO, MOLOKAI, HAWAII

Civil Engineer:
Division of Water and Land Development

May 1992
State of Hawaii
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF WATER AND LAND DEVELOPMENT
Honolulu, Hawaii

CONTRACT SPECIFICATIONS AND PLANS

Job No. 3-9W-J
WAIKOLU STREAM DIVERSION DAM IMPROVEMENTS
MOLOKAI IRRIGATION SYSTEM
KALAWAO, MOLOKAI, HAWAII

Approved: 
YUKIO KITAGAWA
Chairperson
Board of Agriculture

Approved: 
MANABU TAGOMORI
Manager-Chief Engineer
Division of Water and Land Development

May 1992
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NOTICE TO CONTRACTORS

SEALED PROPOSALS for Job No. 3-9W-J, Waikolu Stream Diversion Dam Improvements, Molokai Irrigation System, Kalawao, Molokai, Hawaii, will be received at the Division of Water and Land Development, 2nd floor, Kalanimoku Building, Room 227, 1151 Punchbowl Street, Honolulu, and at the office of the Division of Land Management, Department of Land and Natural Resources, Maui State Office Building, 54 High Street, Wailuku, Maui, up to 2:00 p.m., June 24, 1992, at which time and places they will be opened and read publicly. The bidder shall be responsible for the prompt delivery of the proposal.

Plans and specifications may be examined and borrowed at the aforesaid places.

The work shall generally consist of metal fabrication and grouted rubble paving.

The estimated cost is between $30,000.00 - $60,000.00.

Due to the nature of work contemplated, bidders must possess a valid State Contractor's license, classification A.

The award of the contract, if it be awarded, will be subject to the availability of funds.

Should there be any questions, please call 587-0233.

WILLIAM W. PATY, Chairperson
Board of Land and Natural Resources

Publish in The Honolulu Advertiser

June 1, 3, 5, 1992
# INFORMATION AND INSTRUCTIONS TO BIDDERS

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INFORMATION AND INSTRUCTIONS TO BIDDERS

A. SCOPE OF WORK: The work to be completed under this contract consists of the installation of a steel catwalk, modifications to the existing diversion structure, grouted rubble paving, miscellaneous and appurtenant work.

B. LOCATION OF PROJECT: The project site is located in Waikolu Valley, Molokai, as shown on the plans. Prospective bidders who request to visit the actual project site may call Mr. Thomas Matayoshi of the Molokai Irrigation System office, at 567-6150.

C. SEALED PROPOSALS: All proposals for the work shall be enclosed in a sealed envelope showing the name of the bidder and marked, "Proposal for Job No. 3-9W-J, Waikolu Stream Diversion Dam Improvements, Molokai Irrigation System, Kalawao, Molokai, Hawaii."

D. QUANTITIES: All bids will be compared on the basis of quantities of work to be done as shown in the Proposal; the quantities shown in the Unit Price items are estimated, being given as a basis for comparison of bids. The Board reserves the right to increase or decrease the quantities given under the items or delete items entirely as may be required during the progress of the work.

E. WATER AND ELECTRICITY: The Contractor shall make all necessary arrangements for and pay all expenses for water and electricity used in the construction of this project.

F. RESPONSIBILITY OF BIDDERS TO STUDY SITE: At the time of opening of bids, each bidder will be presumed to have inspected the project site, to have read and to be thoroughly familiar with the Plans, Specifications and other contract documents, including all Addenda. The failure or omission of any bidder to receive or examine any form, instrument or document shall in no way relieve him from any obligation regarding his bid.

Each bidder must form his own opinion of the character of the work and of the materials to be excavated from an examination of the project site, from studies and inspection of available samples and records, and from such other investigation as he may desire to make. He must make his own interpretation and satisfy himself by his own investigations and research regarding all conditions affecting the work to be done and labor and materials needed to make his bid in sole reliance thereon.

Failure of the bidder to familiarize himself of the construction and labor conditions under which the work is to be performed will not relieve him of his
obligations to furnish all materials and labor necessary to perform the work as set forth in his bid and to perform the contract, if awarded to him.

G. INTERPRETATION OF CONTRACT DOCUMENTS: If any prospective bidder is in doubt as to the true meaning of any part of the Specifications, or other contract documents, he may submit a written request for an interpretation thereof to the Manager-Chief Engineer not later than 7 days prior to the time established for opening of bids. The person submitting the request will be responsible for its prompt delivery. All interpretation of the documents will be made only by Addendum duly issued and a copy of such Addendum will be mailed or delivered to each person receiving a set of such documents at the address submitted by him when the documents were issued. The Board will not be responsible for any other explanations or interpretations of the contract documents.

H. ADDENDA OR BULLETINS: Any addendum or bulletin issued during the period of bidding, or forming a part of the documents furnished to the bidder for the preparation of his bid, shall be made a part of the Bid and the Contract. The bidder is responsible to check with the Division of Water and Land Development on the issuance of any addendum or bulletin for this project prior to submitting his bid. Failure of any bidder to receive any such addendum or bulletin shall not relieve the bidder from any obligation under his bid as submitted.

I. PROPOSAL FORM: The attached Proposal form in the specification is furnished only for the guidance of bidders and is not to be used for actual bidding. An official copy of the Proposal on which the bid shall be made will be furnished with proposal envelope to the prospective bidder when Plans and Specifications are obtained.

J. OMISSIONS OR ERASURES: Any Proposal which contains any omission or erasure or alteration not properly initialed, or conditional bid, or other irregularity may be rejected by the Board.

K. NOTICE OF INTENTION TO BID AND QUESTIONNAIRE: A prospective bidder must file a written notice of his intention to bid in the office of the Manager-Chief Engineer at least six (6) calendar days prior to the date designated for opening of bids. If required by the Manager-Chief Engineer, the prospective bidder shall file a completed standard questionnaire form prepared in accordance with Section 103-25, HRS 1985, as amended. This questionnaire form is available at the office of the Manager-Chief Engineer. The completed form shall be received in the office of the Manager-Chief Engineer at least 48 hours prior to the opening of bids.
L. **PROPOSAL GUARANTY:** A Proposal Guaranty will be furnished by each bidder as provided for in sub-section 2.6 of these Specifications. The successful bidder's Proposal Guaranty will be retained until he has entered into a satisfactory contract and furnished a performance bond in the amount equal to one hundred percent (100%) of the total contract price, including amounts estimated to be required for extra work. The Board reserves the right to hold the Proposal Guaranty of the three lowest bidders until the successful bidder has entered into a contract and has furnished the required performance bond.

Should the successful bidder fail to enter into a contract and furnish a satisfactory performance bond within the time stated in his Proposal, the Proposal Guaranty shall be forfeited as required by law.

M. **CONTRACTOR'S LICENSE REQUIRED:** The Board will reject all bids received from contractors who have not been licensed by the State Contractors License Board in accordance with Chapter 444, HRS; Title 16, Chapter 77, Hawaii Administrative Rules; and statutes amendatory thereto.

N. **INFORMAL BIDS:** No informal or irregular bids or propositions for doing the work will be considered by the Board.

O. **WITHDRAWAL OF BIDS:** No bidder may withdraw his bid between the time of the opening thereof and the award of contract.

P. **SUCCESSFUL BIDDER TO FILE PERFORMANCE BOND:** The successful bidder will be required to file a performance bond in the amount equal to one hundred percent (100%) of the total contract price, including amounts estimated to be required for extra work, as provided in sub-section 3.3 of these specifications.

Q. **NUMBER OF EXECUTED ORIGINAL COUNTERPARTS OF CONTRACT DOCUMENTS:** If requested by the Board, three or more copies of the contract proper and performance bond shall be executed.

R. **PREFERENCE FOR AMERICAN PRODUCTS:** Pursuant to Section 103.24, Hawaii Revised Statutes, preference shall be given to American products, materials, and supplies.

S. **EXTRA WORK:** No work of any kind in connection with this work covered by these plans and specifications shall be considered as extra work, or entitle the Contractor to extra compensation, except when the work has been ordered in writing by the Engineer, and specifically referred to as "Extra Work" and the amount of compensation stated in the order and accepted by the Contractor.
T. **WAGES AND HOURS:** The attention of all bidders is called to Section 7.1 of the Standard Specifications relative to hours of labor, minimum wages and overtime pay.

The latest minimum wage rates as promulgated by the Department of Labor and Industrial Relations five (5) days prior to the date set for the opening of bids shall be paid to the various classes of laborers and mechanics engaged in the performance of this contract on the job site.

No work shall be done on Saturdays, Sundays, legal State holidays, and/or in excess of eight (8) hours each day without the written consent of the Engineer. Should permission be granted to work at such times, the Contractor shall pay for all inspectional administrative costs thereof. No work shall be done at night unless authorized by the Engineer.

U. **PERMITS AND BONDS:** The Contractor shall obtain all necessary permits for the prosecution of the work under this Contract except as stipulated under Special Provision Subsection 7.2 of these specifications; shall furnish all bonds; and shall pay for all inspection other than that supplied by the Board.

V. **PRIVATE PROPERTY:** It shall be the responsibility of the Contractor to respect the rights of the property of the State and to cooperate with them in preventing damage to existing improvements. The Contractor will be held responsible for damages resulting from his operations. Immediately upon discovery the Contractor shall repair, to the satisfaction of the Engineer, all existing improvements damaged by him.

Livestock are present within the project site. The Contractor will be held responsible for all livestock lost, injured or killed by him or as a result of his negligence.

If necessary, the Contractor shall erect at no cost to the Department, the enclosure(s) required to prevent the movement of livestock through the project area.

All trees and shrubbery outside the excavation, embankment or construction limits shall be fully protected from injury.

W. **TIME:** The time of completion is specified in the Proposal. It is the intention of the Board to insist that the Contractor diligently prosecute the work to completion within the time limit specified.

Prospective bidders are reminded that the State has the option to proceed with a project or abandon it, depending on whether or not the project can be definitely completed for occupancy by the specified completion time.
The bidder is responsible for checking the availability of all materials before bidding. Accordingly, it is absolutely necessary that the bidder selects subcontractors and suppliers who can warrant the availability as well as the delivery of all SPECIFIED or QUALIFIED materials within sufficient time to complete the project within the specified time of completion.

The successful bidder must assume all risks for completing the project by the specified date. Absolutely no extension of time will be given FOR ANY REASON except for delays caused by Acts of God, labor disputes involving unions, or actions of the State. If for any reason the Contractor falls behind schedule, he shall at his own cost take necessary remedial measures to get the project back on schedule, i.e., working overtime, air freighting all materials, etc. In addition, if he fails to fully complete the project by the completion date, he will be required to make the facility usable at his own cost.

X.  **BIDDER'S RESPONSIBILITY TO PROVIDE PROPER SUPERINTENDENCE:** All bidders are reminded that a representative of the successful bidder authorized to receive and fulfill instructions from the Engineer and who is charged with the responsibility of all work, shall be present at the job site whenever any work is in progress. The cost for this shall be incidental to the project.

Y.  **LIQUIDATED DAMAGES:** The liquidated damages in the amount specified in the Proposal will be assessed for each and every calendar day from and after the expiration of the time period stated in the Contract for the completion of the project.

Z.  **HIRING OF LOCAL LABOR:** The Contractor shall hire local labor whenever practicable.

AA.  **RETURN OF PLANS AND SPECIFICATIONS:** Any bidder borrowing the Plans and Specifications shall return them intact to the office of the Manager-Chief Engineer within fifteen (15) calendar days after the date designated for the opening of bids. The Plans and Specifications shall not, under any circumstances, be disassembled.

BB.  **SPECIFICATIONS:** The Standard Specifications for Construction Work of the Department are made a part of these contract specifications. In case of any conflict between the Standard Specifications, Plans, and Special Provisions included herein, the Plans shall govern over the Standard Specifications; the Special Provisions shall govern over the Plans and all other Specifications.

CC.  **PUBLIC CONVENIENCE AND SAFETY:** The Contractor shall conduct his construction operations with due regard to the convenience and safety of the public at all times. No materials or equipment shall be stored where it will
interfere with the safe passage of public traffic. The Contractor shall provide, install, and maintain in satisfactory condition, all necessary signs, flares and other protective facilities and shall take all necessary precautions for the protection of the work and the convenience and safety of the public.

DD. **WORK TO BE DONE WITHOUT DIRECT PAYMENT:** Whenever it is specified in the contract that the Contractor is to do work or furnish materials of any kind for which no price is fixed in the contract, it shall be understood that he is to do such work or furnish such materials without extra charge or allowance or direct payment of any sort, and that the cost of doing such work or furnishing such material is to be included by him in a unit price for the appropriate item unless it is expressly specified that such work or material is to be paid for as extra work.

EE. **COOPERATION BETWEEN CONTRACTORS:** Where two or more contractors are employed on related or adjacent work, each shall conduct his operations in such a manner so as not to cause any unnecessary delay or hindrance to the other. Each contractor shall be responsible to the other for compatibility with adjacent work and all damage to work, person or property, or for loss caused by failure to finish the work within the time specified for completion.

FF. **CONSTRUCTION LINES, LEVELS AND GRADES:**

1. The Contractor shall verify all lines, levels and elevations indicated on the drawings before any clearing, excavation, or construction begins. Any discrepancy shall be immediately brought to the attention of the Engineer, and any change shall be made in accordance with his instruction. The Contractor shall not be entitled to extra payment if he fails to report the discrepancies before proceeding with any work whether within the area affected or not.

2. All lines and grades shall be verified and established by a licensed surveyor, or licensed Civil Engineer.

GG. **AS-BUILT DRAWINGS:** As-built drawings, the intent of which is to record the actual in-place construction so that any future renovations or tie-ins can be anticipated accurately, shall be required.

To accomplish this, all authorizations given by the Engineer to deviate from the plans shall be drawn onto the job site plans.

All deviations from alignments, elevations and dimensions which are stipulated on the plans shall be recorded on the as-built drawings.
In accomplishing the above, the following procedures shall be followed:

1. Immediately after these changes are constructed in place, the Contractor shall record them on the field office plans. This is to assure that changes are recorded before they are forgotten.

2. Within two weeks after final inspection of the project, the Contractor shall transfer the changes marked on the field office plans onto a clean set of plans using a red pencil. Any deletions shall be so marked and redrawn as necessary. The Contractor shall stamp or mark the tracings "AS-BUILT", and also sign and date each drawing so marked.

3. The Contractor shall submit the as-built drawings together with the marked-up field office plans to the Engineer. Any as-built drawings which the Engineer determines does not accurately record the deviation shall be corrected by the State and the Contractor shall be charged for the services.

4. Transfer of the "As-Built" data onto the tracing shall be accomplished by the Division of Water and Land Development (DOWALD) staff.

HH. **TOILET FACILITIES:** All toilet facilities constructed at the project site shall be in accordance with the Public Health Regulations of the Department of Health. All necessary precautions shall be observed at the project area. The use of sanitary facilities shall be strictly enforced and workmen violating these provisions shall be promptly discharged. In addition, the following requirements of the Department of Health must be strictly adhered to in the Forest Reserve area:

1. Portable covered receptacles for fecal matter and urine, of the design and number specified by the Department, shall be provided.

2. No employee will be allowed to deposit fecal matter or urine in any place except in these receptacles. Any infringement of this requirement shall result in immediate transfer or discharge of the offender or other disciplinary measures satisfactory to the Engineer.

3. All deposits in these receptacles shall be immediately covered with a chemical solution prescribed by the Department of Health. These receptacles, with their contents, shall be
collected and removed for disposal at the close of each working day. The method of disposal must be satisfactory to the Department of Health to prevent contamination of any water supply, stream or other bodies of water.

4. The receptacles shall be thoroughly cleaned with water and the required chemical solution and then returned to their required places for service.

II. OTHER HEALTH MEASURES: The Contractor shall adhere to the requirements of the Division of Forestry and the Department of Health for men working in the Forest Reserve.

Forms of work site exposure or conditions which may be judged by the Department of Health to be detrimental to the health or welfare of workers or of the general public shall be eliminated or reduced to safe levels as required by the Department of Health codes, standards, and regulations. Suitable first aid kits and a person qualified to render first aid, as specified in the Department of Health Regulations, shall be provided at all times when work is scheduled.

JJ. BOTANICAL PROTECTION MEASURES: The Contractor shall comply with the following requirements of the Conservation District Use Application and the Botanists:

1. All equipment before entering the Forest Reserve Area shall be washed with water to prevent exotic plants and seeds that may be attached from being carried into the area and be established.

2. The Contractor shall contain his construction along a route previously surveyed and flagged in the field.
PROPOSAL

For

DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF WATER AND LAND DEVELOPMENT
State of Hawaii

Job No. 3-9W-J
WAIKOLU STREAM DIVERSION DAM IMPROVEMENTS
MOLOKAI IRRIGATION SYSTEM
KALAWAO, MOLOKAI, HAWAII

Manager-Chief Engineer
Division of Water and Land Development
Department of Land and Natural Resources
State of Hawaii
Honolulu, Hawaii

Dear Sir:

The undersigned, having carefully examined the local conditions and all available records and information covering conditions which may affect the cost of the work to be performed, and having carefully examined the Plans and Specifications, and other contract documents, hereby proposes to furnish and pay for all materials, tools, equipment, labor and other incidental work necessary to modify the existing stream diversion structure and install a new catwalk, miscellaneous and appurtenant work, as required or called for in this Proposal, all according to the true intent and meaning of the Notice to Contractors, Information and Instructions to Bidders, Proposal, Special Provisions, Standard Specifications, Plans, and any and all addenda for:

Job No. 3-9W-J
Waikolu Stream Diversion Dam Improvements
Molokai Irrigation System
Kalawao, Molokai, Hawaii

on file in the office of the Division of Water and Land Development for the TOTAL SUM BID of:

Dollars ($________________)

and will fully complete all work under this contract within 180 consecutive calendar days from the date of written notice to proceed, including date of said order, said total sums being itemized on the following pages.

NOT TO BE USED FOR BIDDING PURPOSES

P-1
### PROPOSAL

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<th>Unit</th>
<th>Description</th>
<th>Unit Price</th>
<th>Total</th>
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<tr>
<td>1.</td>
<td>468</td>
<td>S.F.</td>
<td>Grouted Rubble Paving (G.R.P.), including site preparation, concrete and all necessary labor, material and equipment, in place complete.</td>
<td>$_________</td>
<td>$______</td>
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<tr>
<td>2.</td>
<td>L.S.</td>
<td></td>
<td>Section &quot;B&quot; (concrete curb), as shown on the plans, including reinf. steel, epoxy adhesive, exp. bolts, (6) baffles, incidentals and appurtenant work, in place complete.</td>
<td>$_________</td>
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<td>3.</td>
<td>L.S.</td>
<td></td>
<td>Steel Plate, including removal of exist. grating, modifying conc. and CRM dam, baffles, epoxy adhesive, support plate, exp. bolts, SS bolts, incidentals and appurtenant work, in place complete.</td>
<td>$_________</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>43</td>
<td>EA.</td>
<td>Catwalk Supports on Exist. Piers, including metal fabrication, pipe rail support and pipe rail, exp. bolts, incidental and appurtenant work, in place complete.</td>
<td>$_________</td>
<td>$______</td>
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<tr>
<td>5.</td>
<td>14</td>
<td>EA.</td>
<td>Intermediate Catwalk Supports, including metal fabrication, pipe rail support and pipe rail, SS bolts, incidental and appurtenant work, in place complete.</td>
<td>$_________</td>
<td>$______</td>
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<td>6.</td>
<td>L.S.</td>
<td></td>
<td>Grating Support, (L 5&quot; X 5&quot; X 1/2&quot;), as shown on the plans, including SS bolts, nuts, washers and joints, in place complete.</td>
<td>$_________</td>
<td></td>
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<tr>
<td>7.</td>
<td>380</td>
<td>L.F.</td>
<td>Fiberglass Grating, 2 feet wide, including fasteners and SS bolts, nuts, in place complete.</td>
<td>$_________</td>
<td>$______</td>
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<tr>
<td>8.</td>
<td>380</td>
<td>L.F.</td>
<td>Steel Cable, including eye-bolts, turn-buckles, crimps and incidentals in place complete.</td>
<td>$_________</td>
<td>$______</td>
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**TOTAL SUM BID**

**NOT TO BE USED FOR BIDDING PURPOSES**
It is also understood that the award of the contract will be made on the basis of the lowest responsible Total Sum Bid selected by the Board of Land and Natural Resources.

It is understood and agreed that the Board of Land and Natural Resources reserves the right to reject any and/or all bids and waive any defects when, in the Board's opinion, such rejection or waiver will be for the best interest of the State of Hawaii.

It is also understood and agreed that the award of the contract shall be conditioned upon funds being made available for this project and further upon the right of the Board of Land and Natural Resources to hold all bids received for a period of sixty (60) days from the date of the opening thereof, unless otherwise required by law, during which time no bid may be withdrawn.

It is also understood that the successful bidder will be notified to proceed with the construction within 180 days after award and that no claims for escalation costs will be made.

It is also understood and agreed that the quantities given herewith are approximate only and are subject to increase or decrease, and that the undersigned will perform all quantities of work as either increased or decreased, in accordance with the provisions of the Contract Specifications.

It is also understood and agreed that the estimated quantities shown for the items for which a UNIT PRICE is asked in this Proposal are only for the purpose of comparing on a uniform basis, bids offered for the work under this contract, and the undersigned agrees that he is satisfied with and will at no time, dispute said estimated quantities as a means of claims for anticipated profit or loss of profit, because of a difference between the quantities of the various classes of work done or the materials and equipment installed, and the said estimated quantities. On UNIT PRICE bids, payment will be made only for the actual number of units incorporated into the finished project at the contract UNIT PRICE.

It is also understood and agreed that if the product of the UNIT PRICE bid and the number of units does not equal the total amount stated by the undersigned in the Proposal for any item, it will be assumed that whichever figure (UNIT PRICE or TOTAL AMOUNT) that results in the lower total bid for the proposal represents the bidder's intention and for the purpose of determining the lowest bidder, the proposal shall be corrected accordingly. It is also understood and agreed that should the total amount stated be adopted or if the bidder fails to state a unit price, the UNIT PRICE shall be the amount arrived at by dividing the total amount by the number of units.

It is also understood and agreed that liquidated damages in the amount of ONE HUNDRED AND NO/100 DOLLARS ($100.00) for each and every calendar day in excess thereof prior to completion of the contract shall be withheld from payments due to the Contractor.

It is also understood and agreed that if this bid is accepted, the successful bidder will contract with the Board of Land and Natural Resources and said bidder will furnish the required bonds to the Board within ten (10) days after award or within such further time as the Manager-Chief Engineer may allow.
It is further understood and agreed that the successful bidder will provide all necessary labor, materials, tools, equipment, and other incidentals necessary to do all the work and furnish all the materials specified in the contract in the manner and time herein prescribed, and according to the requirements of the Engineer as therein set forth.

The bidder also acknowledges receipt of any and all addenda issued by the Division of Water and Land Development, by recording the date of receipt of the respective addenda in the space provided below:

<table>
<thead>
<tr>
<th>Addendum</th>
<th>Date Received</th>
<th>Addendum</th>
<th>Date Received</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. 1</td>
<td></td>
<td>No. 6</td>
<td></td>
</tr>
<tr>
<td>No. 2</td>
<td></td>
<td>No. 7</td>
<td></td>
</tr>
<tr>
<td>No. 3</td>
<td></td>
<td>No. 8</td>
<td></td>
</tr>
<tr>
<td>No. 4</td>
<td></td>
<td>No. 9</td>
<td></td>
</tr>
<tr>
<td>No. 5</td>
<td></td>
<td>No. 10</td>
<td></td>
</tr>
</tbody>
</table>

It is understood that failure to receive any such addendum shall not relieve the Contractor from any obligation under this Proposal as submitted.

It is also understood and agreed that if this Proposal is accepted and the undersigned should fail or neglect to contract as aforesaid, the Board may determine that the bidder has abandoned the Contract, and thereupon, forfeiture of the security accompanying his proposal shall operate and the same shall become the property of the Board.
JOINT CONTRACTORS OR SUBCONTRACTORS
TO BE ENGAGED ON THIS PROJECT

The bidder certifies that the following is a complete listing of all joint contractors or subcontractors who will be engaged by the bidder on this project to perform the nature and scope of work indicated pursuant to Section 103-29, Hawaii Revised Statutes and understands that failure to comply with this requirement shall be just cause for rejection of the bid.

The bidder further understands that only those joint contractors or subcontractors listed shall be allowed to perform work on this project and that all other work necessary shall be performed by the bidder with his own employees. If no joint contractor or subcontractor for any subdivision of work is listed, it shall be construed that the work shall be performed by the bidder with his own employees.

(Listing of joint contractors or subcontractors who will be engaged if Basic Bid Proposal is awarded.)

<table>
<thead>
<tr>
<th>Complete Firm Name of Joint Contractor or Subcontractor</th>
<th>Nature and Scope of Work to be Performed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOT TO BE USED FOR BIDDING PURPOSES**
Enclosed herewith is a:

Cashier's Check
Surety Bond
Certificate of Deposit
Certified Check
Legal Tender

(cross out all but one)

NOT TO BE USED FOR BIDDING PURPOSES

for the sum of ________________________________ Dollars ($__________)

as required by law.

Respectfully submitted,

Name of Company

By ______________________________________

*Signature

Title ________________________________

Date ________________________________

Address __________________________________________

Telephone No. ________________________________

Contractor's License No. ________________________________

Note: Fill in all blank spaces with information asked for or bid may be invalidated.

*Attach to this page evidence of the authority of this officer to submit bids on behalf of the Company, and also the names and residence addresses of all officers of the Company.

End of Proposal
SPECIAL PROVISIONS

Amendment to "Standard Specifications for Construction Work - 1964"

CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
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</tr>
</thead>
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<tr>
<td>DETAILED SPECIFICATIONS</td>
<td>SP-9</td>
</tr>
<tr>
<td>CONTRACT AND BOND</td>
<td>SP-10</td>
</tr>
</tbody>
</table>
SPECIAL PROVISIONS

These Special Provisions modify and supplement the "Standard Specifications for Construction Work - 1964" of the Department of Land and Natural Resources, to render them applicable to this specific project. There are no deletions to the Standard Specifications except for those sub-sections which are specifically deleted by these Special Provisions or those which obviously cannot apply to this project. Where there is a discrepancy between the Special Provisions and the Standard Specifications, the provisions set forth in these Special Provisions shall govern.

GENERAL SPECIFICATIONS

1.3 - Department of Land and Natural Resources (Also Referred to as the Department):

DELETE the words "A body corporate" and SUBSTITUTE therefor the words "A department".

1.9 - Contractor:

DELETE the word "Board" and SUBSTITUTE therefor the word "State".

2.6 - Proposal Guaranty:

DELETE this sub-section in its entirety and SUBSTITUTE therefor the following:

"All bids shall be presented under sealed cover and shall be accompanied by a Proposal Guaranty. The Proposal Guaranty shall be a deposit of legal tender or by a certificate of deposit, cashier's check, or certified check on a bank or on a savings institution insured by the Federal Deposit Insurance Corporation, or by a share certificate, cashier's check, certified check, or teller's check issued by a credit union insured by the National Credit Union Administration, in a sum not less than five percent of the amount bid, payable at sight or unconditionally assigned to the Department of Land and Natural Resources; provided that when the amount bid exceeds $50,000, the legal tender certificate of deposit, share certificate,
cashier's check, certified check, or teller's check shall be in a sum not less than $2,500, plus two percent of the amount in excess of $50,000. A certificate of deposit, share certificate, cashier's check, certified check, or teller's check may be utilized only to a maximum of $100,000. A bid deposit for a bid requiring a deposit in excess of $100,000 shall be in the form of legal tender or a surety bond conforming to the requirements of section 103-31, HRS 1985, as amended."

2.9 - Public Opening of Proposals:

ADD the following sentence: "The Board reserves the right to postpone or cancel the opening of Proposals."

3.3 - Requirements of Performance:

DELETE sub-section in its entirety and SUBSTITUTE therefore the following:

"At the time of the execution of the Contract, the successful bidder shall file a good and sufficient surety bond on the form furnished by the Department conditioned on the full and faithful performance of the Contract in accordance with the terms and intent thereof and also for the prompt payment to all others for all labor and materials furnished by them to him and used in the prosecution of the work provided for in such contract, in the manner, form and amount required by Section 78-20, 103-34 to 103-38 inclusive and 507-17, Hawaii Revised Statutes as amended, which bond shall be in an amount equal to one hundred percent (100%) of the total contract price, including amounts estimated to be required for extra work. Such bond shall also by its terms inure to the benefit of any and all persons entitled to file claims for labor performed or materials furnished in the work so as to give them a right of action as contemplated by Section 507-17, Hawaii Revised Statutes as amended.

"Pursuant to Section 103-34 to 103-38 inclusive, Hawaii Revised Statutes as amended, if the surety or sureties on the bond, whether individual or corporate, is other than a surety company authorized to do business under the laws of the State, there shall be no more than four sureties who shall severally justify in such amounts as, taken together, will aggregate the full amount of the bond; provided that in the case of the other sureties the Board shall
require that the surety shall also severally deposit with the Board certified checks, certificates of deposit, or share certificates (unconditionally assigned or payable on demand or after such period as the Board may stipulate) or bonds, stocks or other negotiable securities, or execute and deliver to the Board a deed or deeds of trust of real property, all of such character as shall be satisfactory to the Board, each surety to furnish the security to the full cash value of one hundred percent (100%) of the amount for which the surety shall so have justified; provided further that the comptroller or the Board, in the comptroller's or the Board's discretion, may waive the necessity of furnishing the security, to any extent that the comptroller or Board may deem warranted, in cases where, upon an actual examination, the comptroller or Board is satisfied as to the financial responsibility of the proposed surety or sureties; provided that if there be but one personal surety the surety shall so justify for the full amount of the bond."

3.4 - **Execution of Contract:**

**ADD** the following paragraph to this sub-section:

"On any individual award totalling less than $__________, the State reserves the right to execute the contract by the issuance of a State Purchase Order. Acceptance shall result in a binding contract between the parties without further action by the State. Executing the contract Purchase Order shall not be deemed a waiver of these specification requirements."

6.5 - **Trade Names and Alternates:**

**DELETE** this section in its entirety and **SUBSTITUTE** therefor the following:

"In any section of the specifications and/or plans where one or more brand names of materials or equipment are specified to indicate a quality, style, appearance or performance, the bidder shall base his bid on one of the specified brand names.

"The use of alternate brand names of materials and equipment which are of equal or better quality and of the required characteristics for the purpose intended will be permitted subject to the approval of the Engineer in a published addendum to such specifications and/or plans."
"For approval of the alternate brand names, a written request must be received in the office of the Division of Water Resource Management no later than 14 calendar days prior to the opening of bids. The written request must be addressed to the Manager-Chief Engineer, Division of Water and Land Development, Kalanimoku Building, Room 227, 1151 Punchbowl Street, or mailed to P. O. Box 373, Honolulu, Hawaii 96809, with the envelope clearly marked 'SUBSTITUTION REQUEST'. The bearer of the written request shall be responsible for its prompt delivery.

"The written request shall be submitted in triplicate, together with three (3) sets of technical brochures, and accompanied by three (3) copies of a statement of variances as shown on the 'Sample Request for Substitution' form included herein.

"The statement of variances must list all features of the proposed substitution which differ from the plans, specifications and/or product(s) specified and must further certify that the substitute has no other variant features. The brochures shall be clearly marked showing make, model, size, options, etc. and must include sufficient evidence to enable the Engineer to evaluate each feature listed as a variance. Should an unlisted variance be discovered after installation of the product, the penalty shall be immediate replacement with a specified product at no cost to the State."

7.1 - Laws to be Observed:

7.1.C.2, Working Hours: DELETE the following words: "National or" from the first paragraph and "National and" from the second paragraph.

7.1.C.4, Posting of Wage Rates: DELETE the period at the end of the sentence and INSERT the following:

"provided that where there is a collective bargaining agreement, the Contractor does not have to provide his employees the wage rate schedules."

7.2 - Permits and Licenses:

DELETE in its entirety and SUBSTITUTE the following in lieu thereof:

SP-4
The State will process permit applications whenever possible. The contractor shall pick up the pre-processed permits at the places of issuance and pay the required fees for them. If the permit applications are not processed by the State, the Contractor shall process the permit applications. The Contractor shall procure all permits and licenses and pay all charges and fees. Any costs incurred for the processing of the permit applications shall be paid for on a cost-plus basis in accordance with the terms of the contract. In all cases, the Contractor shall give all notices necessary and incident to the due and lawful prosecution of the work.

7.8 - Responsibility for Damage:

DELETE the first paragraph in its entirety and SUBSTITUTE therefor the following paragraph:

"The Department or the Engineer shall not be answerable or accountable in any manner, for any loss or damage that may happen to the work or any part thereof; or for any of the materials or other things used or employed in performing the work; or for injury to any person or persons, either workmen or the public; or for damage to property caused by or which might have been prevented by the Contractor, or his workmen, or anyone employed by him; against all of which injuries, death or damages to persons and property the Contractor having control over such work must properly guard. The Contractor shall be responsible for all liabilities imposed by law for any damage to any person or property resulting from defects or obstructions or from any cause whatsoever during the progress of the work or at any time before its completion and final acceptance, and shall indemnify, hold harmless and defend the State of Hawaii or any of its agencies, officers, employees and representatives from any suit actions, claims or demands of every name and description brought for, or on account of any injuries, death or damages received or sustained by any person or persons, by or from the Contractor, his servants or agents, in the construction of the work or by or in consequence of any negligence in guarding the same, in improper materials used in its construction, or by or on account of any act or omission of the Contractor or his agents; and, in addition to any remedy authorized by law, so much of the money due the Contractor under and by virtue of the Contract as shall be considered necessary by the Department, may be retained by the State until disposition has been made of such suits or claims for damages as aforesaid."
9.4. **Force Account Work:**

In sub-article "C", line 15, **DELETE** the words "Three and one-half (3-1/2)" and **SUBSTITUTE** therefor the word "Four (4)".

9.6 - **Partial Payments:**

**DELETE** this sub-section in its entirety and **SUBSTITUTE** therefor the following:

"9.6 - **PARTIAL PAYMENTS:** Provided the work is progressing satisfactorily, the Contractor will make an estimate each month based on the items of work performed and materials incorporated in the work and the value thereof at the unit prices set forth in the Contract and may include therein all of the cost of acceptable materials delivered at the project site but not incorporated in the work at the time of making the estimate. These estimates will be subject to correction at any time prior to or in the final estimate. The Department will retain five percent of the amount due under the contract to the Contractor to insure the proper performance of the contract. After fifty percent of the contract is completed and progress of work is satisfactory, no additional sums for retainage shall be withheld. However, if progress of work is not satisfactory, the Department may continue to withhold as retainage, sums not exceeding five percent of the amount due the Contractor. The Department will hold the retainage amount until completion, in an acceptable manner of all the work as indicated in the Plans and Specifications. The monthly estimate as ascertained hereinabove, less the retainage and previous payments, will be certified and paid to the Contractor.

"The Department may enter into an agreement with the Contractor which will allow the contractor to withdraw from time to time the whole or any portion of the sum retained upon depositing with the Department any general obligation bond of the State or its political subdivisions with a market value not less than the sum to be withdrawn. The Department may require that the total market value of such bond be greater than the sum to be withdrawn."

9.8 - **Guarantee of Work:**

**ADD** the following after sub-section 9.7:

"9.8 - **GUARANTEE OF WORK:**
a. Except as otherwise specified, all work shall be guaranteed by the Contractor against defects resulting from the use of defective or inferior materials, equipment or workmanship for one year or as otherwise noted in the Special Provisions from the date of acceptance of the contract or beneficial use by the State, whichever is earlier. All guarantees of work shall be transmitted in writing.

b. Should date of beneficial use be earlier than project acceptance date, the maintenance service contracts and warranty date for equipment in use shall start from the date of beneficial use.

c. If, within any guarantee period, repairs or changes are required in connection with the guaranteed work, which in the opinion of the Engineer is rendered necessary as a result of the use of materials, equipment or workmanship which are inferior, defective or not in accordance with the terms of the contract, the Contractor shall within five (5) consecutive working days and without expense to the State commence to:

1. Place in satisfactory condition in every instance all of such guaranteed work and correct all defects therein; and

2. Make good all damages to the work or equipment or contents thereof.

d. Whenever a manufacturer's guarantee on any product hereinafter specified exceeds one year, this guarantee shall become part of this contract thereof. The Contractor shall complete the warranty forms in the name of the State and submit such forms to the manufacturer within such time required to validate the warranty. The Contractor shall submit to the State a photocopy of the completed warranty form for the owner's record as evidence that such warranty form was filed with the manufacturer.

e. All written guarantees from sub-contractor and/or supplier shall be countersigned by the Contractor."
Sample Request for Substitution
Please use own letterhead and submit original and two copies

Date: __________________

Manager-Chief Engineer
Division of Water Resource Management
Department of Land and Natural Resources
State of Hawaii
Honolulu, Hawaii

Dear Sir:

Subject: Request for Substitution

Project Title: ________________________________

In accordance with the requirements of the Special Provisions, Section 6.5 - Trade Names and Alternates, we hereby submit for substitution three (3) sets of technical brochures and statement of variances for your review and approval for the item(s) shown below.

<table>
<thead>
<tr>
<th>Section/Item</th>
<th>Specified Brand</th>
<th>Substitute or Alternate Brand</th>
<th>Variant Features*</th>
</tr>
</thead>
</table>

I further certify that my request for substitution of the above item(s) has no other variant features.

__________________________
Signature

*If there are no variant features, indicate "none".
DETAILED SPECIFICATIONS

Sections 101 through 406 of the "Standard Specifications for Construction Work - 1964" shall be deleted in their entirety and the following sections supplemented:

SECTION 01567 - ENVIRONMENTAL POLLUTION CONTROL 2 pages
SECTION 03300 - CONCRETE 11 pages
SECTION 03603 - EPOXY ADHESIVE 2 pages
SECTION 04410 - GROUTED RUBBLE PAVING 2 pages
SECTION 05500 - METAL FABRICATIONS 4 pages
SECTION 06500 - FIBERGLASS GRATING 2 pages
SECTION 01567 - ENVIRONMENTAL POLLUTION CONTROL

PART I - GENERAL

1.01 - GENERAL: This section covers the requirements of environmental pollution control during construction activities. The Contractor shall be responsible for conformance to Title 11, Chapter 60 of the Public Health Regulations, Department of Health, State of Hawaii.

1.02 - GUIDELINES AND CRITERIA:

A. Erosion and Sediment Control:

1. Soil Protection and drainage facilities shall be completed as early as practicable. Sections of bare earth and the length of their exposure to erosion shall be minimized by proper scheduling and limiting the work areas.

2. Surface drainage from cuts and fills within the construction limits and from borrow and waste disposal areas shall, if turbidity producing materials are present, be held in suitable sedimentation ponds or shall be graded to control erosion within acceptable limits.

B. Landscape Preservation and Protection:

1. Construction activities shall be confined to the work areas defined by the plans and specifications. Care shall be exercised to preserve the natural landscape.

2. All scars made on trees by equipment, construction operations, or by removal of limbs larger than one inch in diameter shall be coated as soon as possible with an approved tree wound dressing.

3. All items having any apparent historical or archaeological interest which are discovered in the course of any construction activities shall be carefully preserved.

C. Dust Control: Dust, which could damage crops, orchards, cultivated fields and dwellings, or cause nuisance to persons, shall be abated and control measures shall be performed. The Contractor shall be held liable for any damage resulting from dust originating from his operations.
D. Waste Disposal Areas:

1. Care shall be exercised to insure that disposal of wastes from construction operations do not create pollution problems.

2. Disposal of any materials, wastes, effluent, trash, garbage, oil, grease, chemicals, etc., in areas adjacent to streams shall be subject to the approval of the Engineer.

E. Waste Waters: Construction operations shall be conducted so as to prevent discharge or accidental spillage of pollutants, solid waste, debris, and other objectionable wastes in surface waters and underground water sources.

F. Noise Control: The operating schedule of large horsepower heavy equipment shall be planned to have the least impact upon nearby residents. Night operations shall be curtailed or eliminated when disturbance will be created in urban or built-up areas.

1.03 - MEASUREMENT AND PAYMENT: The cost for any pollution control activity specified above or deemed necessary by the State will not be measured nor paid for directly but will be considered as incidental to and included in the total sum bid.

END OF SECTION
PART I - GENERAL:

1.01 - GENERAL: This specification covers the furnishing, hauling, mixing, placing, and curing of concrete.

1.02 - CONCRETE: All concrete shall be Class B, 2,500 psi compressive strength, unless otherwise specified or indicated on the plans.

A. Concrete Mix:

<table>
<thead>
<tr>
<th>Min. Strength Pounds Per Sq. Inch at 28 Days</th>
<th>Max. Gallons Per Sack of Cement</th>
<th>Min. Cement Sacks Per Cu. Yd. of Concrete</th>
</tr>
</thead>
<tbody>
<tr>
<td>4,000</td>
<td>5.0</td>
<td>7.0</td>
</tr>
<tr>
<td>3,500</td>
<td>5.4</td>
<td>6.5</td>
</tr>
<tr>
<td>3,000</td>
<td>6.6</td>
<td>6.0</td>
</tr>
<tr>
<td>2,500</td>
<td>7.0</td>
<td>5.2</td>
</tr>
</tbody>
</table>

B. Reinforcing steel and welded wire mesh shall comply with Section 03210 - "Reinforcing Steel."

1.03 - SUBMITTALS: Contractor shall submit six (6) copies of the concrete mix design and specifications for all materials utilized under this section to the Engineer for review and approval.

PART II - PRODUCTS:

2.01 - MATERIALS:

A. Portland cement shall conform to the requirements of ASTM C150, Type I, for all concrete work.

B. Concrete Aggregates: All aggregates shall be clean, free from debris and other extraneous materials, and shall be stored in such a manner to prevent intrusion of foreign matter.

1. Fine aggregates shall be calcareous or basalt sand, or a combination thereof. They shall meet the grading requirements of ASTM C33 unless the concrete producer can provide past data that show that a proposed non-conforming gradation will produce concrete with the required strength and suitable workability.
Fine Aggregate. Fine aggregate shall consist of beach sand, manufactured fines, or a combination thereof.

Fine aggregate shall be graded within the following limits:

<table>
<thead>
<tr>
<th>Sieve Size</th>
<th>Percentage Passing by Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8&quot;</td>
<td>100</td>
</tr>
<tr>
<td>No. 4</td>
<td>95 to 100</td>
</tr>
<tr>
<td>No. 8</td>
<td>80 to 100</td>
</tr>
<tr>
<td>No. 16</td>
<td>50 to 85</td>
</tr>
<tr>
<td>No. 30</td>
<td>25 to 60</td>
</tr>
<tr>
<td>No. 50</td>
<td>10 to 30</td>
</tr>
<tr>
<td>No. 100</td>
<td>2 to 10</td>
</tr>
</tbody>
</table>

If manufactured sands are used in the concrete mix, the Contractor may select and use a water-reducing and/or an air-entraining admixture as specified hereinafter to provide satisfactory workability in the concrete. The cement content of a mix shall be as specified hereinafter, and the use of an admixture shall in no way result in the reduction of the cement factor.

2. Coarse aggregates shall be crushed close-grained, blue lava rock meeting the grading requirements of sizes 57 or 67 (ASTM D448) or both. The maximum size of aggregate shall not be larger than 1/5 of the narrowest dimensions between sides of the forms of the member for which the concrete is to be used nor larger than 3/4 of the minimum clear spacing between individual reinforcing bars or bundles of bars.
Coarse Aggregate. Coarse aggregate shall be graded for the maximum size specified within the following limits:

<table>
<thead>
<tr>
<th>Sieve Size</th>
<th>Percentage Passing by Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>COARSE AGGREGATE</td>
</tr>
<tr>
<td>1-1/2 in.</td>
<td>---</td>
</tr>
<tr>
<td>1 in.</td>
<td>100</td>
</tr>
<tr>
<td>3/4&quot;</td>
<td>90 to 100</td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>---</td>
</tr>
<tr>
<td>3/8&quot;</td>
<td>20 to 55</td>
</tr>
<tr>
<td>No. 4</td>
<td>0 to 10</td>
</tr>
<tr>
<td>No. 8</td>
<td>0 to 5</td>
</tr>
</tbody>
</table>

C. Water shall be clear and free of oil, acid, salt, alkali, organic matter, or other deleterious substances.

D. The maximum aggregate size for use in concrete for reservoir lining shall be 3/4-inch. For concrete used in structures outside the reservoir, the maximum aggregate size shall be 1 inch unless specified otherwise in the special provisions.

E. Admixture (high range water reducer), shall conform to ASTM C494 and shall be mixed in proper amounts at the job site in accordance with directions of the manufacturer. The admixture shall be EUCON-37 by the EUCLID Chemical Company, 19218 Redwood Road, Cleveland, Ohio 44110 or approved equal.

F. Curing the compound shall conform to ASTM C309.

PART III - EXECUTION

3.01 - DESIGN OF CONCRETE MIXES:

A. All concrete throughout shall be either plant or job mixture in an approved type of power operated mixer that will insure uniformity and homogeneity of the concrete produced.

B. Mixing at job site shall be done in accordance with ACI 614.

C. Ready-mixed and mixed-in-transit concrete shall be mixed to conform to the provision of ASTM C94.
D. Concrete shall be mixed only in such quantity as is required for immediate use. No retempering will be permitted and concrete that has started to harden shall be discarded and promptly removed from the job.

E. Admixtures conforming to paragraph 2.01 may be used in the concrete as recommended by the supplier and approved by the Engineer.

F. Concrete Slump: The consistency of the concrete shall be determined by the slump test made in accordance with the current "Standard Method of Slump Test for Consistency of Portland Cement Concrete," ASTM C 143, or by ASTM C 360 (Kelley Ball) when approved by the Engineer. Unless specified otherwise, the slump for the different types of concrete structures shall conform to the following requirements:

<table>
<thead>
<tr>
<th>Types of Construction</th>
<th>Slump in Inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>Road Pavement</td>
<td>2 (max.)</td>
</tr>
<tr>
<td>Reinforced Concrete Structures:</td>
<td></td>
</tr>
<tr>
<td>Heavy Section</td>
<td>3 (max.)</td>
</tr>
<tr>
<td>Thin Sections and Columns</td>
<td>4 (max.)</td>
</tr>
<tr>
<td>Concrete Placed Under Water</td>
<td>6 (min.)</td>
</tr>
<tr>
<td></td>
<td>8 (max.)</td>
</tr>
</tbody>
</table>

3.02 - PLACING CONCRETE:

A. No concrete shall be placed in the absence of the Engineer or his representative who shall be given a one-day advance notice of starting time of concrete pour.

B. Preparation:

1. Concrete shall be placed upon clean, damp surfaces with no free water, or upon properly compacted fills but never upon soft mud or dry, porous earth.

2. Before depositing new concrete on or against concrete which has set, all accumulations of mortar splashed upon reinforcing steel and the surfaces of forms shall be removed and the forms shall be retightened. The surfaces of previously set concrete shall be thoroughly roughened and cleaned of all foreign matter and laitance, saturated with water and slushed with a coat of cement grout or epoxy grout, as directed by the
Engineer. New concrete shall be placed before the
gROUT has attained its initial set.

3. Any concrete having initial set before placing and
finishing shall be discarded and shall not be used for
the work. No remixing with water or with other
materials shall be permitted once the initial set has
taken place.

C. Conveying:

1. Concrete shall be conveyed from mixer to forms as
rapidly as practicable by methods what will prevent
segregation.

2. Concrete shall be deposited as nearly as practicable in
its final position. Extensive spading as a means of
transportation shall be avoided and in no case shall
vibrators be used to transport concrete inside forms.
The placement shall be completed within 30 minutes
after water is first added to the mix. However, when
the concrete is continually agitated, the time may be
extended to 1-1/2 hours. Retempering shall not be
permitted after the concrete has stiffened.

3. Open troughs and chutes shall have a slope not to
exceed 1 vertical to 2 horizontal and not less than 1
vertical to 3 horizontal. Chutes more than 20 feet
long and chutes not meeting the slope requirements
may be used provided they discharge into a hopper
before distribution.

4. The concrete shall not be allowed to drop freely more
than six feet except where specifically authorized by
the Engineer. When placing operations would involve
the dropping of concrete from a height of more than
six feet, it shall be conveyed through pipes or flexible
drop chutes.

5. If any appreciable segregation occurs through the
conveying methods employed, their use shall be
ordered discontinued by the Engineer and some other
satisfactory method of placing concrete shall be used.

6. All chutes, troughs, pipes and other means of
conveyance shall be kept clean and free from coatings
of hardened cement or concrete by thoroughly
cleaning with water and chipping after each pour.
Water used for flushing shall be discharged away from the vicinity of the concrete or forms already in place.

D. Depositing:

1. Unless adequate protection is provided, concrete shall not be placed during rain. Rainwater shall not be allowed to increase the mixing water nor to damage the surface finish. Fresh concrete that has been deposited but has not attained its initial set shall be protected in the event of rain.

2. Placing of the concrete shall be started at the far end of work so that each batch will be dumped against previously placed concrete, not away from it. The concrete shall not be dumped in separate piles and the piles then leveled and worked together.

3. Concrete shall be provided in sufficient quantities for continuous pour of the structure or unit section to avoid formation of cold joints. When work stoppage is required, a construction joint shall be made and constructed at locations shown on the drawings or approved by the Engineer. Before resuming placement of concrete, the joint shall be thoroughly cleaned and wetted.

E. Compaction:

1. All concrete shall be consolidated by vibration so that the concrete is thoroughly worked around the reinforcement, around embedded items, and into corners of forms, eliminating all air or stone pockets which may cause honeycombing, pitting, or planes of weakness. All compaction shall be done by use of high frequency internal vibrators. Where the vibrator cannot be inserted into the concrete, compaction shall be done by spading, rodding, or forking.

2. Frequency of vibrator shall be not less than 7,000 impulses per minute. The Contractor shall provide a sufficient number of vibrators to properly consolidate all concrete immediately after placing. At least one standby vibrator shall be on hand at all times during placement of the concrete.
3.03 - CONCRETE REINFORCING:

A. Reinforcing Steel - see Section 03210 - Reinforcing Steel.

B. All slabs shall be reinforced with 6 x 6 - W1.4 by W1.4 welded wire fabric unless otherwise shown or called for on the plans.

C. Care shall be taken in handling and placing the reinforcement as follows:
   1. Reinforcing fabric shall not be rolled over by trucks, buggies or wheelbarrows, nor trampled to the extent that it is bent out of the plane of the fabric. Material which has been so bent that it cannot be laid out flat shall be rejected.
   2. Reinforcing fabric shall be positively set, either prior to or during the placement of concrete, to the levels required within the slabs as indicated on the plans or as otherwise called for herein.

3.04 - CURING AND PROTECTION:

A. All concrete shall be cured for a period of not less than seven (7) days by one of the four methods listed below:

1. Water Curing: If cured with water, concrete shall be kept wet by mechanical sprinklers, by ponding, or by any other method which will keep the surfaces continuously saturated during the entire curing period.

2. Saturated Sand Curing: Surfaces cured with sand shall be covered with a minimum of one-inch thickness of sand which shall be kept uniformly distributed and continuously saturated during the curing period.

3. Curing Compounds: Curing compounds shall not be used on concrete surfaces that are to receive paint finish, acid stain or resilient flooring, except those that are recommended by the manufacturer to be compatible with the applied finish. The Contractor shall submit to the Engineer a letter certifying that the curing compound is compatible with the applied finish.
Application shall be in accordance with the manufacturer's recommendations. If curing, sealing or other compounds are used which are incompatible with applied finish, such compound shall be thoroughly removed by grinding with a terrazzo grinder.

4. **Waterproof Paper**: Waterproof paper or opaque polyethylene film conforming to ASTM C171 may be used. The paper or film shall be anchored securely and all edges sealed or applied in such a manner as to prevent moisture escaping from the concrete.

B. During this curing period, the concrete shall be maintained with minimal moisture loss at a relatively constant temperature. Fresh concrete shall be protected from heavy rains, flowing water, mechanical injury, and injurious action of the sun. Curing method selected must be compatible with the finish to be applied to the concrete. Curing shall immediately follow the finishing operation.

C. No pedestrian traffic shall be permitted on concrete slab for a period of three days after placing.

**3.05 - CONCRETE FINISHES:**

A. **Horizontal Surfaces**: The tops of equipment pads, floors and curb walls shall receive a steel trowelled finish. After the concrete has been placed, struck off, consolidated and levelled and after the mix has stiffened sufficiently, the surface shall consolidated with power-driven floats. Hand floating with wood floats shall be used in locations inaccessible to power-driven equipment. The surface shall then be steel trowelled to a uniform smooth texture, free of blemishes ripples and trowel marks.

B. The top of pump pads shall receive a wood float finish. After the concrete has been placed, struck off, consolidated, levelled and has stiffened sufficiently, the surface shall be wood floated to a uniform texture. Surface irregularities shall not exceed 1/4 of an inch. Joint and edges shall be tooled.

Concrete
03300-8
C. The tops of exterior walkways and pads shall receive a broom finish. The concrete surface shall be given a coarse transverse scored texture by drawing a broom across the surface. The operation shall immediately follow the steel trowelled finish as specified in paragraph A. above.

Broom finish shall be applied to all concrete surfaces as specified on the Plans or in the Specifications. The broom shall be drawn from one edge of pavement to the other along the lines indicated on the Plans with adjacent strokes slightly overlapping. The brooming operation shall be so executed that the corrugations produced in the surface shall be uniform in appearance and not more than 1/16 inch in depth. Brooming shall be completed before the concrete hardens in such condition that the surface shall be torn or unduly roughened by the operation. The surface thus finished, shall be free from rough and porous areas, irregularities, and depressions, resulting from improper handling of the broom. Broom shall be of quality, size and construction, and be so operated as to produce a surface finish meeting the approval of the Engineer.

3.06 - REMOVAL OF FORMS:

A. Forms shall not be disturbed until the concrete has set. They shall not be removed until the concrete has hardened and has attained the necessary strength to support its own weight and any construction live loads. Forms and supports shall not be removed without the consent of the Engineer.

B. The listing below serves only as a guide in determining the minimum length of time required before removal of forms and is based on the use of Type I portland cement. When high early strength portland cement or high quality concrete is used, the length of time listed below may be reduced.

- Walls in mass work .................. 24 hours
- Thin walls (12 inches or less) and sides of beams and girders ..... 48 hours
- Columns ............................. 7 days
- Bottom forms of beams, girders, and slabs ..................... 7 to 14 days
C. Any method of form removal likely to cause over-stressing of the concrete shall not be permitted. Supports shall be removed in such a manner as to permit the concrete to uniformly and gradually take the stress due to its own weight. The Contractor shall be responsible for safe practice in removing and shoring and for placing adequate reshores.

D. After the forms are removed from any concrete work, the Contractor shall immediately cut all embedded wire and nails at a point at least 1/2 inch inside the concrete surface and fill the resulting void with mortar.

3.07 - REPAIR OF DEFECTS:

A. After forms have been removed, any concrete which is not constructed as shown on the plans or is out of alignment or level beyond required tolerances or which shows a defective surface which in the opinion of the Engineer cannot be properly repaired or patched shall be removed.

B. Where concrete which is exposed to view requires repairing or patching, the texture of the surface of such repair or patch shall closely match that of the surrounding surface.

3.08 - SAMPLING AND TESTING:

A. Sampling - ASTM C172. Collect samples of fresh concrete to perform tests specified. ASTM C31 for making test specimens.

B. Slump Tests - ASTM C143. Take concrete samples during concrete placement. The maximum slump may be increased as specified with the addition of an approved admixture provided that the water-cement ratio is not exceeded. Perform tests at commencement of concrete placement, when test cylinders are made, and for each batch (minimum) or every 10 cubic yards (maximum) of concrete.

C. Compressive Strength Tests - ASTM C39. Make four test cylinders for each set of tests in accordance with ASTM C31. Test one cylinder at 7 days, two cylinders at 28 days, and hold one cylinder in reserve. Provide concrete cylinders for compression tests not less than once a day, nor less than once for each 100 cubic yards of concrete, nor less than once for each 5,000 square feet of surface for slabs or walls. If
the average strength of the 28-day test cylinders is less than $f_c$ and a maximum of one single cylinder is less than $f_c$ minus 300 psi, take three ASTM C42 core samples and test. If the average strength of the 28-day test cylinders is less than $f_c$ and two or more cylinders are less than $f_c$ minus 300 psi, take six core samples and test. Concrete represented by core tests shall be considered structurally adequate if the average of the three cores is equal to at least 85 percent of $f_c$ and if no single core is less than 75 percent of $f_c$. Locations represented by erratic core strengths shall be retested. Remove concrete not meeting strength criteria and provide new, acceptable concrete at no additional cost to the State. Repair core holes with nonshrink grout. Match color and finish of adjacent concrete.

D. Testing - All sampling and testing shall be performed by and independent testing agency and all test results submitted to the Engineer for approval. All cost of sampling and testing shall be borne by the contractor.

3.09 - CLEAN-UP: The Contractor shall clean-up all concrete and cement materials, equipment, and debris upon completion of any portion of the concrete work when so directed by the Engineer, and upon completion of the concrete and related work.

3.10 - MEASUREMENT AND PAYMENT: Concrete, reinforcing steel and welded wire mesh furnished and installed in accordance with these specifications shall not be measured or paid for directly but shall be paid for under the applicable contract unit prices or lump sum prices covering construction requiring concrete which prices shall be full compensation for furnishing and installing all materials; and for all equipment, tools, labor and incidentals necessary to complete the work.

END OF SECTION
SECTION 03603 - EPOXY ADHESIVE

PART I - GENERAL

1.01 - GENERAL CONDITIONS: This section covers the furnishing and installing of epoxy adhesive as required on the plans and in this specification. The epoxy adhesive shall be for structural bonding of concrete, masonry, metals and rock; grouting of reinforcing steel dowels and steel anchor bolts. Epoxy adhesive shall have a gel consistency ideal for vertical applications.

1.02 - COORDINATION WITH OTHER SECTIONS: Coordinate installation of epoxy adhesive with Section 03300: CONCRETE and Section 05500: METAL FABRICATIONS.

1.03 - SUBMITTALS: Submit manufacturer's published literature and manufacturer's specifications for physical characteristics and performance data.

1.04 - PRODUCT HANDLING: Store unopened containers at 40 to 95 degrees F.

PART II - PRODUCTS

2.01 - MATERIALS

A. **Asbestos Prohibition:** No asbestos containing materials shall be used under this section. The Contractor shall insure that all materials incorporated in the project are asbestos-free unless specifically approved in writing by the Engineer.

B. **Epoxy adhesive** shall be a multipurpose, 2 component, solvent free, moisture insensitive structural epoxy adhesive in accordance with ASTM C 881, Types I and II, Grade 3, Classes B and C for Epoxy Resin Adhesives with a minimum pot life of 30 minutes.

C. **Physical Properties of Cured Epoxy Adhesive:**

<table>
<thead>
<tr>
<th>ASTM TEST</th>
<th>RESULTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>D-695 Compressive Strength</td>
<td>11,236 psi</td>
</tr>
<tr>
<td>D-732 Shear Strength</td>
<td>3,550 psi</td>
</tr>
<tr>
<td>D-638 Tensile Strength</td>
<td>2,940 psi</td>
</tr>
<tr>
<td>D-790 Flexural Strength</td>
<td>5,582 psi</td>
</tr>
<tr>
<td>C-882 Bond Strength</td>
<td>2,460 psi</td>
</tr>
<tr>
<td>D-570 Absorption</td>
<td>0.63%</td>
</tr>
<tr>
<td>C-883 Shrinkage</td>
<td>complies</td>
</tr>
<tr>
<td>C-884 Thermal Compatibility</td>
<td>complies</td>
</tr>
</tbody>
</table>

Epoxy Adhesive
03603-1
D. **Silica Aggregate** shall be "Pro Silica aggregate", from Bonded Materials Company or approved equal.

**PART III - EXECUTION**

**3.01 - INSTALLATION AND WORKMANSHIP:** Work shall be performed by skilled workmen in conformance with approved commercial practices and the manufacturer's specifications.

A. Surface shall be clean and sound. It may be dry or damp, but free of standing water. Remove dust, grease, curing compounds, foreign particles and disintegrated materials.

B. Epoxy adhesive shall be mixed in accordance with the manufacture's specifications. Epoxy adhesives shall not be mixed within 50 feet from the stream bed. Any epoxy adhesive spills shall be properly contained and cleaned up with absorbent material and disposed of outside the project site. The Engineer shall be notified within 24 hours of any spills.

C. Epoxy shall be mixed with silica aggregates in accordance with the manufacture's specifications. Smooth river rocks with a maximum diameter of 1" shall be set in place before the epoxy adhesive mortar sets up.

**3.02 - CLEAN UP**

A. During the process of the work, the premises shall be kept reasonably free of all debris and waste materials resulting from the work under this section. All such debris and rubbish shall be removed from the site.

B. Clean residue from drilling immediately after holes are drilled in CRM.

**3.03 - MEASUREMENT AND PAYMENT:** Payment for epoxy adhesives shall not be paid for directly but shall be considered as incidental to and included in the applicable contract unit price or lump sum price covering construction requiring epoxy adhesives.

**END OF SECTION**

Epoxy Adhesive  
03603-2
SECTION 04410 - GROUTED RUBBLE PAVING

PART I - GENERAL

1.01 - GENERAL CONDITIONS

This specification covers the construction of Grouted Rubble Paving (G.R.P.).

PART II - PRODUCTS

2.01 - MATERIALS

A. **ASBESTOS PROHIBITION:** No asbestos containing materials shall be used under this section. The Contractor shall insure that all materials incorporated in the project are asbestos-free unless specifically approved in writing by the Engineer.

B. **STONES:** Shall be clean, hard, sound, durable, free of seams and blemishes or other imperfections, and when tested in accordance with AASHO test method T96, shall show wear not to exceed 50%. All stones shall be obtained from the same source. All stones shall be moss rock or blue stone (quarried or shattered face exposed). The stones may be variable in sizes, shall not be thicker than the depth of the course being placed and shall not be less than 1/3 cubic foot in volume. No stone shall be used that does not extend through the paving depth.

   Stones may be obtained by calling Mr. Thomas Matayoshi, Department of Agriculture, Molokai Irrigation System, at 567-6150 (Molokai).

C. **MORTAR:** Shall have a 2000 psi, 28-day compressive strength.

   (1) Portland Cement shall conform to ASTM C 150, Type I or Type II.

   (2) Aggregates shall consist of natural or manufactured sand in accordance with ASTM C 144.

   (3) Water: Clean, fresh, and free from injurious amounts of oils, acids, alkalis, organic materials or other deleterious substances.

PART III - EXECUTION

3.01 - GENERAL

All grouted Rubble Paving shall be constructed by experienced workmen.
3.02 - DELIVERY, STORAGE, AND HANDLING

Deliver, store, and handle materials and equipment on the site, keeping all materials clean and protected from physical damage. Protect Portland cement from weather and contamination. Materials contained or otherwise damaged due to caking, partial set or other damage, will be rejected and must be removed from the project.

3.03 INSTALLATION

A. MORTAR: Shall be composed of one part portland cement to three parts of fine aggregate in damp and loose condition and a sufficient amount of water. The cement and fine aggregate shall be thoroughly mixed dry and water shall be added until the proper consistency is attained. Mortar not placed within thirty minutes after mixing shall not be used. Retempering will not be permitted. Mix by a mechanical batch mixer for at least 3 minutes. Hand mixing shall not be permitted.

B. LAYING OF GRP: The bed for the grouted rubble paving shall be compacted thoroughly and finished to a smooth surface to a depth that the surface of the grouted rubble paving shall be at the planned grade. All soft and yielding material shall be removed and replaced with satisfactory material to form a stable bed.

Large flat stones shall be selected for the bottom or first course and shall be laid in a full mortar bed in practically horizontal position. Selected stones, roughly squared and pitched to lines, shall be used at all angles and end faces of walls. All stones shall be fully bedded in mortar and so placed as to break joints at least 6 inches.

Selected stones shall be used and roughly shaped to make close joints. Stones shall be well bedded and form a uniform surface with broken joints. After all stones have been placed, the joints shall be completely filled with grout.

3.03 - MEASUREMENT: The quantity to be paid for shall be the actual number of square feet of grouted rubble paving installed as shown on the plans or as ordered by the Engineer and accepted.

End of Section
PART I - GENERAL

1.01 - GENERAL REQUIREMENTS: This section covers the furnishing, fabricating and installing of the new catwalk, steel plate and baffles.

1.02 - COORDINATION WITH OTHER SECTIONS: Coordinate metal fabrications with SECTION 06500: FIBERGLASS GRATING and SECTION 04410: GROUTED RUBBLE PAVING.

1.02 - QUALITY ASSURANCE

A. Qualifications of Welders

Use only certified welders and the shielded arc process for all welding performed in connection with the work of this section.

B. Codes and Standards

In addition to complying with all pertinent codes and regulations, comply with:


1.03 - SUBMITTALS: Submit complete shop drawings of all miscellaneous metal work to Engineer in accordance with General Conditions.

PART II - PRODUCTS

2.01 - MATERIALS

A. Miscellaneous Steel Bars, Rods and Shapes


B. Bolts, Nuts and Washers

Type 303 or 304 Stainless Steel.
C. Expansion Bolts

Provide necessary templates to insure proper and accurate locations and setting of expansion bolts. Expansion bolt shall be Ramset Trubolt wedge anchor or approved equal. Material composition: bolt (type 303 Stainless); expansion sleeve (type 302 stainless); nut and washer (type 302 or 304 stainless).

D. Structural Pipe

Pipe support for cable rail shall be 2" nominal diameter "Extra Strong" with the following dimensions: outside diameter = 2.375", inside diameter = 1.939" and wall thickness = .218 in accordance with ASTM A53 Grade B.

E. Steel Cable

Wire shall be 7 X 19 strand galvanized with a 3/8" bare cable diameter, vinyl coated to a finished diameter of 15/32".

PART III - EXECUTION

3.01 - INSTALLATION AND WORKMANSHIP

A. Except for modifications indicated on drawings and/or specified herein, A.I.S.C.'s "Code of Standard Practice for Steel Buildings and Bridges" and American Welding Society's "Code for Fusion Welding and Gas Cutting in Building Construction," both as amended to date, shall govern materials, fabrication and erection of steel work under this section.

B. Workmanship shall be as per best standard practice of the trade and shall be done by mechanics skilled type of work required. Insofar as possible, work shall be fitted and shop assembled, ready for erection. Jointing and intersections shall be accurately made, in true planes with adequate fastenings.

C. Welding shall comply with applicable codes and to current good practices for the type of work and materials involved. Reference is made to the "Welding Handbook" of the American Welding Society, as a guide for general procedure and for qualification of welders. All welding shall be even and smooth and exposed welded joints ground smooth and flush.

D. Do all cutting, tapping, and drilling required in the shop insofar as possible.
E. **Delivery and Storage**: Before shipment from the factory all metal parts shall be given a coating on all surfaces which will protect the metal against stain and discoloration. It shall be of such composition that it may be easily removed with an approved solvent which shall not be harmful to the metal or to its finish. All work shall be adequately protected during shipment and stored under cover until erection.

3.02 - **GALVANIZING**: All miscellaneous iron shall be hot-dipped, galvanized. Galvanizing shall be done after fabrication. Abraded or burned parts of galvanized work shall be coated with "Galvaloy" or approved equal or hot zinc treatment.

3.03 - **COATING**

A. **Preparation**: metal surfaces to be painted shall be dry, clean and free from dirt, oil, rust, scale and other foreign contaminants. The metal surface shall be as per manufacturer's recommendations to produce satisfactory results.

B. **Galvanized Metal Coatings**:

   * Dupont System: Surface Preparation: 3832-S Duluix Reducer; Prime: 615S mixed equally with 616-S (No induction period), spray 2 coats to achieve 1 mil DFT; Finish: #826 Imron Polyurethane Enamel, 2 mils DFT.

   * Devoe System: Surface Preparation: Vinyl Wash Primer; Prime: Chemfast 4000 Epoxy Primer, 3 mils DFT; Finish: Prufthane Aliphatic Acrylic Urethane Gloss Enamel, 3 mils DFT.


C. **Corrosion Protection**: Where metals are incompatible to other materials, the contact areas of these materials shall be back coated before erection with an approved bituminous paint or other insulation coating as recommended by the metal fabricator.

D. **Protection**: After erection all work shall be adequately protected from damage from grindings, polishing, cement, or other harmful materials.
3.04 - STEEL CABLE: The cable shall be connected to the new eyebolt at the diversion dam and to the existing concrete block at the east portal. Turnbuckles shall be installed at the new eyebolt and the existing concrete block for future adjustments. The cable shall be properly stretched to remove slack in the cable to the satisfaction of the Engineer.

3.05 - CLEANUP: After erection, clean all mud, oil, grease, and dirt from all surfaces. Remove unused materials, tools, scaffolding, and debris from the premises and leave broom clean.

3.06 - MEASUREMENT AND PAYMENT: All metal fabrication as described within this section shall not be measured or paid for directly but shall be considered as incidental to the applicable contract unit prices or lump sum prices requiring fabricated metal work which price shall be full compensation for furnishing and installing all materials, equipment, tools, labor, and incidentals necessary to complete the work.

END OF SECTION

Metal Fabrications
05500-4
SECTION 06500 - FIBERGLASS GRATING

PART I - GENERAL

1.01 - GENERAL CONDITIONS: This section covers the furnishing and installing of fiberglass grating.

1.02 - COORDINATION WITH OTHER SECTIONS

Coordinate installation of fiberglass grating with Section 05500: METAL FABRICATIONS.

1.03 - SUBMITTALS

A. Submit detailed shop drawings for the fabrication and installation of the grating including layout, arrangement and accessories.

B. Submit manufacturer’s published literature for specified products and accessories, including manufacturer’s specifications, physical characteristics and performance data.

1.04 - PRODUCT HANDLING:

A. Store grating above ground on pallets, platforms or other supports.

B. Protect from damage.

PART II - PRODUCTS

2.01 - MATERIALS

A. Asbestos Prohibition: No asbestos containing materials shall be used under this section. The Contractor shall insure that all materials incorporated in the project are asbestos-free unless specifically approved in writing by the Engineer.

B. Fiberglass Grating shall be fiberglass roving reinforced thermoset plastic, constructed to provide thorough wetting of glass by the resin. The grating shall be made in a mold and of single piece construction so the reinforcing glass of the bearing bars are interwoven with the glass of the cross bars. Resin content will be a minimum of 60% and fiberglass a maximum of 40% by weight. Angular silica particles shall be integrally embedded in the top surface of the grating as an anti-slip surface. The grating shall be translucent to allow inspection for defects, air bubbles and thorough glass wetting and shall contain no fillers.
C. **Bearing Bars** shall be 1" high by 3/8" wide on 1" centers. Cross-bars shall be 1" high by 5/8" wide on 4" centers. Grating shall be suitable for a concentrated load of 400 lbs. applied by a 12" X 3" block with 1% deflection when supported 2 feet on center. The tops of the bars shall be in the same plane to maximize the anti-slip surface area.

D. **Resin** shall be a chemical grade thermoset resin, such as CP-84, or approved equal.

E. **Fasteners** shall be "J Hold-Down Clips" with stainless steel (Type 304) 10-24 X 3/4" roundhead bolt, lock nut and washer. 6 clips shall be provided for each panel.

**PART III - EXECUTION**

**3.01 - INSTALLATION AND WORKMANSHIP:** Work shall be performed by skilled workers in conformance with approved commercial practice and the manufacture’s specifications.

A. Check supporting members for correct layout and alignment. Verify that surfaces to receive the grating are free of debris. Check measurement of grating to determine fit.

B. Fasten grating to steel angle as required by the manufacture’s specifications.

C. Field adjust grating as necessary or required by the Engineer. All field cut or sanded surfaces shall be coated with resin furnished by the manufacturer and applied in accordance with the manufacture’s specifications.

**3.02 - CLEAN UP**

A. During the process of the work, the premises shall be kept reasonably free of all debris and waste materials resulting from the work under this section. All such debris and rubbish shall be removed from the site.

B. Clean metal shavings from drilling immediately after holes are drilled in steel angles.

**3.03 - MEASUREMENT AND PAYMENT:** Fiberglass grating shall be measured by the actual lineal feet installed in place complete and will be paid for directly under the following proposal item:

"Fiberglass Grating ..."

END OF SECTION

Fiberglass Grating
06500-2
CONTRACT AND BOND

Delete pages 173, 174 and 175 of the Contract and Bond section of the "Standard Specifications for Construction Work - 1964" and substitute the following pages.
CONTRACT

THIS AGREEMENT, made this ___ day of _____________, 19___, by and between the State of Hawaii, by its Board of Land and Natural Resources, hereinafter called the "STATE" and ___________________________, hereinafter called the "CONTRACTOR";

WITNESSETH

That for and in consideration of the payments hereinafter mentioned, the Contractor hereby covenants and agrees with the State to furnish, deliver, construct, and pay for everything necessary for the completion of the work for, and to perform complete, all the work of:

or such part thereof as shall be required by the State, all in accordance with the Contract Specifications and Plans, Standard Specifications for Construction Work, Special Provisions for Job No. ___________ and the Notice to Contractors, Information and Instructions to Bidders, Proposal, Contractor's Proposal, and any and all additions, deductions and changes thereto or therein which are hereby made a part of this Contract, all on file in the Office of the Department of Land and Natural Resources (all of which, together with this Contract and the Contractor's bonds, are herein referred to as the Contractor Documents), and further covenants and agrees to complete such work on or before _____ consecutive calendar days after receiving notice from the State to proceed, subject to such extensions as may be provided for in the Contract Documents.

For and in consideration of the covenants, undertakings, and agreements of the Contractor, and upon the full and faithful performance thereof by the Contractor, the State hereby agrees to pay to the Contractor the sum of ___________________ Dollars ($_________________) if the number of units actually incorporated in the work proves to be as set forth in the Proposal, or if such number of units varies therefrom, the sum determined by adding the products of the number of units incorporated in the work multiplied by the respective unit prices bid therefor in the Contractor's Proposal (and, where applicable under the Specifications, multiplied by the respective adjusted unit prices). All payments under this Contract shall be made from funds appropriated by _______________ and any other legislative act or source from which such payments may lawfully be made. Such payments shall be made in the manner and at the time provided in the Contract Documents and shall be subject to such additions or deductions as may be in accordance with the provisions of said Contract Documents.
In addition to such payment, compensation for extra work, if any, may be allowed but shall not exceed ____________________ Dollars ($______________) in accordance with the provisions of said Contract Documents and shall be made from funds appropriated as provided hereinabove.

This contract is subject, however, to the release of funds by the Governor.

It is covenanted and agreed by and between the Contractor and the State hereto that in the event a portion of the funds for the project is provided by the Federal Government, the sums of Federal monies which are part of the contract price and/or extras shall be paid to the Contractor only out of the aforesaid Federal funds if and when such Federal funds shall be received from the Federal Government for the purpose of such payment, and that this Contract shall not be construed to bind the State to pay said portions, at all events, out of any funds other than those which may be so received from the Federal Government.

LIQUIDATED DAMAGES per working day for failure to complete the work on time shall be the sum stated in the Proposal submitted by the Contractor.

IN WITNESS WHEREOF, the STATE OF HAWAI, by its Board of Land and Natural Resources, has caused the seal of the Department of Land and Natural Resources to be hereunto affixed and these presents to be duly executed this ______ day of __________________, 19____; and the Contractor has caused this Agreement to be executed and its corporate seal hereto affixed by its proper officer(s) thereunto duly authorized on the day and year first above written.

STATE OF HAWAI

By: ___________________________
   Chairperson and Member
   Board of Land and Natural Resources

And By: _________________________
   Member
   Board of Land and Natural Resources

Deputy Attorney General

Dated: _________________________

Contractor

By: ___________________________
   Its: _________________________
The Contractor shall execute and file with the Department of Land and Natural Resources the following Non-Gratuity Affidavit before final payment is made:

NON-GRATUITY AFFIDAVIT

A Release Form to be Executed and Filed by the Contractor Before the Final Payment is Made.

Name of Project

Project No.

Contract No.

District of

Island of

STATE OF HAWAI

) ) SS.

The undersigned hereby certifies that he is the

_____________________________; that in connection with the aforesaid
project, he or his officers, representatives, agents, subcontractors or employees has
(have) not given or made any agreement to give to any Department of Land and
Natural Resources employee, his relatives or agents, any gift of money or any
other gift; or gratuity in any form whatsoever; has (have) not loaned any money
or anything of value to any Department of Land and Natural Resources employee,
his relatives or agents; has (have) not rented or purchased any equipment, or any
form thereof, or supplies of any nature whatsoever from any Department of Land
and Natural Resources employee, his relatives or agents.

______________________________

Subscribed and sworn to before me this

______ day of _________________, 19__.

______________________________

Notary Public, ___________ Judicial
Circuit, State of Hawaii

My commission expires: ________________
BOND

KNOW ALL MEN BY THESE PRESENTS:

That we ______________________________, as principal; and ______________________________, a corporation, as surety, which or who qualify under Section 103-55, HRS, hereinafter sometimes called "OBLIGORS", are held and firmly bound unto the STATE OF HAWAII, hereinafter called the "OBLIGEE", its successors and assigns, in the full and just sum of ______________________________AND NO/100 DOLLARS ($__________) for the payment of which to the said Obligee, its successors and assigns, well and truly to be made, we do hereby bind ourselves and our respective heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THE OBLIGATION IS SUCH, that, if the above bounden principal shall fully, faithfully, and completely perform and fulfill its contract for Job No. __________, ______________________________, Hawaii, dated the ______ day of __________, 1992, entered into by said principal with said OBLIGEE, in all respects in accordance with each and every requirement and intendment, term, covenant, and condition thereof as they now exist or may hereafter be modified, and shall deliver the work specified in said Contract to said OBLIGEE, or to its successors or assigns, fully completed in a substantial and workmanlike condition, free from all faults, or defects by reason of workmanship or materials and free from all liens and/or claims, and all as in said Contract provided; and without further costs, expenses and/or charges to said OBLIGEE, its successors or assigns, other than those agreed to or provided for in said Contract, if any; and shall also save said OBLIGEE and its officers or agents, successors or assigns, free and harmless from all claims, suits and/or actions of every nature and kind of damages, compensation or otherwise, direct or indirect, and from all costs, expenses and/or charges by reason or on account thereof or of any injury or damage to person or property, arising or growing out of or during the performance of said Contract by said principal, its employees, servants, agents, and/or sub-agents; and shall properly and duly pay or cause to be paid, in full, the wages of all persons employed by said principal or by any Contractor, Sub­contractor, or agent under it, upon said work and shall properly and duly pay for, or cause to be paid for, all materials entering into said work; and if the OBLIGORS herein shall perform each and every covenant and agreement in this Bond and in said Contract contained on its part to be performed, then this obligation shall be void; otherwise, it shall be and remain in full force and effect.
And for valuable consideration, it is hereby jointly and severally covenanted and agreed between the OBLIGORS herein and said OBLIGEES:

A. That no amendment, change, extension, alteration, deduction or addition of, in or to any term or terms of the said Contract, or of the Contract Documents pertaining to said Contract shall in anywise affect the obligation of said surety on this Bond; and that the surety does hereby waive notice of any such amendment, change, extension, alteration, deduction, or addition of, in or to the terms of said Contract or of the Contract Documents pertaining to said Contract, or in or to the said work.

B. That the obligations of this Bond shall continue for the full amount thereof, and shall also extend to and cover any and all costs, expenses and/or charges arising out of any and all defects or faults by reason of defective or faulty materials or workmanship used in or upon said work by said principal, its employees, servants, agents, and/or sub-agents, during the progress of said work, and to save harmless said OBLIGEE from any and all loss or expense by reason of any and all claims, suits and/or actions as aforesaid, any cost, expense and/or charge connected therewith as aforesaid, whether or not, said defects or defaults in said work are known prior to the final acceptance of said work and whether said claims, suits and/or actions are brought or prosecuted before or after the final acceptance of said work and within the statutory period therefor.

C. That if any part, clause, condition, covenant, or agreement of this Bond is held by any court of competent jurisdiction to be invalid, the same shall not affect the validity of this Bond as a whole or any part thereof which can be given effect without the part, clause, condition, covenant, or agreement held to be invalid.

D. That if any part, clause, condition, covenant, or agreement of said Contract shall be held by any court of competent jurisdiction to be invalid, this Bond and the obligations thereof shall continue in full force and effect, notwithstanding said invalid part, clause, condition, covenant or agreement shall not affect the validity of the Contract as a whole, or shall leave any part of the Contract which can be given effect without the part, clause, condition, covenant or agreement so held to be invalid.

E. That suit on this Bond may be brought before a court of competent jurisdiction without a jury, and that in the event of any breach for which liquidated damages are provided in said Contract the sum or sums specified in said Contract as liquidated damages shall be considered as, and held to be fixed and liquidated damages to the State of Hawaii, its successors, or assigns, for said breach.
F. That the obligations, conditions, covenants and agreements of this Bond shall be liberally construed to effect the objects and purposes thereof.

G. That this Bond shall inure to the benefit of any and all persons furnishing materials and performing labor in the performance of the Contract aforesaid, so as to give said persons a right of action as contemplated by Section 507-17, HRS as amended.

Signed, sealed, delivered, and dated this _____ day of __________, 1991, at Honolulu, City and County of Honolulu, State of Hawaii.

_____________________________
Principal

By: __________________________ 

Its: __________________________

APPROVED AS TO FORM

____________________________
Deputy Attorney General

Date: _________________________

By: __________________________

Its: __________________________

____________________________
Surety

By: __________________________

Its: __________________________
On this _____ day of __________, 1992, before me appeared ________ and __________________, to me personally known, who, being by me duly sworn, did say that they are the ________________ and __________________ respectively, of __________________________, and that the seal affixed to the foregoing instrument is the corporate seal of said corporation, and that the foregoing instrument was signed and sealed in behalf of said corporation by authority of its Board of Directors, and said ____________________ and __________________ acknowledged the foregoing instrument to be the free act and deed of said corporation.

Notary Public, Judicial Circuit, State of Hawaii

My commission expires:

On this _____ day of __________, 1992, before me appeared __________________ and ________________________, to me personally known, who, being by me duly sworn, did say that they are the __________________ and __________________ respectively, of __________________________, and that the seal affixed to the foregoing instrument is the corporate seal of said corporation, and that the foregoing instrument was signed and sealed in behalf of said corporation by authority of its Board of Directors, and said ____________________ and __________________ acknowledged the foregoing instrument to be the free act and deed of said corporation.

Notary Public, Judicial Circuit, State of Hawaii

My commission expires:
STATE OF HAWAII
FOR THE
DEPARTMENT OF AGRICULTURE

JOB NO. 3-9W-J

WAIKOLU STREAM DIVERSION
DAM IMPROVEMENTS

MOLOKAI IRRIGATION SYSTEM

KALAWAO, MOLOKAI, HAWAII

T.M.K.: 6-1-01:2

BY THE

DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF WATER AND LAND DEVELOPMENT

ACT 216, SLH 1987, Item A-28, G-87-411-C

INDEX

DESCRIPTION
TITLE SHEET
SITE PLAN & DETAILS
CATWALK PLAN & DETAILS

SHEET NO.
1
2
3

APPROVED:

DATE:

MANAGER-CHEF ENGINEER
DIVISION OF WATER AND LAND DEVELOPMENT
DEPARTMENT OF LAND AND NATURAL RESOURCES
CONSTRUCTION NOTES:

1. Concrete shall be 3,000 psi.
2. Reinforced steel shall be Grade 60.
3. Existing or new C.F.M. surfaces shall be treated with Pro-poxy 300 prior to placing new concrete.
4. Concrete curb expansion joints shall be spaced no greater than 5'-0'.
5. Construction of the concrete curb shall begin at the toe of the dam and proceed upwards.

PLAN OF NEW CATWALK ON 20" C.I. PIPE

CABLE ANCHOR DETAIL

CATWALK SUPPORT ON EXIST PIER

SEATING SUPPORT JOINT DETAIL

PIPE SUPPORT FOR CABLE RAIL DETAIL

STEEL PLATE BAFFLE DETAIL
ASSESSMENT AND IMPROVEMENT RECOMMENDATIONS FOR THE MOLOKAI IRRIGATION SYSTEM

Lance T. Santo
Hawaii Agriculture Research Center
99-193 Aiea Heights Drive, Suite 300,
Aiea, Hawaii 96701-3911
Telephone: (808) 486-5355

October 31, 2001
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4 Sustainable yield/aquifer code for the Island of Molokai

APPENDICES

Appendix

A Senate Resolution No. 34 S.D. 1. Molokai Irrigation System Evaluation

B Photographs of Features of the Molokai Irrigation System

C Daily and Weekly Reports on Flows and Kualapuu Reservoir Depth

D Statistical Analysis of Rainfall at 900-ft Elevation and Pumping of Wells 23 and 24 on the Depth of Well 4

E Water Users by Account Number on the MIS for June and July 2001

F Water Use and Acreage by Preference DHHL and Non-preference Users from July 1989 to June 2000
EXECUTIVE SUMMARY

In August 2001, the Hawaii Agriculture Research Center initiated a review of the Molokai Irrigation System (MIS) to recommend changes to mitigate the current water shortage problem. The system in Waikolu valley (dams, wells and tunnel), Kualapuu (transmission pipeline and reservoir) and Hoolehua (distribution pipeline and users) was visited on August 15, 2001. Past reports, memoranda, meeting minutes and data relative to this task were reviewed at the State of Hawaii, Department of Agriculture (DOA), Agricultural Resource Management Division office in Honolulu. Relevant data were digitized for analysis. Weather, tunnel flows, pumping, reservoir depth and customer use data were obtained and utilized. Various individuals from the DOA, MIS Users Advisory Board, University of Hawaii Cooperative Extension agents, and interested community members were contacted to document the issues and concerns of the Molokai community.

The current water shortage is primarily the result of the most severe drought since the inception of the MIS. The drought started in 1998 and is continuing through 2001. Rainfall total of 7.97 inches in 1998 was a record low compared to the average of 22.68 inches since 1970 at the Kualapuu reservoir in central Molokai. The rainfall in 1999 and 2000 were the second and sixth lowest totals at 9.22 and 11.84 inches. The dry weather has decreased water collection in Waikolu valley and increased water demand in central Molokai resulting in the Kualapuu reservoir depth dropping to 4 ft, the lowest level on record.

The findings indicate that improving the water collection in Waikolu valley, reducing system losses and developing new sources could result in obtaining additional water. New sources being considered are stream diversions of Waihanau, Kawela, Kaunakakai, Manawainui and use of some brackish wells. The additional water may be sufficient to increase the customer base from the current 2,931 acres to about 6,000 acres with a total of about 12 mgd. This assumes that more than 6 mgd can be gained by system improvements and from new sources. The 12 mgd is still not enough to support the 9,960 acres in the current service area of Hoolehua. Therefore, expansion of the MIS to Kalamaula homestead is not feasible unless more water can be obtained from the
northeastern Molokai such as Pelekunu stream with an average flow of 17.2 mgd. Any development in the northeastern mountains will be costly and likely met with environmental and cultural oppositions. The Kalamaula area could be served directly by diverting the water flow of 0.5 mgd from Waihanau stream to irrigate about 125 cultivated acres.

Recommendations for the development of new water sources are long-term courses of action. Environmental and cultural issues of the impact of water removal on the ecosystem, other water sources, the Public Trust Doctrine and Hawaiian rights require studies before any new water project can proceed. Four new sources are proposed: stream diversions on Kawela, Kaunakakai, Manawainui and development of brackish wells near the current MIS system.

Short-term actions are more feasible, and these emphasize the improvement of the efficiency of the water collection, transport, storage, distribution and customer use. These recommendations are divided into system and management improvements. It is roughly estimated that up to 20% more water can be gained by minimizing known system losses. Water use as measured by MIS customers’ meters has never exceeded the west portal tunnel flow, the water collected in Waikolu. The west portal flow provides the best estimate of the total water available before transmission, storage and distribution losses. Evaporation loss alone is about 300 million gallons annually or about 15% of the total available water. Seepage loss from the reservoir could be higher than evaporation loss, but was not measured. The storage of water in Kualapuu reservoir is expected to be the difference of the west portal flow and the flows adjusted for evaporation loss and customer use. From 1990 through 1999, the expected cumulative water storage is expected be 2.540 billion gallons, which is more than the capacity of the 1.4 billion-gallon reservoir. Since the reservoir depths have steadily decreased instead of increasing, it strongly suggests there are other major losses in addition to evaporation such as errors in the measurement of the west portal flow and the customer water usage. Twenty-seven of thirty recommendations are short-term actions to minimize losses, improve irrigation efficiencies and better manage the MIS.
INTRODUCTION

The Molokai Irrigation System (MIS) is operated and managed by the State of Hawaii, Department of Agriculture (DOA) since July 1, 1989. As of August 1, 2001, the MIS serves 239 agricultural customers with 2,931 acres in central Molokai. The MIS was designed to collect and pump water from the Waikolu valley, transport, store and distribute the water in central Molokai. Three consecutive years (1998 to 2001) of sparse rainfall of less than half of normal has resulted in very low water level of less than 5 ft deep in the Kualapuu reservoir, which has a maximum storage depth of 54 ft. This present drought prompted the DOA to encourage a 30% voluntary water use reduction by all MIS customers. The water shortage is reaching a critical point, where the Molokai farmers cannot apply sufficient irrigation to maintain normal yields.

This document is for the Agribusiness Development Corporation (ADC) to provide information to respond to Senate Resolution 34, SD 1 of the 21st Legislature of the State of Hawaii (Appendix A). The information and data provided in this document as specified in Hawaii Agriculture Research Center contract with ADC include the following:

- Original and present design and objective of the MIS
- Physical capacity, operational requirements and maintenance of the MIS
- Current and new sources of water and their limitations
- Current water use patterns relative to optimal crop requirements
- Rights of the Department of Hawaiian Home Lands (DHHL)
- Community concerns and issues as expressed by representatives of ADC, DOA, DHHL, Natural Resources Conservation Service and the MIS Water Users Advisory Board

Based on the above findings, courses of actions are recommended to ADC.
DESIGN

Intended Collection System

The original design of the MIS called for four stages of implementation of which only the first stage was completed. Parsons, Brinckerhoff-Hirota Associates (1969) describes the plan in a report to the State of Hawaii, Department of Land and Natural Resources (DLNR). Stage I included the construction of the water collection system in Waikolu valley consisting of four diversion dams (Dams 1, 2, 3 and 4), six wells (Wells 22, 23, 24, 4, 5 and 6), Waikolu tunnel, transmission system (concrete flume and pipeline), Kualapuu reservoir, and the distribution system to the users. Well 4 have no pump and used only to monitor the groundwater level. Wells 5 and 6 were not operational until after 1996. Photographs of some of the completed structures are shown in Appendix B.

Stages II, III and IV were not undertaken because of funding problems. Stage II proposed the construction of a collection system in Pelekunu valley with a tunnel connecting Waikolu to Pelekunu valley. The average total surface flow (including dike groundwater overflow) at the 1,000 ft elevation in Pelekunu was measured at 17.16 mgd compared to 6.56 mgd for Waikolu at the same elevation. The average base flows (estimate of sustainable groundwater) for Waikolu and Pelekunu were 2.52 and 6.09 mgd at the 1,000 ft elevation, respectively. Stage III would consist of installing additional transmission pipelines. Stage IV proposed three diversion structures each on Pilipiliilau and Lanipuni streams above the 1,000 ft elevation in Pelekunu valley. The intended cumulative amounts of water delivered by MIS in Stages I, II, III and IV were predicted at 3.8, 9.0, 11.0 and 19.3 mgd, respectively. The total cost of all four stages was estimated at $12,568,000 (Parsons, Brinckerhoff-Hirota Associates, 1969). With only Stage I completed, the MIS was intended to have an average annual flow of 3.8 mgd.

Current System

In times of normal rainfall, 54% of the MIS water comes from four surface water diversion dams in the Waikolu valley, 28% from groundwater intercepted by the Waikolu tunnel and 18% pumped from wells (Water Resource Associates, 1999). For the period
from April 12, 1996 to November 30, 1997, the rainfall total in Waikolu valley was 176.52 inches (above normal) and pumping averaged 0.746 mgd. More recent rainfall data from the DOA Waikolu weather station are in Appendix C (weekly reports by the MIS manager). The flows and distribution by water sources for this period were as follows: Waikolu valley surface runoff (diverted stream flow), tunnel groundwater (tunnel interception only), and groundwater (well source) flows were 2.98, 1.60, and 0.746 mgd or 50.3, 33.3, and 16.4% relative to the total of 5.33 mgd, respectively. The collected surface water and pumped groundwater were transported by gravity through a 5.1 mile-long tunnel, 0.3 mile-long concrete flume and a 3.85 mile-long pipeline connecting to the 1.4 billion-gallon Kualapuu reservoir.

Waikolu Stream Watershed

Parsons, Brinckerhoff-Hirota Associates (1969) describes the watershed as follows:

"Waikolu valley consists of a main stream that follows the axis of the valley nearly to its headwater boundary. Its main tributaries flow from swamps on andesite on the small plateau between Waikolu and Pelekunu. No appreciable drainage comes from the west side of the valley in its upper portion. The main stream serves as a drainage channel for dike water except in the lower part of the valley where the old alluvium acts as a semi-impermeable cap. The dikes are about 20 to 25 degrees off the perpendicular at intersections with the stream. In the upper part of the valley, including the portion above elevation 1,000 feet, water in the stream derives from overland flow from the andesite interfluve, direct runoff within the valley, and dike water that drains directly into the stream. In the lower part of the valley, the old alluvium forces water to overflow from dike compartments to a maximum elevation of about 600 feet, and direct runoff originates from the valley proper."

The estimated amounts of groundwater and total surface water available in the Waikolu valley at different elevations are shown in Table 1.
Table 1. Estimates of available water in Waikolu valley at three elevations (ft) with MIS collection structures. The flows are in million gallons per day (mgd).

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<thead>
<tr>
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<tr>
<td>1,000</td>
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<td>750</td>
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</table>

Source: Parsons, Brinckerhoff-Hirota Associates (1969)

The average base flow estimates the amount of groundwater that can be pumped from the ground without significantly lowering the level of the dike-confined water or referred to as the sustainable groundwater yield (Parsons, Brinckerhoff-Hirota Associates, 1969). The average direct surface flow is the average amount of water that can be diverted by dams without dike overflow from the Waikolu stream. The average total available water at the 750 ft elevation is about 7.88 mgd. The dams, wells and tunnel location in Waikolu valley are shown below in Figure 1 where the lowest dam (Dam 4) is at the 730 ft elevation.
Figure 1. Diversions of Waikolu stream and wells in Waikolu valley. Circles and rectangles depict pumps and dams, respectively.

The Waikolu valley surface and groundwater resources were estimated at a maximum average yield of about 7.88 mgd but were not intended to service all the current acres in central Molokai without system upgrades planned in Stages II, III and IV. The Waikolu valley was intended to yield only 3.8 mgd or about half of the average flow available in Waikolu valley. The highest average monthly flow measured at the tunnel’s west portal was 10.24 mgd in February 1990 for the period from 1989 to 2000 (Table 2). The west portal flow represents the total amount of water collected from Waikolu valley and available to the MIS before any delivery or storage losses. The monthly averages for all years in the aforementioned period ranged from a low of 4.60 mgd in September to a high of 6.85 mgd in December with an overall annual average of 5.80 mgd. Average daily pumping from January 1988 to May 2001 was 0.88 mgd (Table 3). October 1995 had the highest pumping at 4 mgd. However, annual average diverted stream flow was only 3.12 mgd for the period from 1989 to 2000 (Table 4), which was less than the expected average direct surface flow of 4.86 mgd at the 750 ft elevation in Waikolu
valley. Therefore, the average obtainable flow is about 7.4 mgd assuming diverted stream flow, pumping and tunnel ground water of 3.1, 2.5 and 1.8 mgd. A maximum of 0.744 mgd of pumping in Waikolu valley was allowed until the well permit was amended to 0.853 mgd on October 17, 2001.

Table 2. East and west portals daily average tunnel flows (mgd) from 1989 through 2000 measured by USGS. West portal average for the period was 5.8 mgd.

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Avg 5.86 4.12 5.97 4.25 6.67 4.89 6.25 4.44 5.53 3.82 5.62 3.81

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Avg 5.78 3.91 4.60 3.04 4.60 2.81 4.88 3.08 6.71 4.72 6.85 5.04
Table 3. Average daily pumping (mgd) of Wells 22, 23 and 24 in Waikolu valley from January 1988 through April 2001.

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Avg 0.86 0.67 0.66 0.66 1.01 0.95 0.77 0.91 1.41 1.29 0.80 0.88

Table 4. Average diverted stream flow (mgd) collected from the diversion dams in Waikolu valley from January 1989 through September 2000.

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Avg 3.30 3.56 4.25 3.80 3.18 2.84 2.96 2.28 1.94 1.66 3.38 4.31 3.12

Surface Water Collection

The Waikolu tunnel begins at the east portal (21° 8' 37" north latitude and 156° 55' 16" west longitude) of the Waikolu valley at an elevation of 990 ft and exits in the west at Kaunakakai gulch (21° 7' 24" north latitude and 156° 59' 44" west longitude) at an elevation of 970 ft. Dams 1, 2 and 3 diverted waters flow by gravity to the tunnel, while water from Dam 4 requires pumping to the tunnel. The elevations for Dams 1, 2, and 4 are 1005, 997, and 730 ft, respectively. The elevation of Dam 3 was not found in
the records, but it is higher than Dam 1. Dam 3 is located northeast of Dam 1 and diverts water from a tributary to Dam 1. Dam 1 is the southernmost dam and the primary diversion of the Waikolu stream. Water diverted from Dam 1 is transported via a 20-inch diameter pipe with a capacity of 15.5 mgd to the tunnel. Dam 2 diverts water from another tributary north of Dam 3. The gravity flow capacity is 4.3 mgd from Dam 2 to the tunnel. Above Dam 2 are three waterfalls. In times of high flow, the lower waterfall can pass over Dam 2, but Dam 4 on the lower section of the Waikolu stream captures this flow. Dam 4 is north of the other dams and 260 ft below the tunnel entrance; hence, the additional cost of pumping is required to capture this surface water. Dam 4 also captures the flow from Napuleloa spring, which is located between and across from Wells 5 and 6. The pump station at Dam 4 consists of three pumps (two 700 gpm and one 1,400 gpm pumps) that are activated by the water level switches.

The amount of water diverted from the Waikolu stream was calculated from the total tunnel’s west portal flow by subtracting the water pumped from wells and groundwater intercepted by tunnel. From January 1989 to September 2000, the average diverted stream flow was 3.12 mgd with the months of December through April having higher than average flows (Table 4). The stream flows for 1990, 1994 and 1998 were above the historical average prior to dam construction measured by USGS gauge 4080 of about 4 mgd (Table 1), but the flows for all the other nine years were lower.

Wells and Groundwater Sources

The wells in Waikolu valley consist of Wells 4, 5, 6, 22, 23 and 24. The well pumping capacities, ranging from 800 to 1,250 gpm, are shown below.

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Well 4 is only used to monitor the groundwater depth in the valley. The original 100 h.p. motor of Well 24 was replaced with a 125 h.p. motor to increase the original capacity of
1,000 gpm to 1,250 gpm. By order of descending elevation, Well 22 is in the tunnel at about 992 ft elevation, 400 ft deep and with the inlet suction at 703 ft elevation (287 ft head relative to the tunnel's east portal). Well 24 is located at 970 ft elevation (between the tributaries diverted by Dams 2 and 3 and next to the main Waikolu stream), 300 ft deep and with the suction inlet at 675 ft elevation (315 ft head). Well 23 is at 875 ft elevation (below Dam 2, below the tunnel and above Well 4), 300 ft deep and with the suction inlet at 614 ft elevation (376 ft head). Well 5 is at 795 ft elevation (south or above the Napuleloa tributary), 285 ft deep and with the suction inlet at 694 ft elevation (294 ft head). Well 6 is at 766 ft elevation (north of Well 5 and below the Napuleloa tributary), 205 ft deep, and with the suction inlet at 675 ft elevation (315 ft head).

The total capacity of the current pumps is about 7 mgd, which exceeds the estimated average available groundwater of about 2.5 mgd (Table 1) and the allowable pumping of 0.853 mgd. Therefore, all pumps cannot be operated more than 30% of capacity, otherwise the groundwater levels will decrease significantly when rainfall is insufficient to recharge the dikes. However, the pumping permit will only allow operation up to 12% of full capacity. Analysis of Wells 4, 23 and 24 data (Water Resource Associates, 1999) for the period April 12, 1996 to November 30, 1997, shows that recharge occurred rapidly on the day after a rainfall and with additional recharging 5 days after the rainfall (Appendix D). The change in water depth (D) in Well 4 was significantly correlated to pumping (P) of Wells 22 and 23 and rainfall (R1) at Waikolu for the 0.05 level of variable entry and rejection using stepwise regression. At the 0.10 rejection level, rainfall 5 days after its occurrence (R5) was included in the regression model but not for variables of 2, 3, 4, 6 or 7 days after the rainfall event. The resulting regression equation was

\[ D = 2.698 R_1 + 0.8376 R_5 - 9.31 P - 33.16 \]

where D is depth in ft, R1 and R5 are rainfall in inch, and P is pumping in mgd. The correlation coefficient (r²) was 0.33 and significant at the 0.01 level.

Pumping output from January 1988 to April 2001 averaged 0.88 mgd (Table 3). The pumping per month ranged from 0 to 4 mgd. The period of high pumping was from September through November with an average of 1.2 mgd, while pumping was low in
from January through May. Months with no pumping occurred because of electrical failure, inoperable pumps or when diverted stream flows were adequate to meet current demand.

**Tunnel**

The transmission system begins from the east portal with a 5.1 mile-long tunnel. The tunnel is 8 ft x 8 ft horseshoe-shaped with a concrete base and 1.5 ft high walls. The remainder surface area of the tunnel is unlined and can intercept and collect groundwater. This occurs mainly in the first 0.9 mile from the east portal. The tunnel slopes down from east to west. The first 0.9 mile is sloped 0.1% then 0.065% slope for 4.2 miles to the west portal. The tunnel is the only route to travel by car to Waikolu valley for equipment and facility maintenance. The flows entering the east portal (USGS station no. 16405100) and exiting the west portal (USGS station no. 16405300) are measured with USGS flow meters. The west portal flow measures the total flow from Waikolu available to central Molokai. DOA has flowmeters, but notes in the DOA files indicated that the data were unreliable. The average flow leaving the west portal from 1989 to 2000 was 5.8 mgd with a low of 4.6 mgd and a high of 6.8 mgd (Table 4). The consistency of the total flow was due to balancing the low stream flow with additional pumping by the MIS manager.

The difference between the west and east portal flow measurements, when Well 22 is not running, is the amount of groundwater intercepted by the tunnel. The average amount of tunnel groundwater was 1.78 mgd for 1989 to 2000 (Table 5). No significant relationship of flow relative to month was observed in this data in contrast to the diverted stream flow and time relationship. The tunnel groundwater flows appear to be lower in 1999 and 2000 than in previous years.
Table 5. Estimate of the average daily groundwater flow (mgd) contributed by tunnel sources from 1989 through 2000.

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Avg 1.74 1.73 1.78 1.81 1.72 1.80 1.87 1.56 1.79 1.81 1.99 1.81

Operation of Well 22 pump, which is in the tunnel, was observed by the MIS manager to reduce the amount of groundwater intercepted by the tunnel. No measurements were found to verify this observation. It is recommended that the DOA take measurements to determine the optimum amount of pumping that can occur without significantly decreasing tunnel-intercepted water. The current pumping schedule is based on the experience of the MIS manager to maximize tunnel groundwater while minimizing the cost of pumping. The study by Water Resource Associates (1999) indicated that pumping water from Well 22 had no effect on the groundwater depth of the monitoring Well 4 and should probably not affect the yields of the other wells in Waikolu valley.

Transmission System

From the tunnel’s west portal, the water travels by gravity 1,600 ft in a covered concrete flume. The purpose of the flume instead of a pipe was said to insure that the water be used for agricultural purposes and not for drinking. The water thereafter travels by pipeline to the Kualapuu reservoir. The flume is connected to 4,400 ft of 26-inch diameter steel pipe, 950 ft of 48-inch diameter C.I. 25 X-S RCPP pipe, 8,400 ft of 30-inch diameter C.I. 50 and C.I. 150 RCPP pipes, and 6,600 ft of concrete pipe (Kahane, 1987). A six-inch diameter pipe from the Molokai Ranch mountain system provides a connection to the MIS to allow injection of surplus water at the junction where the two systems cross. About 0.2 to 0.3 mgd of Molokai Ranch water is metered and added to the...
This was previously studied. The generators would need to be located near the reservoir inlet where the spent water can flow by gravity into the reservoir and with the reservoir height providing enough water pressure for the customers. The water usually flows into the Kualapuu reservoir before being delivered to the customers. Clean water is imperative to enable the use of efficient drip irrigation systems. Sprinkler irrigation systems will result in high evaporation losses and distorted distribution patterns due to windy conditions at Hoolehua and Kualapuu in central Molokai.

Kualapuu Reservoir

The Kualapuu reservoir (inlet at 21° 9’ 19” north latitude and 157° 2’ 44” west longitude) is a 2,000 ft by 2,000 ft by 54 ft deep earthen-embankment reservoir lined with a 1/32 inch thick, nylon reinforced and butyl rubber sheets. Construction was completed in 1969. The inlet elevation is at 821 ft, and the outlet at 770 ft. It has a surface area of about 130 acres when full and can hold about 1.4 billion gallons of water. When full, it can supply most of the annual water consumed, which ranged from 1.2 to 1.9 billion gallons during 1990 to 2000 (Figure 2).

![Graph showing water consumption](image)

**Figure 2.** Annual total water from the tunnel's west portal from Table 2, the west portal amount adjusted for evaporation loss of 0.31 7inch per day, and water use (million gallons) from 1990 through 2000. No storage in the Kualapuu reservoir when the use exceeds the adjusted west portal amount.

Observations on August 15, 2001 found the rubber lining to be damaged beyond
repair above the 8-ft water level. The condition of the lining underwater was not known. The amount of water seepage loss from the reservoir is thought to be low, but hasn’t been measured. A rough estimate of the expected water storage from 1990 through 1999 suggested significant losses due to seepage or other causes. Assuming storage is equal to the difference between the west portal flow, evaporation losses (at 0.31 inch per day) and customer use, the cumulative storage is estimated at 2.5 billion gallons of water. The calculated cumulative storage suggest that the reservoir should be full instead of nearly empty. Seepage should be measured to determine whether relining or resealing of the reservoir is necessary. Hawaii soils are usually difficult to seal because of their normal stable and porous structure, hence significant seepage is expected if the lining is damaged. Seepage losses may exceed 3 mgd if the lining on the bottom is damaged.

Most reports suggest that most of the water loss from the reservoir is due to evaporation from the large 100-acre surface area, with warm temperatures (annual maximum temperature of 85 °F from 1991 through 2000 in Table 6) and high winds (data not found at the reservoir). At the Molokai Airport, a very high wind velocity of 16 to 31 mph (DLNR, 1966) was recorded 58% of the time. Pan evaporation measurements were made from May 1970 to June 1989 at the reservoir until the gauge was stolen on June 22, 1989 (Table 7). From 1977 to 1984, the highest and lowest monthly average daily pan evaporation readings were 0.47 inch per day for July 1981 and 0.18 inch per day for January 1983. The annual daily average for 1977 to 1984 was a very high 0.31 inch per day. Most irrigated agricultural areas in Hawaii have annual pan evaporation averages of about 0.22 to 0.25 inch per day (the average at Kunia, Oahu is 0.22 inch per day). The calculated losses due to evaporation of 0.47 and 0.18 inch per day from 100 acres of water are 1.276 and 0.489 mgd. The expected loss by evaporation is 307 million gallons of water per year based on the annual average evaporation rate of 0.31 inch per day. Bypassing the reservoir and injecting transmission pipeline water directly into the distribution system has the potential of saving 1.276 mgd of water or 22% of the average daily flow of 5.8 mgd from the west portal. At $0.255 per 1,000 gallons, this water saving will increase DOA revenues by $325.38 per day or $9,760 per month assuming all of the extra water is used by the customers. This additional revenue can offset some of the cost of electricity to pump water in Waikolu, which is about $10,000 to $25,000 per month.
The benefit to the farmer in times of drought will be several times more significant than that for DOA.

Another idea by Paul Matsuo of the DOA is to divide the large reservoir into smaller compartments that can be covered to reduce evaporation. This study is recommended to determine the cost and how it can be accomplished without significantly reducing the total storage capacity of the reservoir.

Table 6. Minimum and maximum temperatures (°F) at Kualapuu reservoir from May 1991 to May 2001.

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<th>Jan max</th>
<th>Feb min</th>
<th>Feb max</th>
<th>Mar min</th>
<th>Mar Max</th>
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| Avg  | 52      | 83      | 52      | 83      | 54      | 82      | 56      | 81      | 58      | 85      | 61      | 85      |

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| Avg  | 61      | 86      | 62      | 86      | 61      | 89      | 60      | 88      | 58      | 86      | 55      | 85      | 57.2     |

Shrub (haole koa) and tall grass (California grass) weeds were recently cut to clear the banks and reduce a source of water loss. Frequent maintenance of the interior banks will be required especially to keep haole koa under control. Cutting alone will suffice in drought conditions, but herbicides, such as triclopyr (Garlon) and glyphosate
(Rodeo), may be necessary under normal rainfall conditions. This could be done using a cut-surface or spot-bark treatment on haole koa to minimize potential contamination of the reservoir water. Rodeo will be effective on grass weeds but not on haole koa. Herbicides can be used if the MIS water is not used for drinking by Kaluakoi.

The interior banks of the reservoir were highly eroded when observed on August 15, 2001. Efforts were made to stop the erosion by spray coating protective materials on the banks and planting bermudagrass. Most of the bermudagrass did not survive the drought. Bermudagrass is inexpensive but will require valuable irrigation water to maintain. Other methods to reduce bank erosion should be investigated. The erosion suggests that the bottom of the reservoir may have mud, which is expected to reduce the amount of water storage capacity, but more importantly it will adversely affect the water quality. The sediment layer may be less than 4 ft thick from the observation of the MIS manager when the reservoir depth readings were less than 5 ft. In letters to DOA, some users indicated that their irrigation systems were perhaps fouled by mud.
Table 7. Pan evaporation (inch) at Kualapuu reservoir from January 1977 through March 1984. The raw data sheets in the DOA files had many errors but were amended by an unknown person in colored pencil. The corrected data were used. Some months had more than 31 days, which suggests that data from an adjacent month was included in that total. Pan readings were found from April 1984 to June 1989, but the raw gauge readings were not summarized, hence the data were not used.

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Avg PE/day 0.23 0.23 0.31 0.33 0.35 0.38 0.38 0.38 0.34 0.30 0.25 0.22 0.31

The water quality problem was in part due to the location of the Kualapuu reservoir outlet to the distribution system. The outlet was located on the bottom of reservoir with a screen covering the opening, but was modified to extend off the bottom and has improved the water quality to the users. A floating outlet would be desirable to allow sediments to settle on the bottom and to skim the cleanest water at the surface. Y-strainer type screen filters were found next to the reservoir but were not being used, probably because of their high maintenance requirement for frequent back flushing. Back flushing also wasted a significant amount of water. Other water quality problems are
associated with tilapia and snails living in the reservoir. Dredging the reservoir will be costly and probably not necessary unless to reseal the bottom and banks of the reservoir. Feasible alternatives may be chemical treatment to eliminate the fish and snails and a floating intake to avoid the sediments on the bottom. Chemical additives would make the water non-potable, however. Four feet of sediment will not significantly affect the storage capacity since the maximum height is 54 ft, and the deepest water depth since January 1975 was only 45.2 ft. The average water depth has been less than 23 ft since 1992 and less than 18 ft from 1996 to 2001. From the outlet, the water is distributed via 22 miles of pipeline to the customers. The distribution system after the reservoir was not evaluated in this study.

The reservoir depths from 1982 through 1985 and 1992 through 2001 were found in the DOA files. Data from December 25, 1999 through September 4, 2001 are shown in Appendix C. The lowest levels were recorded in November 1996, October 1999 and March 2001 with a minimum depth of 4 ft. Rainfall totals in 1996 were very low from May through October with only 2.1 inches, but November 1996 had the most rainfall of any month at the Kualapuu weather station. Rainfall annual totals at the reservoir for 1998, 1999 and 2000 were significantly lower at 7.97, 9.22 and 11.84 inches, respectively, than the 31-year average of 22.68 inches (Table 8a). The annual total for 1998 was the lowest ever recorded by this weather station, 1999 the second lowest and 2000 the sixth lowest. The frequency of rainfall events appears normal during the present drought from 1998 to present, but the amount per event was very small (Table 8b).
Table 8a. Monthly rainfall (inch) at Kualapuu reservoir from January 1970 through April 2001.

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<td>8</td>
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<td>11</td>
<td>56</td>
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<td>11</td>
<td>3</td>
<td>5</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td>-</td>
</tr>
</tbody>
</table>

Avg  8.5  6.8  8.0  9.3  4.9  4.8  5.6  4.1  4.7  5.6  8.7  7.6
MIS OBJECTIVE AND SERVICE AREA

The four phases of the MIS project were designed for the irrigation of 8,900 acres of pineapple and 1,060 acres of diversified crops in Hoolehua and 7,500 acres of pineapple in Mauna Loa for a total of 17,460 acres in central Molokai (Parsons, Brinckerhoff-Hirota Associates, 1969). Even though the area in Mauna Loa was never connected to the MIS and there is no acreage in pineapple, the current acreage on the system is water-short because only Stage I of the MIS project was completed. The shortage is primarily due to an increase in diversified crop production in central Molokai and partially because of misassumptions used in estimating the water use for diversified crops in the original design. The water use design criterion was based on annual averages of 1,400 and 4,000 gallons per acre (gpa) per day for pineapple and diversified crops, respectively (M&E Pacific, 1991). The amount for pineapple was based on experimental data while that for diversified crops was estimated using the modified Hargreaves method (DLNR, 1966). The Hargreaves method is expected to underestimate the evapotranspiration because wind speed is not included in the model, and the calculation is based on only temperature and solar radiation data. Wind speed is a significant component affecting evapotranspiration, especially in central Molokai. I-Pai Wu (University of Hawaii) and R. Meinzer (Hawaii Agriculture Research Center) measured the consumptive uses of 0.7 ratio of pan evaporation (panfactor) for both lettuce and coffee, respectively (personal communications). The 4,000-gallon amount for diversified crops is adequate where the annual average pan evaporation is about 0.21 inch per day, as for most agricultural areas in Hawaii. But this is low for central Molokai with an annual average pan evaporation of 0.31 inch per day. The optimum is closer to 5,900 gpa per day in central Molokai. Another assumption was that only half of the available area would be in crop production at any given time. That may be true for vegetable and grain crops but not for perennial crops such as banana and coffee.

Water requirement is estimated at 27.2 mgd for 17,460 acres and 13.6 mgd for 8,730 acres under cultivation with the assumptions of 16,400 acres of pineapple at 1,400 gpa per day and 1,060 acres in diversified crop at 4,000 gpa per day. Excluding the 7,500 acres in pineapple at Mauna Loa, the expected amounts of water are still high at 16.7 mgd
for 9,960 acres (8.35 mgd for half the area). Without the area in Mauna Loa and the Hoolehua area all in diversified crops, the 9,960 acres at 4,000 gpa per day will require 39.8 mgd (19.9 mgd for half the area). At 5,900 gpa per day, water needs are 58.8 mgd for the total area (29.4 mgd for half of the area). These amounts will be reduced if there is increased rainfall and in the cooler winter periods.

The current area, as of August 1, 2001, under the MIS is 2,931 acres. The majority of this is potential diversified crop acres. The actual acres under cultivation are not known. A maximum of 11.7 mgd is required for 2,931 acres at 4,000 gallons per day. Only 1,450 acres can be supported with 5.8 mgd (the annual average daily west portal flow), and 1,850 acres with 7.4 mgd (the maximum average flow possible from Waikolu). For central Molokai, the consumptive use of 0.7 panfactor is equivalent to about 0.217 inches per day or about 5,900 gpa per day assuming an annual average of 0.31 inch per day of pan evaporation. The 0.7 panfactor will increase the amount of water required for 2,931 cultivated acres from 11.7 to 17.3 mgd or support only about 983 and 1,254 cultivated acres with 5.8 and 7.4 mgd. It is clear that the MIS cannot provide sufficient water all the time to all customers in the current service area of 2,931 acres. It could service 49% of the acres when west portal flow is 5.8 mgd, assuming an average consumptive use of 4,000 gpa per day. Servicing more than 1,450 cultivated acres will require a reduction in water loss, water conservation, more pumping in Waikolu valley and the addition of new water sources to MIS. Additional pumping to a maximum of 2.5 mgd may provide sufficient water to meet current water use needs. However, additional pumping may not be sustainable if the present prolonged drought (starting in 1998) continues and reduces groundwater in Waikolu valley.
**ADDITIONAL WATER FROM THE EXISTING SYSTEM**

A three-fold approach should be considered to increase the usable water from the existing system: (1) increase pumping in Waikolu valley up to the sustainable yield of about 2.5 mgd, (2) reduce system losses, and (3) have farmers use water more efficiently.

**Pumping**

The records indicate that there are three primary wells in the system: 22, 23 and 24. However, Well 22 has not operated since August 23, 1997. Thereafter, pumping was primarily from Wells 23 and 24. No records were found for Wells 5 and 6. From November 26, 1995 to April 1, 2001 the downtimes due to mechanical and electrical failures for Well 22, 23 and 24 were estimated from weekly reports to be 1,557, 438 and 409 days, respectively or 46, 13 and 12% (Table 9). Scheduling preventative maintenance to reduce downtime is important to be able to rotate pumps (as intended by DOA) to allow wells to recharge for maximum output.

**Table 9.** Pump failures for Wells 22, 23 and 24 from December 1991 to April 2001 for a total of 3,409 days. Out of order = out. Despite problems, pumping was adequate to deliver 0.88 mgd or more than the allowable amount of 0.744 mgd.

<table>
<thead>
<tr>
<th>Period</th>
<th>Well 22 Days</th>
<th>Well 23 Days</th>
<th>Well 24 Days</th>
<th>Comment</th>
</tr>
</thead>
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<tr>
<td>11/26/95</td>
<td>out 24</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/5/96</td>
<td>out 64</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5/27/96</td>
<td>out 89</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/17/96</td>
<td>out 58</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/17/96</td>
<td>out 177</td>
<td></td>
<td></td>
<td>8/23/97 last day Well 22 on</td>
</tr>
<tr>
<td>12/8/96</td>
<td>out 5</td>
<td>out 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8/23/97</td>
<td>out 1,317</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8/24/97</td>
<td></td>
<td>out 20</td>
<td>out 20</td>
<td>No power, telemetry failure</td>
</tr>
<tr>
<td>11/30/97</td>
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</tr>
<tr>
<td>12/22/99</td>
<td></td>
<td>out 61</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2/22/00</td>
<td></td>
<td>out 20</td>
<td>out 20</td>
<td></td>
</tr>
<tr>
<td>3/20/00</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>10/30/00</td>
<td></td>
<td>out 33</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2/26/01</td>
<td></td>
<td>out 7</td>
<td>out 7</td>
<td>No power</td>
</tr>
<tr>
<td>3/5/01</td>
<td></td>
<td>out 7</td>
<td>out 7</td>
<td>No power</td>
</tr>
</tbody>
</table>

| Total day out | 1,557 | 438 | 409 |
| % Not operating | 46    | 13  | 12  |

The well permits must be amended to allow pumping in excess of a moving average of 0.853 mgd. The average sustainable yield is estimated at 2.5 mgd. Pumping
records and the water depth in Well 4 should be monitored and studied on a timely basis to prevent using too much of the groundwater. The effect of reduced downstream flow on the aquatic macrofauna as a result of over use must also be considered. The Water Resource Associates (1999) found that pumping of 1.55 and .46 mgd in 1996 and 1997, respectively, did not adversely impact the habitat of the Waikolu stream above Dam 1 and below the Napuleloa tributary. The study period from July through October of 1996 was the driest period to date in Waikolu valley and at Kualapuu reservoir. It is recommended that pumping in Waikolu valley not exceed 1.55 mgd to avoid the need for an additional environmental impact study.

It is highly desirable to download the pump operation, flowmeter and weather electronic data from Waikolu valley to a database or spreadsheet for easy data analysis. In addition, the dataset should include electrical use, reservoir depth, weather data at Kualapuu, and customer use to monitor compliance with the pumping permits, the Kaluakoi Resort contract and the DHHL two-thirds preference law. The digitized data also need to be archived for trend analyses. Currently, the data in the file cabinets are very difficult to use for making timely management decisions or for long-range planning.

In times of high rainfall and sufficient diverted stream flow in Waikolu valley, the pumps were set to shutoff automatically to minimize pumping cost. Instead, pumping should be maximized during the wet season. There would then be no danger of over-pumping the groundwater or adversely affecting stream flows as there is with pumping during the dry season. It will be essential that water storage losses be minimized so adequate water will be available in the reservoir for the dry season. The water not pumped in Waikolu valley is expected to overflow the dikes and presumably be lost downstream below Dam 4, the lowest stream diversion.

Besides the pumping permit, another limiting factor to more pumping is the high electricity cost. The cost for DOA to generate electricity should be investigated and compared to purchasing power from the utility company. Several farmers in the State find it more cost-effective to generate electricity rather than to purchase power from the utility. Another possibility is to find more energy efficient pumps, although electric pumps are usually very efficient and allow simpler remote control. The least acceptable
alternative is to pass the cost on to the consumer. However, this may be preferable to no crop production in times of drought and for high value crops. One user pays $1.45 per 1,000 gallons for potable DHHL water for irrigation when MIS water at $0.25 per 1,000 gallons is insufficient.

System Losses

System losses can occur from diversion blockage, dam and pipeline leakage, reservoir seepage, faulty meter readings, inadequate maintenance and evaporation. Reduction of losses is probably the most cost-effective method for increasing the quantity of available water. The prerequisite is more water intensive management and maintenance of the entire system. Sufficiently trained personnel will be required to accomplish this goal. The current DOA staff on Molokai of a manager and two maintenance persons maintains the MIS, reads meters and services customers but are not trained as technicians. Budget cuts reduced the staff from five to three in 2000. The optimum MIS staff needs to be balanced with maximizing the amount of water from the entire system. One task considered urgent by the current staff and some customers is checking and replacing defective flowmeters.

Considerable losses can occur with obstruction by debris of the dam’s collection grates. It is important to clean the grates prior to and during periods of expected high rainfall and runoff. Detection of blockage may be possible with the installation of accurate flowmeters on the pipes from the dams to the tunnel or with cameras at the dams linked electronically by the telemetry system to the MIS office. The current flow measurement in Waikolu valley is only taken at the east portal near the tunnel entrance. The large weir in use is not intended to detect small changes in flow, which can result in significant amount of undetected water lost over extended periods. The current manual detection requires frequent visits to Waikolu valley. Each visit takes about 90 minutes (travel-time and dam inspection of 60 and 30 minutes, respectively). Two staff members are usually required for safety reasons on a visit to the isolated Waikolu valley. The cost of electronic detection should be weighed against the value of the additional collected water and the labor cost of three worker-hours per visit.

Dams 1 and 4 were observed to have leaks on August 15, 2001. The magnitude
and significance of these leaks in the diversion dams need to be evaluated. In addition, the lower waterfall is said to fall beyond Dam 2 during high runoff flow. Although Dam 4 captures this water downstream, it needs to be pumped to the tunnel. Water can be captured more efficiently and transported without pumping at Dam 2 if the angle of the falling water could be altered to fall before and not over Dam 2. Perhaps this can be accomplished by reshaping the rock-face of the lower waterfall with explosives. Another more expensive option is to modify Dam 2. Reshaping or reconstruction costs need to be weighed against pumping cost at Dam 4.

System leaks in the tunnel and transmission pipeline were not observed nor were any records of such losses found. One possible source of leakage is from cracks in the tunnel cement lining that bear the weight of the Jeep used to travel to Waikolu valley. It is recommended that this lining be visually inspected regularly. Seepage losses could occur through the concrete lining in the transmission tunnel and Kualapuu reservoir. Elsewhere in the system, water is contained in nonporous flumes or in pipes. The tunnel lining has a surface area of about five acres where a 0.1 inch per hour seepage loss is equivalent to about 326,000 gallons per day. The water permeability of the 35-year old concrete is not known and should be measured to determine if a sealant is necessary.

The most probable leakage losses would be in the distribution system after the reservoir. There is an unresolved incidence of 0.4 mgd of water unaccounted for by Kaluakoi. Pipeline leaks could not be found (discussed at the MIS Advisory Board on August 15, 2001). Accurate flowmeters are necessary to detect these losses. Under Chapter 4-152 of the Hawaii Administrative Rules (DOA, 1989), the DOA shall determine the suitability of the flowmeter. The user is responsible for the cost of purchase and installation of the flowmeter. Calibration, service and replacement of flowmeters on a routine basis are necessary to accurately monitor the daily water use and detect losses. The user can request a meter check free of charge. The presumed water loss may be due to faulty flowmeter readings instead of a leak. It will be impossible to determine the true water use of the MIS customers with defective meters. This unrecorded “lost” may be more significant than leakage and seepage losses. The highest maintenance priority must be given to replacing defective meters on a timely basis. Each flowmeter requires at least
biennial calibration.

It is not uncommon to have seepage losses in excess of one mgd in small reservoirs in Hawaii because of the highly structured (resist compaction) and well-drained soil. This is true of the Molokai soil series (an Oxisol) found at the Kualapuu reservoir. The seepage loss can be estimated by measuring the pan evaporation at the site (best to locate the pan in the water of the reservoir), estimating the water surface area (simplest by aerial photograph if a known area is in the photograph) and measuring the change in water depth over time. During the seepage measurement, it is desirable to keep water from entering or exiting the reservoir via the inlet and outlet since large capacity flowmeters are not accurate enough. This can be accomplished by diverting the transmission pipeline water directly into the distribution pipeline. The seepage losses can be estimated from the change of reservoir depth after subtracting the evaporation loss. DOA has qualified personnel to perform these measurements.

Pan evaporation measurements (open Class A pan) or evapotranspiration estimates (using automated weather stations with rainfall, temperature, solar radiation, relative humidity and wind data) are desirable to estimate evapotranspiration losses (consumptive use). The proper location of the weather station is important in accurately estimating the crop’s water use requirement. The weather station should not be located near the reservoir where the evaporating water will affect the readings nor over bare soil where radiant heat can interfere with accurate readings. The weather station needs to be clear of tall obstructions and at a location that represents the crop’s microclimate as close as possible. More than one weather station may be required. The data can be collected remotely, stored on data loggers and can be polled by telephone via connection by wire, radio or microwave. The weather station requires annual calibration. These data could be made available (poll station by telephone) to all MIS farmers in real time to determine the most efficient water use for optimum harvest yields. Determining how much and how to apply water is the first step in any water conservation effort. This will be a valuable service to the farmers. In addition, the DOA could provide feedback or develop incentives/disincentives for customers based on their water use and the normal expected evapotranspiration for the billing period. The digital weather data could be archived for
use in crop models driven by weather information to determine optimum irrigation amounts and agronomic practices for optimal yields in central Molokai. New crops can be evaluated using the weather data and crop models to find alternative crops that are better adapted to the windy central Molokai.

Pan evaporation loss (Table 7) from the 100-acre reservoir surface is expected to be as much as 20% of the daily west portal flow (Table 2) during the hot summer months when water is least available. Oils and films covering the surface of the water have been used elsewhere with mixed success. A review of past studies would help to determine if this method is feasible and what material can be used to reduce evaporation in Kualapuu reservoir. Kaluakoi currently uses the MIS water for drinking; hence, most chemicals cannot be added to the reservoir until a separate pipeline is constructed from Well 17 to Kaluakoi customers. It is recommended that the MIS water be only used for agricultural purposes.

The simplest means of reducing evaporation loss is to place the water from the transmission line directly into the distribution system instead of the reservoir. This will also bypass most of the water quality problems associated with the reservoir. The excess water from the transmission line must be placed into the reservoir to prevent the entire transmission system from backing up. An engineering solution would minimize manual control. Customers without pressure reducing valves must be warned of the higher water pressure with transmission water to prevent damage to low pressure drip irrigation systems. It is the users responsibility to reduce the pressure at their farm per DOA administrative rule Chapter 4-152, section 4-152-5. The user can use an inexpensive gate valve with a pressure gauge to reduce the pressure, but the drawback is that the user must manually adjust the gate valve with changing MIS pressures. An alternative is for DOA to install a pressure-regulating valve on the MIS transmission pipeline, which is expected to be costly. Higher pressures at the farm site can be an advantage for most farmers where smaller pipe diameters and longer irrigation lateral lengths could be used reducing the farm irrigation system cost. However, the higher pressure must be maintained otherwise poor water distribution and inefficient irrigation will result with pressures lower than the system’s designed operating pressure. Direct feeding through the bypass
will help maintain pressures, especially during a drought when the static head in the reservoir is small due to shallow water depth.

A clean irrigation water source can lead to water saving. Less water will be used to back flush the irrigation system of contaminants. Back flushing takes 5 to 15 minutes for most filter stations. A 10-acre drip-irrigated system usually is designed to irrigate at about 30 gpm per acre. Flushing for 10 minutes can use 3,000 gallons per flush and up to four flush cycles per day may be required when the water is dirty resulting in a total loss of 12,000 gallons per day for 10 acres or enough to irrigate 3 acres. For 1,000 acres, flushing losses could be as high as 1.2 mgd. It is recommended that the DOA conduct a survey to document the number of users with filters, the actual flushing losses and problems related to water quality. In drip irrigation, clean water will result in less plugging of drip emitters, improved distribution uniformity, and higher production per unit of water.

Water Conservation By Improving the Irrigation Efficiency

Total water use by all MIS users by month from 1989 to 2000 is shown in Figure 3. Water use in the summer peaked at 5.5 to 9.5 mgd and was significantly more than during winter at 2.5 to 4.5 mgd. The water use during the summer usually exceeds the west portal flows (Table 2) resulting in lower depths in the Kualapuu reservoir (Appendix C). Conservation efforts are required even in the wet winter to increase water storage for the dry summer.

![Figure 3: Daily average water use (mgd) for all MIS user meter readings from 1989 to 2000](chart.png)
July 1989 to April 2000.

Review of the farmer water use for June and July 2001 shows that some farmers were grossly over-irrigating or their systems had large leaks (Appendix E). If 50% of the account acres were assumed to be under cultivation, then 26 accounts exceeded the desirable amount of 0.7 panfactor in a time when the DOA recommended a water reduction of 30% (Table 10). The total area for 8 accounts with the highest use per acre was only 23 acres or 0.8% of the total acres but represented 10% of the total volume of water used for both months (Table 11). Assuming all acres were under cultivation, eight accounts exceeded 1.2 panfactor where the panfactor ranged from 1.26 to 3.20. This suggests a mismanagement of water or more acres being irrigated than the assessed acres. An audit of the actual acres irrigated against the assessed acres for selected accounts is recommended.

Table 10. Estimate of irrigation adequacy when farmers cultivate 100, 75 and 50% of the assessed acres, and the total amount of water used for the months of June and July 2001. Irrigation adequacy is expressed as a percent of the water applied to the estimated crop requirement of 0.7 panfactor where the pan evaporation was estimated at 0.38 inches per day for both months. The column for acres is for accounts assuming 100% of acres in cultivation.

<table>
<thead>
<tr>
<th>Irrigation Adequacy</th>
<th>ET Class (Ratio of PE)</th>
<th>Percent of Acres Cultivated</th>
<th>Number of Accounts for</th>
<th>Total Water Use</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>100%</td>
<td>75%</td>
<td>50%</td>
<td>Acres</td>
<td>Gallons</td>
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<td>&gt;100%</td>
<td>&gt;0.7</td>
<td>8</td>
<td>10</td>
<td>26</td>
<td>23,639,000</td>
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<tr>
<td>75-100%</td>
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<td>2,511,000</td>
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<tr>
<td>50-75%</td>
<td>0.35-0.525</td>
<td>16</td>
<td>20</td>
<td>17</td>
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<tr>
<td>&lt;50%</td>
<td>&lt;0.35</td>
<td>213</td>
<td>197</td>
<td>181</td>
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<td>239</td>
<td>239</td>
<td>239</td>
<td>2,931</td>
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</table>
Table 11. MIS water users exceeding the estimated crop requirement of 0.7 panfactor for June and July 2001. Calculations are based on a crop demand of 0.266 inch per day at 0.38 inch pan evaporation and assuming 100, 75 and 50% of acres under crop production. Panfactor is the ratio of applied water (inch per acre) to pan evaporation (inch).

<table>
<thead>
<tr>
<th>Acct</th>
<th>Acres</th>
<th>Water Use (gallons)</th>
<th>Calculated Panfactor</th>
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<td>Jul 2001</td>
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<td>2,576,000</td>
<td>3,569,000</td>
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<td>1,050,000</td>
<td>1,128,000</td>
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<td>10</td>
<td>1,146,000</td>
<td>1,431,000</td>
</tr>
<tr>
<td>5234</td>
<td>2</td>
<td>178,000</td>
<td>334,000</td>
</tr>
<tr>
<td>5119</td>
<td>2</td>
<td>206,000</td>
<td>286,000</td>
</tr>
<tr>
<td>5170</td>
<td>10</td>
<td>1,053,000</td>
<td>1,237,000</td>
</tr>
<tr>
<td>5031</td>
<td>2</td>
<td>272,000</td>
<td>185,000</td>
</tr>
<tr>
<td>5000</td>
<td>3</td>
<td>317,000</td>
<td>363,000</td>
</tr>
</tbody>
</table>

Total 204 30,840,000 45,784,000 76,624,000

The majority of users had 2 to 5 acres with 176 of 239 accounts falling in this size class. There were only nine accounts with more than 50 acres, but these had a total of 1,312 acres or 45% of all acres (Table 12). Only one large account (50-100 acres size) applied adequate amounts of irrigation. All of the other eight large accounts were irrigating at less than adequate amounts. Of the 239 accounts, 141 and 160 accounts had no water use in June and July, respectively. The lack of crop production may be related to the water shortage, too high temperatures for some cool climate vegetable crops, seasonality of operations as for the seed industry or low market prices.
Table 12. Number of accounts and water use of customers grouped by class-size of five-acre units

<table>
<thead>
<tr>
<th>Class</th>
<th>#Acct.</th>
<th>Acres</th>
<th>#Users</th>
<th>Gallons</th>
<th>June 2001</th>
<th>July 2001</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>176</td>
<td>420</td>
<td>106</td>
<td>18,479,000</td>
<td>120</td>
<td>23,427,000</td>
<td>99,776</td>
</tr>
<tr>
<td>10</td>
<td>12</td>
<td>100</td>
<td>7</td>
<td>6,188,000</td>
<td>8</td>
<td>8,865,000</td>
<td>150,530</td>
</tr>
<tr>
<td>15</td>
<td>5</td>
<td>65</td>
<td>4</td>
<td>1,110,000</td>
<td>4</td>
<td>1,515,000</td>
<td>40,385</td>
</tr>
<tr>
<td>20</td>
<td>6</td>
<td>111</td>
<td>2</td>
<td>2,980,000</td>
<td>2</td>
<td>2,480,000</td>
<td>49,189</td>
</tr>
<tr>
<td>25</td>
<td>7</td>
<td>166</td>
<td>2</td>
<td>981,000</td>
<td>2</td>
<td>1,505,000</td>
<td>14,976</td>
</tr>
<tr>
<td>30</td>
<td>17</td>
<td>493</td>
<td>11</td>
<td>11,142,000</td>
<td>14</td>
<td>17,995,000</td>
<td>59,101</td>
</tr>
<tr>
<td>35</td>
<td>4</td>
<td>140</td>
<td>1</td>
<td>202,000</td>
<td>1</td>
<td>202,000</td>
<td>2,886</td>
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<td>40</td>
<td>2</td>
<td>79</td>
<td>2</td>
<td>4,808,000</td>
<td>2</td>
<td>15,637,000</td>
<td>258,797</td>
</tr>
<tr>
<td>45</td>
<td>1</td>
<td>45</td>
<td>1</td>
<td>2,238,000</td>
<td>1</td>
<td>5,359,000</td>
<td>168,822</td>
</tr>
<tr>
<td>60</td>
<td>1</td>
<td>60</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>90</td>
<td>2</td>
<td>180</td>
<td>1</td>
<td>12,941,000</td>
<td>1</td>
<td>14,101,000</td>
<td>150,233</td>
</tr>
<tr>
<td>95</td>
<td>3</td>
<td>282</td>
<td>2</td>
<td>4,777,000</td>
<td>2</td>
<td>12,875,000</td>
<td>62,596</td>
</tr>
<tr>
<td>150</td>
<td>1</td>
<td>150</td>
<td>1</td>
<td>3,834,000</td>
<td>1</td>
<td>5,709,000</td>
<td>63,620</td>
</tr>
<tr>
<td>180</td>
<td>1</td>
<td>180</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>5,000</td>
<td>5,000</td>
</tr>
<tr>
<td>460</td>
<td>1</td>
<td>460</td>
<td>1</td>
<td>27,597,000</td>
<td>1</td>
<td>28,827,000</td>
<td>122,661</td>
</tr>
<tr>
<td>2-50</td>
<td>230</td>
<td>1,619</td>
<td>136</td>
<td>48,128,000</td>
<td>154</td>
<td>76,985,000</td>
<td>125,113,000</td>
</tr>
<tr>
<td>50-460</td>
<td>9</td>
<td>1,312</td>
<td>5</td>
<td>49,149,000</td>
<td>6</td>
<td>61,517,000</td>
<td>110,666,000</td>
</tr>
</tbody>
</table>

The DOA can help by providing evapotranspiration estimates for the farmer and notifying the users when use exceeds the norm. It would be beneficial to include on the water bill the amount of water necessary to meet evapotranspiration and compare to the amount used by the customer. The DOA can work in cooperation with University of Hawaii Extension Service to target individuals in need of education and assistance to make farming a profitable endeavor.

The conversion of sprinkler to drip irrigation is highly desirable in central Molokai because of the strong winds and high evaporation losses. Poor irrigation efficiencies with sprinkler irrigation are due to wind-distorted patterns and higher than Class A pan evaporation losses. Sprinkler-applied water can also adversely affect the germination of small seeds, decrease rainfall infiltration, and increase runoff and soil erosion due to soil surface crusting from water droplet impact. Besides conserving water, drip irrigation provides an efficient means of uniformly and frequently applying fertilizers. The limiting factor is the initial cost of a drip system, but the payback can be rapid if higher yields are achievable.
NEW SOURCES OF WATER

More water in Waikolu valley is not readily available other than by increased pumping from existing wells. DLNR map (Figure 4) suggest that only 0.7 mgd is available for development in Waikolu. More surface runoff water and groundwater are found in the Pelekunu and Wailau valleys but none are considered developable because of environmental and cultural obstacles. The northeast streams are considered to be some of the most pristine areas in Hawaii for native species such as the o‘opu, hiihiwai and ‘opae. Environmental groups and individuals will object strongly in having any water diverted from these valleys. Two constraints to Pelekunu development as stated by M&E Pacific (1991) were its proposed kapu status and to it being the property of the Nature Conservancy. Some community members feel that development of this source of water may lead to unwanted urbanization of west and central Molokai and further displacement of the native Hawaiians. It is unlikely that a compromise can be reached among all the diverse groups. Hence, studying the development of this source is not recommended.

Figure 4. Sustainable yield/aquifer code for the Island of Molokai. DY = Developable yield. The sustainable and developable yields are estimated at 81 and 38 mgd. Source: DLNR map dated October 17, 1996.
The MIS Advisory Users Group, the Water Initiative Group and DOA have considered other water sources. Some new sources are: (1) capturing intermittent storm runoff, (2) low flow streams, and (3) brackish well sources. For the new source to be cost effective, the captured water should be above the MIS system to allow transmission of water by gravity instead of pumping. Possible runoff sources are from the higher reaches of Manawainui and Kaunakakai gulches. The flows of both gulches tend to be intermittent. Records of USGS stream gauges 4130 and 4120 for Manawainui and 4053 for Kaunakakai need to be studied to determine the available flows. Rough estimates are 0.8 mgd of divertible water from each gulch (communication with Paul Matsuo). The possibility of damming these gulches to allow recharge of groundwater for future pumping has also been considered.

Running a pipeline from the Kawela gulch at about the 1,000-ft elevation to the MIS is still being investigated by the DOA. Approximately 1.5 mgd of storm flows may be available for diversion consisting of overflow from Molokai Ranch's diversion. The water will be able to travel by gravity to MIS. This is currently the largest source available to the MIS.

Diversion of Waihanau stream was considered where about 0.5 mgd of stream flow is available for diversion. However, majority of the Water Initiative Group felt that the DOA should not consider using this water. The homesteaders were concerned that they will lose their full rights to this water if it is connected to the MIS where they have only a two-thirds preference. This source of water is targeted as a reserve for the future expansion in the DHHL Kalamaula agricultural subdivision (Water Initiative Group draft 2 of July 18, 2001 meeting).

A brackish well close to the MIS west portal with a yield of about 0.7 mgd is a possible source but contains about 700 ppm of chlorides. This water must be diluted to make it safe for sensitive crops. Concentrations of less than 200 ppm are desirable to minimize salinity and sodicity hazards. Chloride analyses of the Waikolu water from 1976 to 1984 indicated a very low level of about 12 ppm. The resulting mix of 5.8 mgd of Waikolu water and 0.7 mgd of the brackish well water will result in an estimated chloride content of 86 ppm, which is suitable for most if not all crops. As a comparison, the
County of Honolulu potable well water ranges from 16 to 250 ppm where most sources are less than 150 ppm of chlorides (source: communications on October 4, 2001 with the Honolulu Board of Water Supply, Chemical Laboratory). Analysis of the brackish water for calcium, magnesium, potassium and sodium will be important to the farmer if this water is used. The water can be a source of potassium, which will reduce the fertilization cost to the farmer. However, brackish water often contains too much magnesium relative to calcium that may require amending the soil with calcium. Excess sodium can lead to drainage and soil aeration problems. However, the Molokai soil in the Kualapuu and Hoolehua areas are very tolerant of salinity and sodicity affects. Minor soil physical property changes occurred with continuous application of saline water with electrical conductivity of 2 to 6 milliohms per cm or about 600 to 2,500 ppm of chloride in sugarcane at Pioneer Mill with the same Molokai soil (unpublished data by Pioneer Mill). Normal Kona storms were sufficed to leach the accumulated salts from the rooting zone.

Other brackish sources considered are located on the leeward coast at about the 300-ft elevation. Construction of a series of shallow wells was considered to give a total yield of about 0.25 mgd. However the cost of pumping the water to the Kualapuu reservoir will be high.

Kaluakoi Well 17 (21° 9' 5" north latitude and 157° 1' 30" west longitude) has a present pumping capacity of 2.37 mgd. Well 17 is 1,062 ft deep and is located at 981 ft elevation. The water is of good quality in terms of salinity and sodicity with chloride content averaging 60 ppm with a range of 54 to 121 ppm from 1952 to 1984. The chloride levels of this well are required to be monitored by contractual agreement between Kaluakoi and the State of Hawaii, but no data were found after 1984. More pumping from this well could lead to increased saltwater intrusion and lead to soil salinity and sodicity problems. This pump is already attached to the MIS and is used to replace water removed by Kaluakoi. One concern is the impact of more pumping of Well 17 on the water quality of other wells at lower elevations, especially on potable water. This question needs to be addressed and studied if Well 17 is to be an option. One community member interviewed favored the closure of this well, while most want it reserved for potable use only. The cost of pumping is expected to be too high for
agricultural uses.

DHHL's Well 16 (21° 8' 57" north latitude and 157° 1' 10" west longitude) is close to Well 17 and to the MIS transmission pipeline, but it has not been used at least since 1961 (DNLR, 1961). The water quality is good with an average chloride content of 67 ppm. This well is 1,095 ft deep and is at the 1,005 ft elevation. This deep well water is expected to be too expensive for agricultural use but may be a potential source of potable water for the Kalamaula homesteads.

The sources recommended for consideration by the Water Initiative Group in times of emergency were the Kakalahale well, the Molokai Ranch surplus and County of Maui sources. This group felt an essential part of obtaining more water was to protect and improve the watershed by planting and managing trees, controlling feral goats, and improving diversions to promote recharge instead of runoff.

The total amount of new water from brackish wells, Waihanau, Kawela, Kaunakakai and Manawainui is estimated at 4.55 mgd. The gross average annual flow will be 10.35 mgd combined with the current west portal flow of 5.80 from Waikolu valley. Assuming 10% losses, 9.315 mgd can irrigate 2,329 acres at 4,000 gpa per day. About 4,660 acres can be supported assuming that only half of the area to be cultivated on the annual basis. With these assumptions, the maximum expansion of the customer base with the new water is an additional 1,730 acres from the present 2,391 acres.
RIGHTS OF THE DEPARTMENT OF HAWAIIAN HOME LANDS

The Hawaiians rights to the MIS water are documented in the current law HRS Chapter 168, Irrigation and Water Utilization Projects. Section 168-4 Preference reads as follows:

"To the extent that the same may be necessary from time to time for the satisfaction of their water needs, domestic and agricultural, the Hawaiian homes commission and lessees of the Hawaiian homes commission shall at all times, upon actual need therefore being shown to the board of agriculture, have a prior right to two-thirds of the water developed for the Molokai irrigation and water utilization project by the tunnel development extending to Waikolu valley and ground water developed west of Waikolu valley, which was planned by the board of land and natural resources as the first stage of the Molokai irrigation project. [L 1987, c 306, pt §2]"

Section 168-4 originated as part of Act 227 in 1943, which created the MIS. In its original form, it appears to give prior and absolute right to all MIS water to the native Hawaiians and homesteaders. In 1955, the law was amended to reduce the homesteader preference to two-thirds of the water developed from the MIS and has not changed since. This part of law is often referred to as the two-thirds preference, which protects the native Hawaiians and DHHL rights to the MIS water to enable present and future development of Homestead lots. The lack of water is said to be the single most limiting impediment for development of Hawaiian Homestead lands on Molokai.

The key phrases in section 168-4 are “actual need,” and “first stage.” The DHHL lessees’ uses are based on actual needs. The “actual need” is not defined in the DOA administrative rules in Chapter 4-152. This law addresses the current water sources in Waikolu valley. However, as mentioned in a letter from Attorney General to DOA dated December 28, 2000, it is not clear whether the preference would extend to any water developed after the first stage of the MIS. The DOA did not ask the question nor did the Attorney General render an opinion. Whether the two-thirds preference will apply to any new sources developed for the MIS is still open to debate and will require a legal opinion from the State of Hawaii Attorney General. It is recommended that the DOA seek this
opinion from the Attorney General as soon as possible.

Since 1992, the water use of non-DHHL users exceeded that of the DHHL users (Table 13 and Appendix F). In 1994, DHHL and non-DHHL uses were 786.2 (43.5%) and 1,019.2 (56.5%) million gallons, respectively. It is assumed that this water use trend continued after 1994 to present. No water use data by the user type were found after June 30, 1994. This trend might change in the future if the acres presently in coffee are discontinued. This single non-DHHL customer exceeded 20% of the total MIS water used in June and July 2001. In 1994, the acreage was split roughly in half between DHHL and non-DHHL users (Table 13). The two-thirds law suggests that in time of water shortage, the DHHL users will probably be able to maintain crop production while the other users will have to irrigate at less than consumptive use. Low yields or crop loss may result for the non-DHHL users if the drought continues. The only alternative for the non-DHHL users is to anticipate droughts and then to limit or stop production when necessary.

Table 13. Annual water uses and charges for MIS water and assessment. Several fold differences in the annual assessments were partially due to adjustments relating to voided third party agreements. Evaluation of the assessment collection procedures is needed to explain all of the differences.

<table>
<thead>
<tr>
<th>FY</th>
<th>DHHL</th>
<th>Others</th>
<th>All</th>
<th>Assessment</th>
<th>Water charge</th>
<th>Total charges</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>na</td>
<td>na</td>
<td>1,166.1</td>
<td>$156,584</td>
<td>$173,838</td>
<td>$330,422</td>
</tr>
<tr>
<td>1991</td>
<td>807.0</td>
<td>636.8</td>
<td>1,443.8</td>
<td>$32,755</td>
<td>$285,142</td>
<td>$317,896</td>
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<tr>
<td>1992</td>
<td>726.0</td>
<td>812.2</td>
<td>1,538.2</td>
<td>$36,632</td>
<td>$246,113</td>
<td>$282,745</td>
</tr>
<tr>
<td>1993</td>
<td>648.8</td>
<td>806.6</td>
<td>1,455.5</td>
<td>$164,624</td>
<td>$232,874</td>
<td>$397,498</td>
</tr>
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<td>1994</td>
<td>786.2</td>
<td>1,019.2</td>
<td>1,805.4</td>
<td>$43,014</td>
<td>$288,872</td>
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<td>1,811.8</td>
<td>$43,014</td>
<td>$289,764</td>
<td>$332,779</td>
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<td>1996</td>
<td>na</td>
<td>na</td>
<td>1,529.8</td>
<td>$44,600</td>
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<td>$289,364</td>
</tr>
<tr>
<td>1997</td>
<td>na</td>
<td>na</td>
<td>1,176.5</td>
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</tr>
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<td>1,626.3</td>
<td>$168,350</td>
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<td>na</td>
<td>1,896.6</td>
<td>$166,533</td>
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</tr>
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<td>na</td>
<td>1,774.8</td>
<td>$44,456</td>
<td>$382,347</td>
<td>$426,804</td>
</tr>
</tbody>
</table>

The Water Initiative Group recommended "the DOA should settle more clearly the two-thirds preference issue and put it into practice." The law implies that the preference applies only to the water developed for the MIS in Stage I. Subsequent water development requires a legal interpretation. The DOA administrative rules in Chapter 4-
152 should be amended to reflect the two-thirds preference in the law and its enforcement. The DOA administrative rule, Chapter 4-152, section 4-152-4, covers conservation measures and interruption of water supply, but the implementation of two-thirds preference issue is not specifically addressed. Section 4-152-4 relative to this issue reads as follows:

"(b) Whenever in the board's opinion special conservation measures are deemed necessary in order to forestall water shortage and a consequent emergency, the board may restrict or ration the use of water by any reasonable method of control.

(e) Shortage of irrigation water supply for the Molokai irrigation system during seasonal drought periods may occur. During these periods, the department shall supply only the amounts of irrigation water and at the times as in the best judgment of the department will assure all consumers of receiving a fair share of the irrigation water available."

Implementation of the two-thirds preference will require the DOA to estimate the "actual need" of each DHHL user before determining the amount of water available to non-preference users. The MIS water is intended for agricultural use only; therefore, the maximum use is expected to be equivalent to the crop's potential evapotranspiration (PET), which is a function of weather. To minimize bias, it is suggested that the DOA use PET for the assessed acres in crop production to estimate the user's "actual need." Water use may vary significantly by month (Figure 3). 41% and 33% of customers used no water in June and July of 2001, respectively (Table 12). Recalculation of allowable amounts may be necessary because the available water in the MIS can change significantly from month to month. Another question is whether the west portal flow (total available water before system losses) or the reservoir height should be used to enforce the two-thirds preference of the law. It would be easier to trigger the two-thirds law using a "critical" water depth (depth at which 100% of the user actual needs cannot be met) in the reservoir. Thereafter the west portal flow (after adjusting for losses) could be used to implement the two-thirds law until the reservoir depth increases above the
critical depth. The water use records for July 2001 suggest that this situation may now exist, although it cannot be confirmed without estimates of DHHL users' actual needs. If so, the two-thirds preference should come into play favoring water allocation to DHHL users.

A condition requiring mandatory water restriction should exist before the two-thirds preference law will be enforced. Enforcement could be based on users' monthly meter readings (a month after-the-fact). This emphasizes the need for accurate flowmeters. The amounts of water available to each user will have to be estimated and communicated to the user at least monthly. A penalty clause, such as higher rates and/or a penalty fee, could be implemented and enforced whenever users exceeded the allowable limits. Enforcement may require additional DOA staffing and/or the development of appropriate computer software.

Another law relevant to this water rights issue is the State Water Code, HRS section 174C-101, Native Hawaiian water rights, part (a), which recognizes the homesteaders rights to "current" and "foreseeable" water rights (communication with Malia Akutagawa on October 26, 2001). It reads as follows:

"Provisions of this chapter shall not be construed to amend or modify rights or entitlements to water as provided for by the Hawaiian Homes Commission Act, 1920, as amended, and by chapters 167 and 168, relating to the Molokai irrigation system. Decisions of the commission on water resource management relating to the planning for, regulation, management, and conservation of water resources in the State shall, to the extent applicable and consistent with other legal requirements and authority, incorporate and protect adequate reserves of water for current and foreseeable development and use of Hawaiian home lands as set forth in section 221 of the Hawaiian Homes Commission Act. [L 1987, c 45, pt of §2; am L 1991, c 325, §8]."

It was suggested that the DOA should not only estimate DHHL's "actual need" but also the "foreseeable need" in order to determine the amount of water available to non-preference users. Any future projection will be difficult to quantify and subject to debate.
ISSUES AND CONCERNS OF THE MOLOKAI COMMUNITY

The issues and concerns documented in past surveys by Kahane (1987), M&E Pacific (1991) and Molokai Agriculture Development Master Plan (1993) are the same today. Some common themes were having sufficient water, maintenance and efficient management of the MIS, Hawaiian rights, water and natural resources, and soil and water conservation. Some deemed further development of Molokai and the MIS as necessary to the economy, while others felt it would adversely affect the rights and lifestyle of the Hawaiians.

Some of the issues and concerns in Kahane (1987) survey were as follows:

1. Use of MIS water for drinking.
2. Accuracy of flow measurements.
3. Storage and filling of reservoir over the winter.
4. Operation of pumps to fill the reservoir.
5. Cost of electricity.
7. MIS staffing size compared to other State run water systems.
8. Clarification of the two-thirds preference in the law.
9. Long range planning.

The Molokai Agriculture Development Master Plan (1993) documented additional issues and concerns as follows:

1. Cultural concerns of the native Hawaiians.
2. Lack of sufficient water for current and projected uses from existing sources.
3. Preservation of ecosystems in the watersheds.
4. Sustainability of potable aquifers.
5. Protection of the land from water and wind erosion especially in sloping
terrain where soil surfaces were devoid of cover.

6. Nonpoint source (sediments, animal waste, pesticides and fertilizers) pollution effects on water quality of streams, aquifer and coastal water.


The MIS users and the community were not always in agreement, but some of their current issues and concerns are as follows:

1. Improvement of the efficiency of the MIS by reducing losses (replacing meters, performing the necessary fixes and regular scheduled maintenance) and maximizing water collection.

2. Conservation and system improvements instead of development of new water sources.

3. Reliability of MIS water flow and clean water quality.

4. Inadequate staffing for operation and maintenance of the system. Need for more maintenance for maximum collection, transmission, storage and distribution of water, such as: routine pump maintenance, cleaning of intakes and valves, and meter checks and replacements were other tasks mentioned.

5. Concern about who should bear the cost for water between DHHL and other users and between the MIS users and the State.

6. Concern that expansion of the MIS service area is not a reasonable option without increasing water availability.

7. Conflicts over non-DHHL water use within the MIS service boundaries.

8. Availability of Molokai Ranch surplus water to MIS.

9. Concern over more pumping of groundwater for agricultural uses. Issues are related to cost, impact on surrounding wells, especially potable wells, and the use and long-term soil effects of brackish water for irrigation.

10. Lack of sustainability of groundwater in Waikolu valley.
11. Environmental and cultural concerns over collection of water from Pelekunu valley.

12. Availability of enough water to sustain current activities let alone expansion.

13. Objections to use of Kaluakoi Well 17 water for agriculture because of high pumping cost and because of its possible effect on the Kualapuu aquifer, which is the main source of potable water.

14. Concerns about Kaluakoi Well 17 water being pumped into and withdrawn from the MIS.
RECOMMENDATIONS

Expansion Potential of the MIS

The current customer base of 2,931 acres may be doubled to a maximum 6,000 acres if the following can be achieved:

1. Reduce current losses by at least 25% to gain an annual average of 1.45 mgd.
2. Increase pumping output by 0.5 mgd in Waikolu valley to a moving average of 1.4 mgd.
3. Develop new sources such as from brackish wells and stream diversions on Kawela, Kaunakakai gulch and Manawainui gulch for a total of 4.05 mgd.

The calculation for the new acres assumes that only half of the area will be in crop production and the cultivated area will use an average of 4,000 gpa per day.

Molokai’s best agriculture lands with irrigation are located in central Molokai in Hoolehua area (State of Hawaii, DLNR, 1966). The current MIS service area in Hoolehua has about 9,960 acres, but not all can be serviced even with 6.0 mgd of additional water. Therefore, the expansion of the MIS to Kalamaula homestead land is not recommended. The Molokai Water Initiative Group and the MIS Advisory Committee advocated the use of Waihanau stream diversion of about 0.5 mgd for future Kalamaula development, which is sufficient to irrigate about 123 cultivated acres or support about 250 agricultural acres annually.

Development of New Water Sources

The following long-term actions are recommended:

1. Study the feasibility and the effect on the environment of collection of runoff water from other sources. Possible sites for collection are on Manawainui, Kaunakakai, and Kawela gulches with intermittent stream flows. The bulk of the capture will be storm runoff. Another possible source is Molokai Ranch overflow as in the case for Kawela. Sources located higher than the Kualapuu reservoir are desired in order to transport the water by gravity instead of by pumping.
2. Investigate the use of non-potable brackish well water for mixing with Waikolu valley water for irrigation. The Waikolu valley water contains lower chloride content than most potable well sources elsewhere in the State of Hawaii. Mixing this water with a brackish source of 700 ppm of chloride can still yield a mixture having better quality than most potable wells on Oahu.

3. Negotiate an agreement to share or purchase Molokai Ranch water especially in times of declared water rationing.

Improvements of the Current System

The following short-term actions are recommended to improve the collection and storage of the MIS water:

1. Inject water from the transmission pipeline directly into the distribution system. Evaporation losses can be minimized; cleaner water is achievable, and higher pressure will be available with direct injection. Redesign of the system will be required to screen the water first before entering the distribution system and to prevent excess water from backing up the transmission pipeline. The excess flow above normal customer use must be redirected into the reservoir for storage. A solution to this engineering problem is needed.

2. Consider dividing the Kualapuu reservoir into smaller compartments then covering to reduce evaporation losses.

3. Measure water losses due to seepage in the Kualapuu reservoir. Seepage losses should be measured to determine if the magnitude of water loss warrant resealing or relining the reservoir. For the short-term, bypassing the reservoir may be the only option if seepage losses are high. Seepage loss measurement as proposed in this report is relatively simple and should be performed on a regular annual or biennial basis to detect potential problems. All DOA reservoirs storing water for extended periods will benefit from seepage loss measurements.

4. Review the literature on the use of oils, polymers and other materials to reduce evaporation losses from an open reservoir such as Kualapuu reservoir.
5. Determine how best to minimize soil erosion on the interior banks of the Kualapuu reservoir. NRCS should be contacted to provide corrective courses of actions.

6. Consider treating or draining the reservoir water to eliminate fishes, snails and other organisms that can clog irrigation systems. The logistics of draining the reservoir while still providing water to the customer must be studied.

7. Inspect the tunnel's floor lining for cracks and measure the water permeability of the concrete floor to determine if a sealant is necessary.

8. Modify the face of the waterfall at Dam 2 to capture more water in periods of high rainfall.

9. Study the feasibility of electricity generation for pumps in Waikolu valley.

10. Install weather stations for DOA and customer use.

11. Replace defective flowmeters as soon as possible.

Management Actions to Improve the MIS

1. Write administrative rules to document how the DOA will estimate the DHHL users “actual need” and to implement the two-thirds preference law. A computer program will be required to calculate the allowable water available to each DHHL user based on monthly customer needs, the available amount of water and the monthly meter readings. A perquisite is having accurate meter readings. This program is expected to be a subroutine of the monthly billing and implemented when the DOA declares a mandatory water rationing.

2. Obtain a legal opinion to determine if the two-thirds preference applies to water developed after the first stage of the MIS project.

3. Limit MIS water to only agricultural uses.

4. Create a maintenance priority work schedule and document task completion. Replacement of defective flowmeters should be given top priority.

5. Conduct timely maintenance of the MIS for optimal efficiency. The DOA should
draft a justification for additional staffing in Molokai or a plan to use existing staffing to provide optimal service and results.

6. Consider amending the well permits in Waikolu to pump more than 0.853 mgd in times of emergency. A moving average of 1.4 mgd is suggested because environmental data supports pumping of 1.55 mgd in 1996 (Water Resource Associates, 1999). The sustainable capacity is estimated to be about 2.5 mgd at 1,000 ft or 3.02 mgd at 750 ft elevation. Monitoring of the water depth of Well 4 should be a condition before allowing more pumping in the valley to prevent over-pumping of the valley.

7. Service pumps on a regular basis and document maintenance to minimize expensive repairs and lost opportunity to fill the reservoir. Adequate pumping capacity currently exists in Waikolu valley.


9. Digitize all data collected for the MIS, such as water flows, pumping, reservoir depth, rainfall and customer use, for timely analysis to make informed management decision and monitor compliance of pumping permits and Kaluakoi-DOA water agreement.

10. Compare the amount of available water collected and the customer use to the quantity of water stored in the reservoir on a routine basis to identify losses.

11. Verify the actual acres irrigated against the assessed acres.

12. Inspect diversion intakes in Waikolu valley on a regular basis and schedule more frequent visits with increasing amounts of rainfall events or use flowmeters and/or remote cameras to monitor each dam for obstruction of the collection grates.

13. Verify annually or at least on a regular basis that all flowmeters are functioning and accurate. The most important meters are those feeding water into the MIS transmission pipeline to give an accurate account of the available flow per day. The east portal flowmeter triggers the well pumps, and west portal flowmeter determines the amount of water collected from Waikolu valley. The portal
flowmeters are the responsibility of the DOA, while USGS meters can serve as checks or backups. Accurate flowmeters are needed on other water sources entering into MIS from Molokai Ranch overflow at the MIS-Molokai Ranch systems junction and from Kaluakoi Well 17. Kaluakoi is responsible for maintaining and reading that meter, but the DOA should at least annually audit their data for compliance to contractual agreement and confirm the accuracy of the flowmeters. Another flowmeter of major importance is where Kaluakoi is removing water from the MIS. The priority of flowmeter audits should be Kaluakoi, tunnel portals, large users then others users.

14. Provide the farmers with weather data and assistance to improve irrigation efficiency and conserve water. The DOA should make weather data available in real time, and provide a comparison of actual and predicted water use on the monthly bill. The DOA should target individuals exceeding the crop requirement by confirming the accuracy of the user’s flowmeter and the area in crop production. The University of Hawaii Cooperative Extension agents can provide technical expertise to help the farmer maximize yields with water.

15. Subsidize or give incentives for the conversion of sprinkler and furrow irrigation systems to drip irrigation. Sprinklers are ineffective because of high winds in central Molokai, which distort the spray patterns and evaporation of too much water. Furrow irrigation cannot deliver water efficiently to the crop, especially with high soil infiltration rates in the Molokai soil series at Hoolehua. Higher yields may be possible with less water using drip irrigation making more water available to other users.

16. Conduct an annual survey of each user on the acreage of each crop grown, the type of irrigation system, the use of filters and frequency and duration of back flushing, and specific water related problems.
REFERENCES


State of Hawaii, Hawaii Department of Agriculture. 1989. Adoption of Chapter 4-152, Hawaii Administrative Rules.


APPENDIX A. Senate Resolution No. 34 S.D. 1. Molokai Irrigation System Evaluation

Report Title:
Molokai Irrigation System; Evaluation (SD1)

THE SENATE
TWENTY-FIRST LEGISLATURE, 2001
STATE OF HAWAII

SENATE RESOLUTION

REQUESTING AN ASSESSMENT OF AND IMPROVEMENT RECOMMENDATIONS FOR THE MOLOKAI IRRIGATION SYSTEM.

WHEREAS, Molokai's water shortage has reached a critical stage and the stability of Molokai's agriculture industry is in jeopardy; and

WHEREAS, unless action is taken immediately, Molokai's farmers will not have the water needed to maintain their farming operations; and

WHEREAS, the Molokai Irrigation System (MIS) was designed to serve up to 17,640 acres of farm land in Molokai's arid Ho'olehua plain, most of which is owned by the Department of Hawaiian Home Lands, and to have a capacity of 21 million gallons of water per day; and

WHEREAS, the expansion of the MIS into Pelekunu and Wailau Valleys to provide the aforementioned capacity have not occurred, and are not likely to be developed for environmental and other considerations; and
WHEREAS, two-thirds of the water developed by the MIS has preference in favor of the Department of Hawaiian Home Lands and/or their lessees; and

WHEREAS, the growth in demand for water from the system has occurred such that over one-half of the water is used by non-preference users; and

WHEREAS, while the non-preference users have a junior claim to water from the system and would be dramatically affected by rationing of system capacity, they provide a significant percentage of farm related employment and economic input to the island; and

WHEREAS, expansion of the MIS to agriculture lots in Kalamaula has been in discussion for years; and

WHEREAS, concerted, comprehensive, and cooperative efforts must be initiated to assess the practical limits of expanding the available supply of water to the MIS system together with appropriate limits to expansion of the MIS customer base, with due consideration to the preference of the Department of Hawaiian Home Lands and its lessees; now, therefore,

BE IT RESOLVED by the Senate of the Twenty-First Legislature of the State of Hawaii, Regular Session of 2001, that the Agribusiness Development Corporation, Department of Agriculture, and Department of Hawaiian Home Lands are requested to work jointly with the Molokai community to identify the expansion potential of the Molokai Irrigation System by adding new water sources and the appropriate size of the customer base that can be reliably supported by an expanded system with due concern for the preferential rights of the Department of Hawaiian Home Lands and its lessees, and to develop a plan for improvements to the Molokai Irrigation System for the long-term; and

BE IT FURTHER RESOLVED that long-term assessments and improvement recommendations for the Molokai Irrigation System shall address the expansion of the Molokai Irrigation System to agricultural lots belonging to Kalamaula homestead farmers; and
APPENDIX A (continued)

BE IT FURTHER RESOLVED that the Agribusiness Development Corporation with the assistance of the Department of Agriculture and Department of Hawaiian Home Lands shall prepare and submit the plan, their recommendations, and any proposed legislation to the legislature not less than twenty days before the convening of the Regular Session of 2002; and

BE IT FURTHER RESOLVED that certified copies of this Resolution be transmitted to the Chairperson of the Board of the Agribusiness Development Corporation, Chairperson of the Board of Agriculture, and Chairperson of Hawaiian Home Commission.
APPENDIX B. Photographs of Features of the Molokai Irrigation System

Dam 1 in Waikolu Valley

Top: Dam at Waikolu Stream. Steel grating over the collection concrete box can filter large debris. Large obstructions can plug the grating and require cleaning by hand.

Bottom: A bypass above the collection box allows about 1.5 mgd to flow past the dam for aquatic life below the dam to survive.
Dam 1 in Waikolu Valley

Dam 1 with 20-inch cast iron pipe for the captured water to flow by gravity to the tunnel's east portal.

Walkway over the cast iron pipe to the tunnel's east portal.
Dam 2 in Waimakihau Valley
During periods of high flow, the waterfall can flow over the dam.

Dam 2 structure diverts water to the 16-inch pipe. This diversion does not have gratings like Dam 1.
Tunnel's East Portal in Waikolu Valley

East portal tunnel entrance. A Jeep is able to drive through the tunnel. This is the only route to Waikolu Valley.

Power controls at the entrance of the east portal. The electrical and telemetry cables are attached to the ceiling of the 5.1-mile tunnel.
Well 5 is located below the east portal and a short distance above the exit of the Napoleon tributary into Waikou stream. Well 5 has a capacity of 1.15 mgd (800 gpm). Well 6 is similar to this station but with a 1.45 mgd (1,000 gpm) capacity pump.

Three pumps are located at the lowest diversion, Dam 4, to pump the collected runoff to the tunnel. The pumps are activated by a float switch. In the background are two 700-gpm pumps, while in the foreground is a 1,400-gpm pump.
Dam 4 is constructed similarly to Dam 1 with grating over a concrete box. Watercress is growing over half of the grating. The watercress was reported present at this dam since 1997 (Water Resources Associates, 1999).

Water leaking past Dam 4.
Barren landscape about a mile from the west portal heading to Kualapuu reservoir. Brush fires have destroyed most of the vegetation covering the soil. This site is highly susceptible to soil erosion by wind and water.

Transmission pipeline heading toward the Kualapuu reservoir.
Kualapuu Reservoir

Inlet from the transmission pipeline.

Damage lining. Bermuda grass, weeds and mulch.

Soil erosion of the reservoir bank.

Outlet with screen leading to the distribution system.
Rainfall weather station on the bank of the Kualapuu reservoir.

Coffee below the Kualapuu reservoir. This farm is one of the largest customer on the system.
APPENDIX C. Daily and Weekly Reports on Flows and Kualapuu Reservoir Depth

**Daily Reports by the MIS Manager.** West portal tunnel flow (mgd) is the total amount of water collected from Waikolu valley. Kaluakoi Well 17 inflow and outflow (mgd) are water removed and injected into the MIS, respectively. The Kualapuu reservoir depth is in feet. The MIS outflow (mgd) is the amount of water being removed and used by the consumers. The difference of the west portal flow and the MIS outflow is an estimate of reservoir storage (+) or depletion (-) without evaporation. The difference was calculated from the daily reports.

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**APPENDIX C (continued)**

**Weekly Reports by the MIS Manager.** The rainfall (inch) is from Waikolu valley at the 900-ft elevation. West portal tunnel flow (mgd) correlated and increased with rainfall in the valley. The MIS outflow (mgd) is the amount of water being removed and used by the consumers. The Kualapuu reservoir depth is in feet. Kaluakoi Well 17 is the hours of pumping having a capacity of about 1,650 gpm.

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APPENDIX D. Statistical Analysis of Rainfall (inch) at 900-ft Elevation and Pumping (mgd) of Wells 23 and 24 on the Depth (ft) of Well 4

Rainfall readings corresponding to the Well 4 depth was correlated to shifting the date of the rainfall occurrence 0, 1, 2, 3, 4, 5, 6 and 7 days (RAINFALL, RF1, RF2, RF3, RF4, RF5, RF6 and RF7) ahead. For example, the rainfall of 0.92 inch occurring on April 14, 1996 was RAINFALL and correlated to the well reading of -32 ft on the same day, while RF1 was the rainfall on April 14, 1996 but correlated to the well reading on April 15, 1996. Stepwise regression was using the software Statistix 7 by Analytical Software. The analysis was conducted twice with variable entry and exit probabilities of 0.05 and 0.10 levels. The results are shown in this appendix. The source of data used in the statistical analyses is Water Resource Associate (1999) in Appendix A of that report.

**Statistix 7 Output – 0.05 Probability Level**

STEPWISE REGRESSION OF Depth (ft) of Well 4
UNFORCED VARIABLES: PUMPAGE RAINFALL RF1 RF2 RF3 RF4 RF5 RF6 RF7

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<th>VARIABLE</th>
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<th>P</th>
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RESULTING STEPWISE MODEL

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CASES INCLUDED 537
MISSING CASES 14
R SQUARED 0.3282
MSE 102.820
ADJ R SQ 0.3257
SD 10.1400
### APPENDIX D (continued)

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<td>RF4</td>
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#### Statistix 7 Output – 0.10 Probability Level

**STEPWISE REGRESSION OF Depth (ft) of Well 4**

**UNFORCED VARIABLES:** PUMPAGE RAINFALL RF1 RF2 RF3 RF4 RF5 RF6 RF7

**P to ENTER 0.1000**

**P to EXIT 0.1000**

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**RESULTING STEPWISE MODEL**

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**CASES INCLUDED 537**

**MISSING CASES 14**
### APPENDIX D (continued)

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APPENDIX E. Water Users by Account Number on the MIS for June and July 2001.

The average daily water use was 3.8 mgd for all users for both months. The gallon per acre (gpa) is express on a daily basis, inch per acre per day and panfactor (Pf). The panfactor is the ratio of the amount of water used in inches per acre per day to pan evaporation of 0.38 inch per day.

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<th>July 2001</th>
<th>Total</th>
<th>GPA/day</th>
<th>In/ac/day</th>
<th>Pf</th>
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APPENDIX E (continued)

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<th>In/ac/day</th>
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### APPENDIX E (continued)

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- 76 -
**APPENDIX F. Water Use and Acreage by Preference DHHL and Non-Preference (Others) Users from July 1989 to June 2000.**

The water use by users type was found for December 1989 through June 1994. The DHHL water use and acres are expressed as a percent of the totals.

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### APPENDIX F (continued)

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- 79 -
STATE OF HAWAII
DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESOURCE MANAGEMENT DIVISION
MOLOKAI IRRIGATION SYSTEM

PUMP #23 & #24 PUMPING DATA from January 01, 2001 to October 10, 2001

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215,824 / 12 = 17,985 mg  273,790 / 13 = 21,061 mg
265 / 285 = 0.93 kgd  691.4 kgd
38.0 kgd

1,282.634 (compare w/ 0.853)

Attn: Neal Fujii / Charley Ice

Post-It Fax Note 7871

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<td>Co./Dept: DLNR-OW</td>
<td>CO: DOA-PES</td>
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<td>Fax: 517-8014</td>
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registration 0754-01 → "West Kawela Intake"

Pepeohe

DIVERSION 0754-02
(CHANUHOLUO INTAKE)

"WOA location (0754-01)
registration location (w/ funnel!)
but: (0754-02)"
COMMISSION ON WATER RESOURCE MANAGEMENT

FROM: LINNEL

DATE: 1/6

SUSPENSE DATE

TO: INIT. TO: INIT. FOR: PLEASE:

| BAUER, G. | | LUM, A. | | Approval |
| CHING, F. | | NAKAMA, L. | | Signature |
| DANBARA, S. | | NAKANO, D. | | Information |
| FUJI, N. | | NISHIOKA, L. | | |
| HARDY, R. | | OHYE, M. | | |
| HIGA, D. | | SAKODA, E. | | |
| HIRANO, E. | | SUBIA, S. | | |
| ICE, C. | | SWANSON, S. | | |
| IMATA, R. | | UYENO, D. | | |
| JINNAI, R. | | YODA, K. | | |
| KUNIMURA, I. | | | | |

PLEASE:

See Me
Review & Comment
Take Action
Type Draft
Type Final
File
Xerox ___ copies

Spoke w/Paul - informed him of our decision - just need to submit WERs when ready. Thanks him for the notice.
June 6, 2000

TO: Honorable Timothy Johns, Chair
Commission on Water Resource Management

FROM: James J. Nakatanani
Chairperson, Board of Agriculture

SUBJECT: Emergency Pump Replacements, Waikolu Valley, Molokai Irrigation System

This is to inform you that the Department of Agriculture will be conducting pump repairs and replacements for our wells in Waikolu Valley shortly and although we do not believe pump installation permits are required, please review the work described below for conformance with the water code.

The Molokai Irrigation System (MIS) has experienced pump and motor failure at both Well Nos. 22 and 23. Well No. 24’s pump is operating but needs to be repaired. Due to the loss of pumping capacity and the prolonged drought on Molokai, our Kualapuu Reservoir has approached a critical depth of 13 feet. With the summer weather forecast indicating no or little rainfall, the MIS is in grave danger of running out of water.

The Department has recently declared an emergency pursuant to section 3-122-89, HAR, and requested the Governor for release of emergency CIP funds to repair the three pumps. The work will consist of removing each submersible pump and motor and either repair or replace each pump and motor together with appurtenant works.

If you have any questions or if more information is required, please contact me at 973-9551 or have your staff contact Paul T. Matsuo, Administrator and Chief Engineer of the Agricultural Resource Management Division, at 973-9473.
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If you have any questions or if more information is required, please contact me at 973-9551 or have your staff contact Paul T. Matsuo, Administrator and Chief Engineer of the Agricultural Resource Management Division, at 973-9473.
Waikolu Streamflow Problem Statement

- In June 1993, the Department of Agriculture/ Moloka'i Irrigation System applied for a water use permit for 3.36 mgd of groundwater from the dike compartments in Waikolu Valley, for use at Ho'olehua. Public testimony noted the occasional dewatering of part of the stream, and a decision was postponed until a 2-year study could shed light on this issue.

- Dewatering a segment of Waikolu Stream, now referred to as Section III, was first noticed in 1984, occurring for 1-2 months during drought periods. In 1996, a combination of prolonged subnormal rainfall and renewed drought, plus continuing pumpage from the wells, caused the pools in Section III -- some up to 40 feet deep -- to completely dry up for the first time.

- It is now clear that the only segment that gets dewatered is where the invert crosses the dike compartment with two pumping wells. There is a clear 1:1 relationship between ground-water and surface water, in this case meaning that pumpage from the wells lowers the water level below the stream invert (drains the stream), and conversely, resumed flows into the dewatered segment also raise water levels in the wells.

- In the State Supreme Court's decision at Wai'ahole (August 2000), the court clarified that prior to making allocations from streamflow, CWRM must determine appropriate instream flows to protect beneficial instream uses. No one is certain how to define that. What is the measure of instream flow, what are the beneficial uses, and how much flow adequately protects those uses? The Court presumes that the facts in the case -- as well as we may know them -- will yield the answers -- as well as we can formulate them now.

- Action on DoALMIS' application is once again a current issue, now that the "2-year study" has been completed and the results, along with Moloka'i Water Working Group comments from a September 2000 consultant presentation, reported to the Commission in October 2001. Testimony favored approving as much of the requested 3.36 mgd as possible, as soon as possible, as the prolonged drought was underway. Staff indicated that the sense of urgency was appreciated and that action was a high priority but that the required establishment of streamflow standards had nowhere yet been done (new interim standards have since been completed for streams in the Wai'ahole case). The Commission asked for a progress report in 6 months (for its April meeting).

- The existing system of diversions and wells, tunnel, pipeline, and reservoir, was constructed in the late 1950s and completed in 1962, prior to adoption of the Water Code, and registered as existing use once the Water Commission was created in 1989. The only data gathered prior to construction were flow data to determine development feasibility.

- Under the Interim Streamflow Standard adopted in March 1988, the Commission permitted the then-current 12-month moving average ground-water withdrawal (0.744 mgd). In addition to ground-water use, surface water diversions average a
benefit threshold, or how much “less” might be a significant detriment. We do not know how long the endangered species will remain viable during low flow periods, nor the effect of eliminating the viable populations now surviving in Section II by pumpage from Wells #5 & #6 over an extended dry period. We have not studied other species (flora or fauna) that may be significant to the studied macrofauna—whether they face long-term risks from dewatering. We have no information on any possible floral species that would be of concern, nor have we explored any other potential “stream values” to be protected by instream flows.

The management plan is designed to minimize operating costs of electricity, as it is very expensive on Moloka‘i. The pumping schedule is therefore not geared specifically to hydrologic or biological criteria. We had hoped to get an understanding of the effect of different pumping schedules, but that has not been part of this effort. The pumps each only operate from 3 to 6 hours per day, in sequence. Wells #5 & #6 were programmed to be the second-to-last pumps in the sequence to start, followed by the sump pumps, and the sequence is reversed to take the pumps off-line. When total diverted stream flows reach a sufficiently low threshold, the sump pumps can run 24 hours per day.

Conclusions
The purpose of this study was to determine whether Wells #5 & 6 could be allocated new water use permits in addition to those made for Wells #22, 23, and 24. We hoped to learn the impact of pumping the various wells, singly and in combination, on stream flows and therefore on native macrofauna, resulting in recommendations for a pumping schedule that would protect instream values and optimize diversions for agricultural irrigation.

A secondary objective was to determine whether a low-flow weir at the Upper Dam (#1) would significantly enable the passage of animals upstream. We learned that it does work when animals can reach the base of the dam, but that issue is often moot because Sections II & IV are dewatered by pumpage from Wells #23 & 24. The question has been raised whether its proper functioning is well-advised if the result is a greater number of larvae otherwise headed for the ocean being entrained into the irrigation system. It is not known, at this point, how much of the larval return to the ocean occurs during freshet flows that create continuous flows through Sections III & IV. This poses a question for determining the appropriate instream flow standard for Waikolu.

Subsequent to the study objectives, the Supreme Court has opined that the Commission’s responsibility for stream protection goes beyond merely balancing instream and offstream uses. Rather, the responsibility is to determine instream values to be protected prior to any consideration of offstream uses. We are thus in the position to begin asking what permanent instream flow standards are appropriate to Waikolu.

We are encouraged to learn that the drought periods we have faced, and the ongoing diversions from Waikolu, have not eliminated native macrofauna from the stream throughout the study area, although clearly there are periods when they cannot survive in certain sections of the study area. We know that the populations respond normally when freshets return, and that in this sense the populations are “healthy”.

We do not know whether further diversions will maintain this set of circumstances, and we believe that “more” water left in the stream would have a positive effect on those populations. We know that allocations for Wells #5 & 6 could result in dewatering Section II of the study area except in times of freshet flows, although the contributions of Napuleloa Spring help to maintain flows in Section II when Wells #5 & 6 are in use. The critical threshold for this maintenance, from the macrofaunal point-of-view, is unknown.

The conclusion for the time being is that the current pumping regime has some adverse impacts on stream values that are not irreversible—that resilience of instream species supports recovery as rainfall returns. The correlations from this study do not inform us about “permanent” standards, and in fact, suggest that “permanent” refers not to a static gallonage or “minimum stream flow” but to ecological thresholds that are not understood, that may be preserved by assuring that pumping parameters are not exceeded. Perhaps a “permanent” standard would be expressed as a proportion of flow, or a proportion of time diverted, regardless of season or relation to long-term norm.
Waikolu is now considered to be of greater-than-average native biological importance, now that many policies, but with gradual improvement of ecological knowledge and continuing new findings, and with Management Perspectives, more flow is better. This study demonstrates that existing native populations respond quickly to adapted, it is still true that minimum flows are essential to habitat health, and that generally speaking opportune freshet flows, even following lengthy dry periods in certain sections of the stream.

Nonetheless, the number of individuals of these species were fewer above Dam #4 than below. Unique Endemic Fauna

Native macrofauna are found in representative proportions throughout the length of Waikolu Stream, except in Sections III & IV during dry periods. When rainfall augments flows, the macrofauna move upstream normally, excepting species which are unable to climb the upper dam. When low flows are continuous through Sections III & IV, species capable of climbing the dam do so, due to a modification of the weir to permit the lowest flow to cross the dam. Prior to modifications, no water crossed the dam during low flows. Different species arrange themselves along the stream according to their habitat and physiology requirements. We do not know how "normal" this arrangement is, as this study area has been diverted for many years, and because repeated drought conditions may have altered the recovery expectations of these populations. We do know that Waikolu now has lower flows than Pelekunu and lower densities of observed species than Pelekunu, and that species densities vary directly with volumes of flow. We may assume therefore that undiverted flows in Waikolu would result in higher densities of native species. The report is not clear whether the encouraging response of the macrofauna moving upstream when flows are restored after drought represents a "vigorous" or adequate response, or whether this response is within the parameters of a "normal" stream situation.

The study identified several species of native macrofauna -- three species of o'opu, one arthropod ('opae), and one univalve (hihiwai) -- as indicator species for measuring habitat health. No other floral or faunal species were studied, although a full ecological understanding would include other species as well. Exotic flora are obvious and common in the study area, while exotic fauna were not identified. In other locations in Hawaii'i, aquatic scientists have identified subsurface habitats with unique native species, but the presence of such habitat in Waikolu is unexplored. In recent years, new interest has been expressed in other potential indicator species, such as insects and algae, to show high habitat value.

Management Perspectives

Biological consultants on this study opine that while freshet flows (episodic storm flows that scour the stream bed) are key features of the Hawai'i stream ecology to which native species are uniquely adapted, it is still true that minimum flows are essential to habitat health, and that generally speaking more flow is better. This study demonstrates that existing native populations respond quickly to opportune freshet flows, even following lengthy dry periods in certain sections of the stream. Nonetheless, the number of individuals of these species were fewer above Dam #4 than below. Waikolu is now considered to be of greater-than-average native biological importance, now that many other streams of the state are impacted by development.

The Commission staff approved the scope of work for the study as adequate under existing policies, but with gradual improvement of ecological knowledge and continuing new findings, and with directions from the Supreme Court in the Wai'ahole case, there now exist questions that were not intended to be answered by this study. We do not know how much "more" flow would be a significant
Our effort to develop an instream flow standard for Waikolu does not have to be a one-time project, solving all conceivable problems. It should, at minimum, account for the best information and understanding we have now. I propose a two-part approach, in which 1) we take what is now known and do our best to assess the instream flows required to protect the values we know, by April; and 2) we ask the right questions and prepare a path for a more comprehensive, complete, or satisfactory instream flow standard based on some other definition of the values to be protected.

Who else should be involved in this effort, and at what stage? Presumably, others with an interest are the National Park Service (NPS), USGS, Natural Resource Conservation Service (NRCS); Department of Hawaiian Home Lands (DHHL), DoA/MIS, the Moloka'i Water Working Group (MWWG).
General Description

Waikolu Stream is a “gaining” stream, meaning that it receives base flows from ground-water storage all along its length, and under natural conditions, it is perennial throughout its length. In the upper sections studied for this report, the valley is crossed by dikes, separating the underlying rock into ground-water compartments which overflow or well up into the streambed (“stream invert”). The study area provides the full habitat range of plunge pool (up to 40 feet deep), riffle, and run.

In past years, there was flow along the entire study length except during the summer dry period. Since the 1980s the weather has increasingly provided below-normal rainfall, and not until 1996 were there no pools in Section IV at all. The study period provided a wide range of conditions, from freshets providing continuous streamflow throughout the study area to one of the worst drought periods on record.

Unfortunately, there are no long-term data for the study area from an undisturbed period to use as a baseline, either for the stream characteristics or for the species populations in question. Flow estimates were prepared from a limited period of record in support of a water development project. Therefore we do not know what the original or “normal” distribution of macrofauna would be in Waikolu Stream, nor how nearly fifty years of altered flow have shaped what we now see. We also cannot say with certainty how protracted or repeated drought characteristics of recent years may have shaped the baseline evidence gathered in 1994-95. What we now know is how the habitats and macrofauna distribution in a stream that has been modified since the 1950s are changed by ground water pumpage during low stream flows. Waikolu Stream is now considered an important stream from the standpoint of native species, as it has intact populations and complete life cycles of representative species. Comparing Waikolu with Pelekunu in her 1997 “Habitat Use...in Two Streams on Moloka’i”, Anne Brasher found that macrofauna populations in Waikolu were not as dense, due to lower streamflows than are found in Pelekunu (National Park Service, Cooperative National Park Resources Studies Unit, June 1997).

Description of MIS Water Collection System  (See labeled diagram of the study area, Exhibit __)

Base flow and freshet flows during rainfall events are captured by the infrastructure of the Moloka’i Irrigation System, consisting of two dams on the main channel (“Upper”, #1 and “Lower”, #4) and two on tributary streams entering from the East (Dams #2 & #3; see Exhibits 1 & 2). Stream flows collected by the upper three dams enter the transmission tunnel by gravity; sump pumps empty a chamber in the Lower Dam (#4). Depending on the volume of rainfall, stream flows continue over the Lower Dam to the undiverted Section I to the ocean. During low flows, all but a trickle in uppermost stream Section 5 above the Upper Dam (#1) is collected by the MIS, and virtually all the flow at the lower three dams is collected.

Gravity flow moves water from the three upper dams through a 5.1-mile tunnel from elevation 990 feet (East Portal) to the West Portal above Kaunakakai at an elevation of 970 feet, into a 48-inch pipe leading to a rectangular concrete culvert about 54” x 40” and thence to another 48” pipeline, which then is connected to a 30” pipeline. The capacity allows a maximum combined gravity-flow of about 19.8 mgd, realized only rarely during storm events. The tunnel also collects about 1 mgd additional ground-water seepage to bring the total capacity to about 21 mgd. When the tunnel exit flows measure less than 13 mgd, the electrical monitoring and control (SCADA) system brings additional sources (wells) on-line to augment stream diversions.

The augmentation system includes two wells/pumps at the upper end of the study area, and two at the lower end. In addition, there is a well in the tunnel transmitting diverted flows from Waikolu Valley to the West Portal above Kaunakakai. An observation well (“Well #4”) lies between “Well #23” and “Well #5”. The report does not identify whether any or all of the wells are in different ground-water compartments, although the map shows five dikes crossing the stream: one at the Lower Dam (#4), one between Wells #5 & #6, and three in Section II, above “Well #24” and “Dam #2”. Pump testing was done to determine impacts on stream flow. The observation well was used to try to correlate ground water levels with stream flows. However, it is not apparent from the report whether the observation well reflects water levels in any other particular well compartment. Because water levels are not read in any other wells, it is not known whether they interact.

Waikolu Hydrology

With rainfall in the upper valley, the streamflows move through the study area and into Section I below it,
little over 3.0 mgd. Total existing diversion capacity for the system (both ground-water and surface water) equals about 21 mgd, harvested during peak rainfall events.

- Native macrofauna ‘o’opu, hihiwai, and ‘opae appear to be good indicators of instream flow values because they require relatively undisturbed substrata, natural flows, and high water quality, for subsistence and to support various stages of their life cycles, which include periodic, naturally-triggered migration both downstream and upstream to recognized favored habitats. If stream alteration or introduced flora and fauna have adverse impacts to other aspects of the ecosystem and thus to instream values, they have not yet been identified.

- Other candidates for indicators of instream values have not been identified. Candidates may include medicinal or other culturally significant flora or fauna, and spiritual or other cultural values.

- While some data are believed to have been collected earlier by DAR, the earliest known habitat study for Waikolu appears to be by Anne Brasher on native macrofauna ‘o’opu, hihiwai, and ‘opae, published in 1995. These have the benefit of earlier studies identifying the relationships between habitat features and the requirements of these macrofauna.

- Dewatering this section has led to depopulation of the native species in this reach, a clear negative impact. However, the same species appear to remain as viable populations in the other sections, and when adequate flows return, migrations resume normally. This has not been studied over a very long period, and long-term results of prolonged dewatering have not been noted.

- A hydrological and biological study of Waikolu Stream was conducted from June 1995 through September 1998, with results published in November 1999, as a requirement by the Water Commission in its consideration of the DoA/MIS application. This study established the relationship between pumpage and dewatering Section III, and provided information about the native macrofaunal species in Waikolu.

- The new interim streamflow standards for Wai’ahole streams rested primarily on facts unique to that case, specifically the evidence that increased flows were beneficial to native macrofaunal populations and the partial record of pre-diversion flows. They did not establish particular relationships between population vitality and streamflow quantities, nor identify stream measures that could be used elsewhere.

- The Division of Aquatic Resources has contracted Jim Parham of LSU to develop a GIS framework for streamflow and habitat characteristics (“Spatial Model for Conserving Native Stream Fish”). We are nearing the next phase of reporting for that effort, and anticipate reviewing the model’s conclusions. Next, we need to determine what other questions we have concerning instream values that are not answered by Parham’s model.
Waikolu Chronology

June 8, 1993
Water Use Permit Application for 3.36 mgd accepted as complete.

September 15, 1993
Commission deferred action to pursue a public hearing due to objections from the Division of Aquatic Resources (DAR) and the National Park Service (NPS).

November 17, 1993
Public hearing conducted on Moloka'i. Testimony focused on the impact of ground water withdrawal upon stream flows.

January 12, 1994
Commission approved interim Water Use Permit No. 220 for 744,000 gpd (12-MAV as of the interim instream flow standard adoption, October 8, 1988) from Wells 22-24, deferred approval of the 0.109 mgd between the 0.744 mgd and the January 1994 12-MAV of 0.853 mgd, and denied without prejudice the use of amounts over 0.853 mgd.

A special condition of the permit for 0.744 mgd was a minimum 2-year biological and hydrological study to 1) document the existing system operating procedures; 2) evaluate the effects of pumping alternatives on stream flows, including the pumping of new Wells 5 & 6 for testing and monitoring only with all flow returned back to the stream; and 3) evaluate the effectiveness of weir modifications ("fish ladder") in allowing passage of native macrofauna into the stream reach above uppermost Dam #1. The Moloka'i Water Working Group was to be reconvened to review the results of the study.

Deferred amounts were pending submittal of a petition to amend the instream flow standard.

October 10, 1994
The Commission received a letter dated October 7 outlining a scope of study underway for the Biological and Hydrological Monitoring Study.

October 14, 1994
A petition to amend the instream flow standard was submitted in accordance with the Commission's January 12, 1994 decision. With the petition were documents from DLNR's Division of Water and Land Development (DoWaLD) and the Maui Planning Department opining that the fish ladder came under the existing Special Management Area (SMA) permit, and verifying both that 1) the Office of Environmental Quality Control (OEQC) found that an additional Environmental Assessment (EA) would not be required; and 2) that the DLNR's Office of Conservation and Environmental Affairs (OCEA) did not require a Conservation District Use Permit (CDUP)

December 28, 1994
The Commission acknowledged receipt of applications for installation of permanent pumps in Wells 5 & 6. The applications were returned because the Commission had denied use of water from those wells, approving use only for testing and monitoring; temporary pumps were satisfactory for this purpose and could be replaced as necessary without application. The applications were returned with the recommendation to resubmit following completion of the biological and hydrological study.

March 14, 1995
Commission modified the water use permit approved January 12 to allow the additional ground water pumpage of 0.109 mgd to equal the January 1994 12-MAV, and to take three actions necessary to install the fish ladder: a diversion works amendment, a stream channel alteration permit, and an interim instream flow amendment.

September 27, 1995
DoA requested emergency water use up to 4.0 mgd due to drought. Staff did not approve but but stated that enforcement would be stayed, given the circumstances of drought, ability to pump 4.0 mgd, and the ongoing Bio-Hydro Study.

October 10, 1995
Commission received the proposal for the biological-hydrological study of Waikolu, and subsequently approved it, in consultation with the Division of Aquatic Resources.

October 11, 1995
A letter from Chairperson Mike Wilson to DoA Chair James Nakatani clarified that CWRM cannot issue emergency permits, clarified the meaning
of a 12-MAV in the context of overpumping up to 4 mgd from Wells 22 – 24, and stated that if the drought continued and it were necessary to exceed the allocation of 0.853 mgd, Wilson would recommend that CWRM stay enforcement of the water use permit.

December 1, 1999
Commission received a copy of the Waikolu Stream Biological and Hydrological Monitoring Study (Bio-Hydro Study) ordered January 12, 1994.

December 22, 1999
Commission received a renewed (identical) application for 3.36 mgd for Wells #22-24 and Wells 5 & 6 of the Waikolu Battery (Well Nos.0855-01 to 05). It was not officially accepted, pending complete review of the Bio-Hydro Study.

March 15, 2000
Six available copies of the Bio-Hydro Study were sent to reviewers on Moloka'i Water Working Group (MWWG) and the Moloka'i Public Library, and excerpts were sent to additional members of the MWWG (see Exhibit 5).

August 22, 2000
The Hawaii Supreme Court issued its decision in the appeal from the Commission's decision on the Wai'ahole Ditch Combined Contested Case Hearing, opining in part that the Commission was obligated to apply the best available information in determining instream flow requirements before determining reasonable-beneficial offstream uses.

September 25, 2000
The Department of Agriculture (DOA) and consultants presented the results of the Bio-Hydro Study to a special meeting of the MWWG for discussion.

August 20, 2001
DAR responded to the Commission with final written comments on the Bio-Hydro Study results (Exhibit 6).

October 17, 2001
The Commission amended Water Use Permit No. 220 to allow Well 22 to pump at its installed capacity up to the allocation of 0.853 mgd (12-MAV) water, pending further review of water levels and streamflow requirements. Any further action on DoA's application for 3.36 mgd was deferred until a new instream flow standard is set, with staff required to report its progress within six months.
FIGURE 1. LOCATION OF MONITOR AND CONTROL SITES WITHIN THE HOLOKAI IRRIGATION SYSTEM
Does survey branch have input? By rights, they should be generating these requests. Good!
December 23, 2002

Acting Manager
Moloka'i Irrigation System
Department of Agriculture
P.O. Box 205
Ho'olehua, HI 96729-355

Dear Madam or Sir:

Reporting Water Use
Moloka'i Irrigation System

Thank you for all your cooperation in the past. We appreciate the effort to comply with Water Code requirements for water use reporting.

We have typically received monthly reports of pumpage from three wells in Waikolu, but not of stream diversions, which are also required. We are aware, however, that while you do not meter the diversions at Waikolu Stream Dams #1 through #4, you do meter water exiting the West Portal of the Moloka'i Tunnel. If you were report this figure, we could subtract the well pumpage to derive streamflow diversions, in addition to the approximately 1 mgd produced within the tunnel itself.

Because the Commission is now in the process of establishing a streamflow standard for Waikolu, it is essential that we have the best information, as required under the Code. Please submit records of West Portal flows for the period of record.

In the interest of enforcing water use permits, we also have need of regular reporting of Kaluakoi’s withdrawal of irrigation water at Mahana, to compare with their pumpage reporting from “Well 17” (Well No. 0901-01). We are aware that it may be tabulated by week rather than by month, and if this is easier to forward, that is satisfactory; only monthly reporting is required.

The Commission’s enforcement policy to protect resources will eventually shift to reporting requirements. While the policy for failure to report has not been established, potential fines for violations of the Water Code are up to $1000 per day.

If you have any questions, please call Charley Ice of the Commission staff at 587-0251 or toll-free at 1-800-468-4644, extension 70251.

Aloha,

[Signature]
GILBERT S. COLOMA-AGARAN
Chairperson
There was a suggestion (Sarah Sykes & Makenaani Davis) to send a story about the Waikoloa meeting to both Moloka'i papers. Charley sent drafts to Sarah & Makena - their comments were incorporated. OK to send to papers? As far as we know - no change.
The Water Commission staff met with Moloka'i residents last Monday evening of June 17 to talk about Waikolu Valley water, its past and present uses, and possible future demand. Participants shared information, and made suggestions about getting more information from other people.

This was the first meeting in the process to formally set an instream flow standard for Waikolu. The process has two phases: 1) information-gathering about instream uses and values; and 2) discussion of withdrawals for the Moloka'i Irrigation System.

At Monday's meeting, community members and agency representatives noted Kalaupapa's past and possible future use of Waikolu water, possible restoration of kalo lo'i, instream and nearshore subsistence uses, and healthy habitat needs. The Commission on Water Resource Management needs to hear from all who have information about Waikolu. They hope to contact and learn from the descendants of the families displaced when Kalawao became a Hansen's disease settlement. Information from those who gather and fish in the area is also needed.

In Phase 2 of the process, an expanded and renewed Water Working Group will examine the needs of the Moloka'i Irrigation System and other potential offstream uses, suggest scenarios for sharing instream and offstream uses, and discuss draft recommendations by staff before they are finalized for the Commission.

If you have information about Waikolu, you are encouraged to contact Charley Ice of the Commission staff in Honolulu, 587-0251 (toll-free 1-800-468-4644 extension 70251), or charley.ice@exec.state.hi.us, or at P.O. Box 621, Honolulu 96809.
Waikolu Meeting Information

The Commission on Water Resource Management (Commission) staff met with Moloka'i residents on Monday, June 17 to talk about Waikolu Valley water, its past and present uses, and possible future demand. Participants shared information and made suggestions about getting more information from other people.

This was the first meeting in the process to formally set an interim instream flow standard for Waikolu. The process has two phases: 1) information-gathering about instream uses and values; and 2) discussion of withdrawals for the Moloka'i Irrigation System.

At the meeting, community members and agency representatives noted Kalaupapa's past and possible future use of Waikolu water, possible restoration of kalo lo'i, instream and nearshore subsistence uses, and healthy habitat needs. The Commission needs to hear from all who have information about Waikolu. They hope to contact and learn from the descendants of the families displaced when Kalawao became a Hansen's disease settlement. Information from those who gather and fish in the area is also needed.

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PART II
FINALS REPORT
INTERIM DRINKING WATER STUDY
PRIVATE WATER SYSTEMS
STATE OF HAWAII

GEORGE A. L. YUEN
DIRECTOR OF HEALTH

GEORGE R. ARIYOSHI
GOVERNOR

DEPARTMENT OF HEALTH
STATE OF HAWAII

Prepared by:
S6S ENGINEERS, INC.
1350 Kukila Street
Honolulu, Hawaii

April, 1978
KALAUPAPA WATER SYSTEM
STATE DEPARTMENT OF HEALTH
KALAUPAPA SETTLEMENT, MOLOKAI
FIGURE 3-12
KALAUPAPA WATER SYSTEM - STATE DEPARTMENT OF HEALTH - KALAUPAPA SETTLEMENT, MOLOKAI

The Kalaupapa Water System serves the State Department of Health's Kalaupapa Settlement and a United States Coast Guard lighthouse station in the Kalawao District of Molokai. The service areas range in elevation from 10 to 50 feet. The 200 persons that are provided water from this isolated community water system consume an average of 160,000 gallons per day with a maximum daily consumption of 300,000 gallons.

Water Works Facilities

Sources: The primary source for this system is Notley Springs located on the east wall of Waikolu Valley at an elevation of 584 feet. These springs provide water of low turbidity.

A standby source is the Waikolu Stream which has an average flow of seven million gallons per day. The intake is located in Waikolu Valley at an elevation of 527 feet. During periods of high flow, this source supplies excessively turbid water and has not been used since 1974.

Storage Facilities: One-hundred-fifty-thousand gallon covered redwood tank, elevation 289 feet. This 10 year old tank located about 1-1/2 miles above the settlement.
has an effective capacity of 148,000 gallons due to the elevation of the overflow line and to leaks.

One-hundred-fifty-thousand gallon buried concrete tank, elevation 285 feet. This storage facility is 70 years old and is located about 1-1/2 miles above the settlement. The effective capacity is 141,000 gallons due to the elevation of the overflow line.

Fifty-thousand gallon buried concrete tank, elevation 285 feet. This 70 year old tank located about 1-1/2 miles above the settlement has an effective capacity of 49,000 gallons due to the elevation of the overflow line.

Disinfection: Disinfection is provided by a hypochlorinator located below the storage facilities at an elevation of 200 feet. It has a capacity of 24 gallons per minute and provides a dosage of about two parts per million. This hypochlorinator requires continuous maintenance.

Distribution Lines: Eight-inch diameter, cast iron, 14,100 feet length. This line runs from the sources to the proximity of Kalawao Park where it connects to two other lines. It is 80 years old and in poor condition. A 2000 foot exposed section that runs along the shoreline below the high cliffs is in particularly bad shape.
Six-inch diameter, cast iron, 8000 feet length.
Four-inch diameter, galvanized iron, 8000 feet length.
These two lines run parallel to each other from the connection with the 8-inch line to a point approximately 700 feet beyond the storage facilities. They are 80 years old and in satisfactory condition.

Six-inch diameter, cast iron, 8700 feet length.
This line is connected to the 4- and 6-inch lines and transports water to Kalaupapa Settlement. It is 80 years old and in satisfactory condition.

Two-inch diameter, galvanized iron, approximately 9000 feet length. This line runs from the Kalaupapa Settlement to the Coast Guard Station. Its condition is not known.

Plumbing consists of galvanized iron pipe.

Water System Operation

The water supply flows by gravity from Notley Springs, elevation 584 feet, to the storage facilities at an elevation of 285 feet through the 8-inch cast iron pipe and the 4- and 6-inch lines. The Waikolu Stream source, elevation 527 feet, is used only for emergency conditions. After leaving the storage tanks, the water supply is disinfected and distributed to the Kalaupapa Settlement and Coast Guard Station by gravity.
Planned improvements include the replacement of the exposed pipeline along the beach with ductile iron pipe. This new line will be moved closer to the cliffs and protected from falling rocks by burying beneath beach boulders where feasible or covered with prestressed concrete. Also planned are the replacement of several valves on the transmission line, the repair of Notley Catchment Dam, and the construction of additional storage facilities.
MEETING NOTICE AND AGENDA
MOLOKAI IRRIGATION SYSTEM WATER USERS ADVISORY BOARD

DATE: Thursday, June 13, 2002
TIME: 8:30 A.M.
PLACE: Molokai Irrigation System Conference Room
Puupeelua Avenue
Hoolehua, Molokai, Hawaii

I. Call to Order

II. Approval of Agenda

III. Approval of Minutes as Circulated (if any)

IV. Old Business
   A. Update on irrigation system, including levels and system integrity - Randolph Teruya
   B. Update on new water sources - Brian Kau
   C. Update on Drought Action Plan - Brian Kau

V. New Business
   A. 2002 legislative appropriations for repair - Brian Kau
   B. Filling of Irrigation District Manager position due to retirement of Thomas Matayoshi - Brian Kau
   C. Contract with Molokai Ranch for system use of Well 17 - Brian Kau

VI. Set Next Meeting Date

VII. Announcements

VIII. Adjournment
Waikolu Streamflow Problem Statement

- In June 1993, the Department of Agriculture/Moloka'i Irrigation System applied for a water use permit for 3.36 mgd of ground water from the dike compartments in Waikolu Valley, for use at Ho'olehua. Public testimony noted the occasional dewatering of part of the stream, and a decision was postponed until a 2-year study could shed light on this issue.

- Dewatering a segment of Waikolu Stream, now referred to as Section III, was first noticed in 1984, occurring for 1-2 months during drought periods. In 1996, a combination of prolonged subnormal rainfall and renewed drought, plus continuing pumpage from the wells, caused the pools in Section III -- some up to 40 feet deep -- to completely dry up for the first time.

- It is now clear that the only segment that gets dewatered is where the invert crosses the dike compartment with two pumping wells. There is a clear 1:1 (one-to-one) relationship between ground water and surface water, in this case meaning that pumpage from the wells lowers the water level below the stream invert (drains the stream), and conversely, resumed flows into the dewatered segment also raise water levels in the wells.

- In the State Supreme Court's decision at Wai'ahole (August 2000), the court clarified that prior to making allocations from streamflow in situations involving substantial conflict between instream and offstream interests, CWRM must determine appropriate instream flows to protect beneficial instream uses. No one is certain how to define "appropriate instream flow". What is the measure of instream flow, what are the beneficial uses, and how much flow adequately protects those uses? The Court presumes that the facts in the case -- as well as we may know them -- will yield the answers -- as well as we can formulate them now.

- Action on DoA/MIS' application is once again a current issue, now that the "2-year study" has been completed and the results, along with Moloka'i Water Working Group comments from a September 2000 consultant presentation, reported to the Commission in October 2001. Testimony favored approving as much of the requested 3.36 mgd as possible, as soon as possible, as the prolonged drought was underway. Staff indicated that the sense of urgency was appreciated and that action was a high priority but that the required establishment of streamflow standards had nowhere yet been done (new interim standards have since been completed for streams in the Wai'ahole case). The Commission asked for a progress report in 6 months (for its April meeting).

- The existing system of diversions and wells, tunnel, pipeline, and reservoir, was constructed in the late 1950s and completed in 1962, prior to adoption of the Water Code, and registered as existing use in 1989, after the Water Commission was created. The only data gathered prior to construction were flow data to determine development feasibility.

- Under the Interim Streamflow Standard adopted in March 1988, the Commission permitted the then-current 12-month moving average ground-water withdrawal (0.744 mgd). In addition to ground-water use, surface water diversions average a
little over 3.0 mgd. Total existing diversion capacity for the system (both ground water and surface water) equals about 21 mgd, harvested during peak rainfall events.

- Native macrofauna ‘o’opu, hiihiwai, and ‘opae appear to be good indicators of instream flow values because they require relatively undisturbed substrata, natural flows, and high water quality, for subsistence and to support various stages of their life cycles, which include periodic, naturally-triggered migration both downstream and upstream to recognized favored habitats. If stream alteration or introduced flora and fauna have adverse impacts to other aspects of the ecosystem and thus to instream values, they have not yet been identified.

- Other candidates for indicators of instream values have not been identified. Candidates may include medicinal or other culturally significant flora or fauna, and spiritual or other cultural values.

- While some data are believed to have been collected earlier by DAR, the earliest known habitat study for Waikolu appears to be by Anne Brasher on native macrofauna ‘o’opu, hiihiwai, and ‘opae, published in 1995. These have the benefit of earlier studies identifying the relationships between habitat features and the requirements of these macrofauna.

- Dewatering this section has led to depopulation of the native species in this reach, a clear negative impact. However, the same species appear to remain as viable populations in the other sections, and when adequate flows return, migrations resume normally. This has not been studied over a very long period, and long-term results of prolonged dewatering have not been noted.

- A hydrological and biological study of Waikolu Stream was conducted from June 1995 through September 1998, with results published in November 1999, as a requirement by the Water Commission in its consideration of the DoAmIS application. This study established the relationship between pumpage and dewatering Section III, and provided information about the native macrofaunal species in Waikolu.

- The new interim streamflow standards for Wai’ahole streams rested primarily on facts unique to that case, specifically the evidence that increased flows were beneficial to native macrofaunal populations and the partial record of pre-diversion flows. They did not establish particular relationships between population vitality and streamflow quantities, nor identify stream measures that could be used elsewhere.

- The Division of Aquatic Resources has contracted Jim Parham of LSU to develop a GIS framework for streamflow and habitat characteristics (“Spatial Model for Conserving Native Stream Fish”). We are nearing the next phase of reporting for that effort, and anticipate reviewing the model’s conclusions. Next, we need to determine what other questions we have concerning instream values that are not answered by Parham’s model.
Our effort to develop an instream flow standard for Waikolu does not have to be a one-time project, solving all conceivable problems. It should, at minimum, account for the best information and understanding we have now. I propose a two-part approach, in which 1) we take what is now known and do our best to assess the instream flows required to protect the values we know, by April; and 2) we ask the right questions and prepare a path for a more comprehensive, complete, or satisfactory instream flow standard based on some other definition of the values to be protected.

Who else should be involved in this effort, and at what stage? Presumably, others with an interest are the National Park Service (NPS), USGS, Natural Resource Conservation Service (NRCS); Department of Hawaiian Home Lands (DHHL), DoA/MIS, the Moloka'i Water Working Group (MWWG).
General Description
Waikolu Stream is a “gaining” stream, meaning that it receives base flows from ground-water storage all along its length, and under natural conditions, it is perennial throughout its length. In the upper sections studied for this report, the valley is crossed by dikes, separating the underlying rock into ground-water compartments which overflow or well up into the streambed (“stream invert”). The study area provides the full habitat range of plunge pool (up to 40 feet deep), riffle, and run.

In past years, there was flow along the entire study length except during the summer dry period. Since the 1980s the weather has increasingly provided below-normal rainfall, and not until 1996 were there no pools in Section IV at all. The study period provided a wide range of conditions, from freshets providing continuous streamflow throughout the study area to one of the worst drought periods on record.

Unfortunately, there are no long-term data for the study area from an undisturbed period to use as a baseline, either for the stream characteristics or for the species populations in question. Flow estimates were prepared from a limited period of record in support of a water development project. Therefore we do not know what the original or “normal” distribution of macrofauna would be in Waikolu Stream, nor how nearly fifty years of altered flow have shaped what we now see. We also cannot say with certainty how protracted or repeated drought characteristics of recent years may have shaped the baseline evidence gathered in 1994-95. What we now know is how the habitats and macrofauna distribution in a stream that has been modified since the 1950s are changed by ground water pumppage during low stream flows. Waikolu Stream is now considered an important stream from the standpoint of native species, as it has intact populations and complete life cycles of representative species. Comparing Waikolu with Pelelrunu in her 1997 “Habitat Use...in Two Streams on Moloka’i”, Anne Brasher found that macrofauna populations in Waikolu were not as dense, due to lower streamflows than are found in Pelelrunu (National Park Service, Cooperative National Park Resources Studies Unit, June 1997).

Description of MIS Water Collection System (See labeled diagram of the study area, Exhibit 26)
Base flow and freshet flows during rainfall events are captured by the infrastructure of the Moloka’i Irrigation System, consisting of two dams on the main channel (“Upper”, #1 and “Lower”, #4) and two on tributary streams entering from the East (Dams #2 & #3; see Exhibits 1 & 2). Stream flows collected by the upper three dams enter the transmission tunnel by gravity; sump pumps empty a chamber in the Lower Dam (#4). Depending on the volume of rainfall, stream flows continue over the Lower Dam to the undiverted Section I to the ocean. During low flows, all but a trickle in uppermost stream Section 5 above the Upper Dam (#1) is collected by the MIS, and virtually all the flow at the lower three dams is collected.

Gravity flow moves water from the three upper dams through a 5.1-mile tunnel from elevation 990 feet (East Portal) to the West Portal above Kaunakakai at an elevation of 970 feet, into a 48-inch pipe leading to a rectangular concrete culvert about 54” x 40” and thence to another 48” pipeline, which then is connected to a 30” pipe. The capacity allows a maximum combined gravity-flow of about 19.8 mgd, realized only rarely during storm events. The tunnel also collects about 1 mgd additional ground-water seepage to bring the total capacity to about 21 mgd. When the tunnel exit flows measure less than 13 mgd, the electrical monitoring and control (SCADA) system brings additional sources (wells) on-line to augment stream diversions.

The augmentation system includes two wells/pumps at the upper end of the study area, and two at the lower end. In addition, there is a well in the tunnel transmitting diverted flows from Waikolu Valley to the West Portal above Kaunakakai. An observation well (“Well #4”) lies between “Well #23” and “Well #5”. The report does not identify whether any or all of the wells are in different ground-water compartments, although the map shows five dikes crossing the stream: one at the Lower Dam (#4), one between Wells #5 & #6, and three in Section II, above “Well #24” and “Dam #2”. Pump testing was done to determine impacts on stream flow. The observation well was used to try to correlate ground water levels with stream flows. However, it is not apparent from the report whether the observation well reflects water levels in any other particular well compartment. Because water levels are not read in any other wells, it is not known whether they interact.

Waikolu Hydrology
With rainfall in the upper valley, the streamflows move through the study area and into Section I below it,
even with pumps running (see Figure 5 in Report, Exhibit 4). Without rainfall augmentation, the base flow from ground storage is subject to reduction from pumpage, as indicated below.

The report seems to indicate that Well #24 affects only Section IV, and that it takes 45-60 days of pumping to eliminate the low flows from Section IV without rainfall augmentation. By contrast, Well #22 apparently only affects Section III, eliminating low flows after only 25-30 days of pumpage without rainfall augmentation.

Section II, below the dry Section III, is continually fed by flows from Napuleloa Spring entering the main Waikolu channel, and therefore flows perennially even when upper sections are dewatered. However, Section II flow levels are reduced by the pumping of new Wells #5 & #6, preventing flows from Napuleloa Spring from reaching Dam #4. Section II ends at the Lower Dam (#4), located at a dike, which collects streamflow in a chamber emptied by sump pumps. Use of the sump pumps, even without using Wells #5 & #6, eliminates normal flow from Napuleloa Spring from crossing Dam #4 and continuing to the coast. The dike naturally impedes ground water from Section II from reaching Section I below the dike, Section I receives ground water overflowing from dike compartments, typical of the entire length of Waikolu, and regardless of rainfall and pumping conditions, the stream has perennial flow all the way to its outlet at the coast. Section V, above Dam #1, similarly has perennial flow.

Conversely, after a period of dry weather and the dewatering of Sections III & IV by pumping Wells #23 & #24, rainfall freshets rapidly restore the ground-water compartments beneath the stream invert, underscoring the direct connection between streamflow and ground-water storage. While the replenishment rate obviously depends on the steadiness and volume of the rainfall, a wet period of a few days may be all that is required. Low flows from transitory rainfall readily percolate down to replenish the dike compartments rather than flowing on down to Section II.

Unique Endemic Fauna

Native macrofauna are found in representative proportions throughout the length of Waikolu Stream, except in Sections III & IV during dry periods. When rainfall augments flows, the macrofauna move upstream normally, excepting species which are unable to climb the upper dam. When low flows are continuous through Sections III & IV, species capable of climbing the dam do so, due to a modification of the weir to permit the lowest flow to cross the dam. Prior to modifications, no water crossed the dam during low flows. Different species arrange themselves along the stream according to their habitat and physiology requirements. We do not know how "normal" this arrangement is, as this study area has been diverted for many years, and because repeated drought conditions may have altered the recovery expectations of these populations. We do know that Waikolu now has lower flows than Pelekunu and lower densities of observed species than Pelekunu, and that species densities vary directly with volumes of flow. We may assume therefore that undiverted flows in Waikolu would result in higher densities of native species. The report is not clear whether the encouraging response of the macrofauna moving up the stream when flows are restored after drought represents a "vigorous" or adequate response, or whether this response is within the parameters of a "normal" stream situation.

The study identified several species of native macrofauna -- three species of 'o'opu, one arthropod ('opae), and one univalve (hihiwai) -- as indicator species for measuring habitat health. No other floral or faunal species were studied, although a full ecological understanding would include other species as well. Exotic flora are obvious and common in the study area, while exotic fauna were not identified. In other locations in Hawai'i, aquatic scientists have identified subsurface habitats with unique native species, but the presence of such habitat in Waikolu is unexplored. In recent years, new interest has been expressed in other potential indicator species, such as insects and algae, to show high habitat value.

Management Perspectives

Biological consultants on this study opine that while freshet flows (episodic storm flows that scour the stream bed) are key features of the Hawai'i stream ecology to which native species are uniquely adapted, it is still true that minimum flows are essential to habitat health, and that generally speaking more flow is better. This study demonstrates that existing native populations respond quickly to opportune freshet flows, even following lengthy dry periods in certain sections of the stream. Nonetheless, the number of individuals of these species were fewer above Dam #4 than below. Waikolu is now considered to be of greater-than-average native biological importance, now that many other streams of the state are impacted by development.

The Commission staff approved the scope of work for the study as adequate under existing policies, but with gradual improvement of ecological knowledge and continuing new findings, and with directions from the Supreme Court in the Wai'ahole case, there now exist questions that were not intended to be answered by this study. We do not know how much "more" flow would be a significant
benefit threshold, or how much "less" might be a significant detriment. We do not know how long
the endangered species will remain viable during low flow periods, nor the effect of eliminating the
viable populations now surviving in Section II by pumpage from Wells #5 & #6 over an extended dry
period. We have not studied other species (flora or fauna) that may be significant to the studied
macrofauna – whether they face long-term risks from dewatering. We have no information on any
possible floral species that would be of concern, nor have we explored any other potential "stream
values" to be protected by instream flows.

The management plan is designed to minimize operating costs of electricity, as it is very
expensive on Moloka'i. The pumping schedule is therefore not geared specifically to hydrologic or
biological criteria. We had hoped to get an understanding of the effect of different pumping schedules,
but that has not been part of this effort. The pumps each only operate from 3 to 6 hours per day, in
sequence. Wells #5 & #6 were programmed to be the second-to-last pumps in the sequence to start,
followed by the sump pumps, and the sequence is reversed to take the pumps off-line. When total
diverted stream flows reach a sufficiently low threshold, the sump pumps can run 24 hours per day.

Conclusions
The purpose of this study was to determine whether Wells #5 & 6 could be allocated new water use
permits in addition to those made for Wells #22, 23, and 24. We hoped to learn the impact of pumping
the various wells, singly and in combination, on stream flows and therefore on native macrofauna,
resulting in recommendations for a pumping schedule that would protect instream values and optimize
diversions for agricultural irrigation.

A secondary objective was to determine whether a low-flow weir at the Upper Dam (#1) would
significantly enable the passage of animals upstream. We learned that it does work when animals can
reach the base of the dam, but that issue is often moot because Sections II & IV are dewatered by
pumpage from Wells #23 & 24. The question has been raised whether its proper functioning is well-advised if the result is a greater number of larvae otherwise headed for the ocean being entrained into
the irrigation system. It is not known, at this point, how much of the larval return to the ocean occurs
during freshet flows that create continuous flows through Sections III & IV. This poses a question for
determining the appropriate instream flow standard for Waikolu.

Subsequent to the study objectives, the Supreme Court has opined that the Commission's
responsibility for stream protection goes beyond merely balancing instream and offstream uses. Rather,
the responsibility is to determine instream values to be protected prior to any consideration of offstream
uses. We are thus in the position to begin asking what permanent instream flow standards are
appropriate to Waikolu.

We are encouraged to learn that the drought periods we have faced, and the ongoing diversions
from Waikolu, have not eliminated native macrofauna from the stream throughout the study area,
although clearly there are periods when they cannot survive in certain sections of the study area. We
know that the populations respond normally when freshets return, and that in this sense the populations
are "healthy".

We do not know whether further diversions will maintain this set of circumstances, and we
believe that "more" water left in the stream would have a positive effect on those populations. We
know that allocations for Wells #5 & 6 could result in dewatering Section II of the study area except in
times of freshet flows, although the contributions of Napuleloa Spring help to maintain flows in Section
II when Wells #5 & 6 are in use. The critical threshold for this maintenance, from the macrofaunal
point-of-view, is unknown.

The conclusion for the time being is that the current pumping regime has some adverse impacts
on stream values that are not irreversible – that resilience of instream species supports recovery as
rainfall returns. The correlations from this study do not inform us about "permanent" standards, and in
fact, suggest that "permanent" refers not to a static gallonage or "minimum stream flow" but to
ecological thresholds that are not understood, that may be preserved by assuring that pumping
parameters are not exceeded. Perhaps a "permanent" standard would be expressed as a proportion of
flow, or a proportion of time diverted, regardless of season or relation to long-term norm.
Waikolu Chronology

June 8, 1993
Water Use Permit Application for 3.36 mgd accepted as complete.

September 15, 1993
Commission deferred action to pursue a public hearing due to objections from the Division of Aquatic Resources (DAR) and the National Park Service (NPS).

November 17, 1993
Public hearing conducted on Moloka'i. Testimony focused on the impact of ground water withdrawal upon stream flows.

January 12, 1994
Commission approved interim Water Use Permit No. 220 for 744,000 gpd (12-MAV as of the interim instream flow standard adoption, October 8, 1988) from Wells 22-24, deferred approval of the 0.109 mgd between the 0.744 mgd and the January 1994 12-MAV of 0.853 mgd, and denied without prejudice the use of amounts over 0.853 mgd.

A special condition of the permit for 0.744 mgd was a minimum 2-year biological and hydrological study to 1) document the existing system operating procedures; 2) evaluate the effects of pumping alternatives on stream flows, including the pumpage of new Wells 5 & 6 for testing and monitoring only with all flow returned back to the stream; and 3) evaluate the effectiveness of weir modifications ("fish ladder") in allowing passage of native macrofauna into the stream reach above uppermost Dam #1. The Moloka'i Water Working Group was to be reconvened to review the results of the study.

Deferred amounts were pending submittal of a petition to amend the instream flow standard.

October 10, 1994
The Commission received a letter dated October 7 outlining a scope of study underway for the Biological and Hydrological Monitoring Study.

October 14, 1994
A petition to amend the instream flow standard was submitted in accordance with the Commission's January 12, 1994 decision. With the petition were documents from DLNR's Division of Water and Land Development (DoWaLD) and the Maui Planning Department opining that the fish ladder came under the existing Special Management Area (SMA) permit, and verifying both that 1) the Office of Environmental Quality Control (OEQC) found that an additional Environmental Assessment (EA) would not be required; and 2) that the DLNR's Office of Conservation and Environmental Affairs (OCEA) did not require a Conservation District Use Permit (CDUP).

December 28, 1994
The Commission acknowledged receipt of applications for installation of permanent pumps in Wells 5 & 6. The applications were returned because the Commission had denied use of water from those wells, approving use only for testing and monitoring; temporary pumps were satisfactory for this purpose and could be replaced as necessary without application. The applications were returned with the recommendation to resubmit following completion of the biological and hydrological study.

March 14, 1995
Commission modified the water use permit approved January 12 to allow the additional ground water pumpage of 0.109 mgd to equal the January 1994 12-MAV, and to take three actions necessary to install the fish ladder: a diversion works amendment, a stream channel alteration permit, and an interim instream flow amendment.

September 27, 1995
DoA requested emergency water use up to 4.0 mgd due to drought. Staff did not approve but did state that enforcement would be stayed, given the circumstances of drought, ability to pump 4.0 mgd, and the ongoing Bio-Hydro Study.

October 10, 1995
Commission received the proposal for the biological-hydrological study of Waikolu, and subsequently approved it, in consultation with the Division of Aquatic Resources.

October 11, 1995
A letter from Chairperson Mike Wilson to DoA Chair James Nakatani clarified that CWRM cannot issue emergency permits, clarified the meaning...
Overview of Trend Analysis

Figure 16

- Rainfall (-5 in.)
- Pumpage Well 23 & 24 (mgd)
- Stream Level at 1st Crossing (x1/15 ft)
- Groundwater Level Well 4 (ft)

900' El. (in)
Moloka‘i Water Working Group  
Department of Agriculture, Moloka‘i Irrigation System  
National Park Service, Kalaupapa National Historic Park  
Water Resource Associates  
DLNR, Division of Aquatic Resources

Dear Interested Party:

Waikolu Stream Interim Instream Flow Standard  
Information Gathering

The Commission on Water Resource Management (Commission) seeks community assistance in a process to gather information relevant to updating the interim instream flow standard for Waikolu Stream. We are convening a meeting Monday, June 17, 2002 at the DHHL Conference Room, Kulana 'Oiwi Complex in Kalamaula, at 6:00 p.m. If you know of people with information about present or past uses of Waikolu Stream, please invite them to attend. If you do not have information, you are welcome but not obligated to come.

Tentative Agenda for June 17, 2002:

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<tr>
<td>6:00</td>
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<td>Staff Overview</td>
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<td>Facilitation Agreements</td>
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<td>7:00</td>
<td>Discussion: Information on present and past instream uses in Waikolu Valley, resource people to follow up with, other sources of information</td>
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The issue that prompts this discussion is the application by the Department of Agriculture’s Moloka‘i Irrigation System (MIS) for water from Waikolu Stream. Because of the Supreme Court’s decision in the Wai‘ahole contested case hearing, the Commission directed staff to work toward setting an instream flow standard (IFS) prior to taking further action on the MIS application.

In order to do this, the Commission must document past and present uses, e.g. traditional and customary gathering rights, agriculture, kalo cultivation, recreation, urban/municipal uses. This is the process we’re asking you to help us with.

If you have any questions, please contact Charley Ice of the Water Commission staff at 587-0251 or toll-free at 1-800-468-4644, extension 70251.

Sincerely,

[Signature]

LINNEL T. NISHIOKA  
Deputy Director
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<th>FROM: LINNEL</th>
<th>DATE: MAY 28 2002</th>
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"A - they suppose to have a report monthly - right?"
TO: Linnel T. Nishioka  
Deputy Director  
Commission on Water Resource Management  

FROM: Brian Kau  
Agricultural Resource Management Division  

SUBJECT: Molokai Irrigation System Information  

May 23, 2002  

Thank you for allowing us the time to respond to your letter. I apologize for the length of time it has taken me to reply, however, our staffing situation has been non-optimal since the retirement of Mr. Matsuo. The following responses are per your letter dated March 4, 2002:  

1) Due to the Waikolu Stream’s hydrology, for all intents and purposes, the pumping average is the 12 month moving average as most of the time there is no flow in the stream at all. Our request is for groundwater withdrawal only; surface flows are not factored into the permit application.  

2) No, we do not have Q90 data.  

3) We have considered pumping during rainfall periods, however it is difficult to time these events. The climate in Waikolu Valley can be difficult to predict. Pumping during peak hours is very expensive (four to five times off-peak rate). We do not believe there is enough power to run all of the wells simultaneously.  

4) We have not estimated the cost of installing water level recorders in the wells. Currently, the only way to measure a drop in pool level would be manually via site visit.  

5) No, we have not considered means to prevent entrainment of native species into the diversion system. The layout and physical location of the diversions would make modifications very difficult and would involve altering the stream.
## Table I

**Summary Statistics of Stream Flow**

*(All Q in MGD)*

<table>
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<tr>
<th>USGS No.</th>
<th>Recorded</th>
<th>Elev.</th>
<th>Area Sq.Mi.</th>
<th>Min Q</th>
<th>Per Sq.Mi. Q90</th>
<th>Q50</th>
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**Note:**

All data for USGS gage stations taken or computed from Dowald publication R-27, except average flows which are from B-16.
STAFF SUBMITTAL

for the meeting of the
COMMISSION ON WATER RESOURCE MANAGEMENT

May 22, 2002
Honolulu, Oahu

Hawaii Department of Agriculture/ Moloka‘i Irrigation System

Information Only

INTERIM INSTREAM FLOW STANDARD
Waikolu Stream

APPLICATION FOR A WATER USE PERMIT
Waikolu Valley Battery (Well No. 0855-01 to -06), TMK 6-1-1
Existing and Existing and Future (Agricultural) Use for 3.36 mgd
Waikolu Ground Water Management Area, Moloka‘i

APPLICANT: Department of Agriculture/
Moloka‘i Irrigation System
P.O. Box 205
Ho‘olehua, HI 96829

LANDOWNER: State of Hawaii

LOCATION MAP: See Exhibit 1

BACKGROUND:

June 8, 1993 Water Use Permit Application (WUPA) for 3.36 mgd accepted as complete.

September 15, 1993 Commission deferred action to pursue a public hearing due to objections from the Division of Aquatic Resources (DAR) and the National Park Service (NPS).

November 17, 1993 Public hearing conducted on Moloka‘i. Testimony focused on the impact of ground water withdrawal upon stream flows.

January 12, 1994 Commission approved interim Water Use Permit No. 220 for 744,000 gpd (12-MAV), denying without prejudice the use of amounts over 0.853 mgd. It deferred approval of the use of amounts between 0.744 and the then-current 12-MAV of 0.853 mgd and deferred use of water from new Wells 5 & 6 pending the completion of a 2-year biological and hydrological study to 1) document the existing system operating procedures and evaluate the effects of pumping alternatives including use of new wells on stream flows, and 2) evaluate the effectiveness of weir modifications in allowing passage of native macrofauna into the stream reach above uppermost Dam #1.

October 14, 1994 A petition to amend the instream flow standard was submitted in accordance with the Commission’s January 12, 1994 decision.

March 14, 1995 Commission modified the interim water use permit approved January 12 to reflect use of new Wells 5 & 6 during the study period for testing purposes only.

September 27, 1995 DOA requested emergency water use up to 4.0 mgd due to drought. Staff did
October 10, 1995
Commission received the proposal for the biological-hydrological study of Waikolu, and subsequently approved it, in consultation with the Division of Aquatic Resources.

December 1, 1999
Commission received a copy of the Waikolu Stream Biological and Hydrological Monitoring Study (Bio-Hydro Study) ordered January 12, 1994.

December 22, 1999
Commission received a renewed (identical) application for 3.36 mgd for Wells #22-24 and Wells 5 & 6 of the Waikolu Battery (Well Nos. 0855-01 to 05). It has not been officially accepted, pending complete review of the Bio-Hydro Study.

March 15, 2000
Six available copies of the Bio-Hydro Study were sent to reviewers on Moloka'i Water Working Group (MWWG) and the Moloka'i Public Library, and excerpts were sent to additional members of the MWWG.

August 22, 2000
The Hawaii Supreme Court issued its decision in the appeal from the Commission's decision on the Waipio Ditch Combined Contested Case Hearing, opining in part that the Commission was obligated to apply the best available information in determining instream flow requirements before determining reasonable-beneficial offstream uses.

September 25, 2000
The Department of Agriculture (DOA) and consultants presented the results of the Bio-Hydro Study to a special meeting of the MWWG for discussion.

August 20, 2001
DAR responded to the Commission with final written comments on the Bio-Hydro Study results.

October 17, 2001
Commission approved an interim water use use permit for 0.853 mgd, subject to amounts above 0.744 coming only from Well 22 (Well No. 0855-01) and to further modification upon determination of an amended interim stream flow standard; deferred action on any new application until the interim instream flow is set; and requested an update in six months.

UPDATE
Staff has reviewed the Supreme Court's decision in the Wai'hole case, prepared a synopsis of the 2-year Biological and Hydrological Study completed for the Department of Agriculture/Moloka'i Irrigation System (MIS) in 1999, requested additional information from the MIS and reviewed Assessment and Improvement Recommendations for the Moloka'i Irrigation System (Hawai'i Agriculture Research Center, October 2001), prepared an internal problem statement relative to MIS' water use permit application, consulted with the Division of Aquatics, and outlined a scope and sequence of inquiry for setting the interim instream flow standard.

Staff will next engage the Moloka'i Water Working Group (MWWG) in a series of discussions. Staff anticipates both a short-term and long-term approach. The short term is to understand what recommendation can be based on currently available information. Longer term recommendations will result from new information still needed to inform our understanding of important values.

The first steps, in both cases, are to identify the instream flow values to be protected, how to measure these values, and to understand how these values relate to each other. The next steps are to
TO: Brian Kau, Acting Administrator  
Division of Agricultural Resource Management  
Department of Agriculture  

FROM: Linnel T. Nishioka, Deputy Director  
Commission on Water Resource Management  

SUBJECT: Information Request, Moloka‘i Irrigation System

In October 2001, the Commission deferred any future action on your water use permit application for 3.36 million gallons per day (mgd) from five well sources in Waikolu Valley, Moloka‘i, to serve the Moloka‘i Irrigation System, until an interim instream flow standard is set for Waikolu Stream. This action was a follow-up to previous action that denied without prejudice the same request until a 2-year hydrological and biological study could be completed. That study was completed and transmitted with a renewed water use permit application to the Commission in December 1999, which led to a review phase, including a presentation of the report by the consultants to the Moloka‘i Water Working Group, an advisory group selected by the Commission to assist on planning issues.

During this process, in August 2000, the Hawaii Supreme Court issued a decision on the appeal of the Wai‘ahole Contested Case Hearing, which resulted in the necessity of establishing an interim instream flow standard prior to making allocations of stream flow for off-stream uses.

We anticipate the standard-setting effort to unfold roughly as follows: following some preliminary staff discussions, we will be meeting with the Division of Aquatic Resources (DAR) to map out a process for establishing the interim instream flow standard. We believe our next step will be to convene the Moloka‘i Water Working Group for facilitated discussions of values and parameters to be considered.

The recommendation to the Commission ultimately lies with Commission staff, in consultation with DAR. Our position at present is to seek a short-term interim instream flow standard based on available information, while leaving the door open for further examination of issues to move closer to a more sensitive or sophisticated flow standard. The Commission has requested an update by its April 2002 meeting.
As we proceed with the process of defining an instream flow standard for Waikolu Stream, the source for the Moloka‘i Irrigation System, we find we have several questions you may be able to clarify. Your expeditious reply will be much appreciated. If some questions would take some time to answer, please let us know what sort of effort may be involved. (Attached is a submittal “Exhibit 2b” for visual orientation to the water collection system in Waikolu Valley, taken from the November 1999 Waikolu Stream Biological and Hydrological Study, completed by Water Resource Associates.)

1. Your application for a water use permit for the Waikolu battery of wells requests 3.36 mgd from this battery. We note that this is approximately equivalent to your stated combined total average collection from the Waikolu source, which includes stream flow diversions as well as pumped ground-water withdrawals. In testimony before the Commission in October 2001, several individuals expressed dismay that we were only considering the amount of 0.853 mgd, which is the 12-month moving daily average (12-MAV) ground-water withdrawals at the time of designating Moloka‘i a water management area, rather than the combined surface- and ground-water average. The notion that the 3.36 mgd request is for a combined surface- and ground-water withdrawal total rather than the ground-water component only is reinforced as we note that the collection system seems to be regulated so that the pumps come on only when stream flows are reduced below a certain point. We had not anticipated this interpretation, as our understanding of the Water Code is that surface water diversions existing prior to the adoption of the Code are to be recognized and continued if they are reasonable amounts and in the absence of a petition to change the diverted amount. Does the requested 3.36 mgd 12-month moving average refer to the total average collection, including surface-water diversions and ground-water withdrawals, or are you requesting only ground-water withdrawals? If the latter, is the correct amount really 3.36 mgd, or is it a compensatory amount to offset reduced streamflow diversions during periods of low flow, to assure that the total average collection, even in times of drought, is 3.36 mgd? If so, the offset amount to be achieved through ground-water pumpage would be something less than 3.36, as there is substantial surface water diversion during wet times of the year.

2. Do you have $Q_{90}$ data from your system records, or adequate records to construct a $Q_{90}$? If so, where were these measurements taken?

3. Have you investigated alternative pumping regimes, such as pumping during rainfall periods when the surface diversions do not fill the transmission system and could be augmented by well pumping without affecting streamflow? Could all wells be pumped simultaneously if the transmission system allowed?

4. Have you estimated the cost of installing water level recorders in pumping wells? Is there a means for measuring the habitat reduction (drop in pool level) in Section III during drought pumping conditions?
5. Have you considered means to prevent or remedy entrainment of native species into the diversion system (sloped intake screen, backwater pools along the pipeline where fish can stop over before returning upstream)? Do you have feasibility estimates for these?

6. The Bio-Hydro Report suggests that prolonged pumping of Wells 5 & 6 may also dewater Section II over a long enough period, although that did not occur during the test period. Do you concur with that view? Also it seems that pumping the sump pumps at the Lower Dam (#4) will prevent water from leaving Section II; what is the minimum flow that will allow water to continue downstream when the sump pumps are going?

If you have any questions, please contact Charley Ice of the Water Commission staff at 587-0251.

CI:ss
Enclosure
Moloka`i Irrigation System
Waikolu Wells (0855-01,02,03)

---

Wai`olu 12 MAV

(date latest data 9/01)
MEMO: Division of Aquatic Resources
FROM: Charley Ice, Commission on Water Resource Management

Invitation to Set Instream Flow Standard for Waikolu Stream, Moloka'i

I will be communicating with you in the days to come to set a meeting time and place to go over our need for and hopes for developing an instream flow standard for Waikolu Stream on Moloka'i. I have attached a “Problem Statement” to outline the context for this meeting.

From our office there will also be Dave Higa and Ed Sakoda, and we hope to include Bill Puleloa from your Moloka'i office, as well.

In a nutshell:

- The Commission is mandated to establish an instream flow program to protect, enhance, and reestablish where practicable, beneficial instream uses of water.
- The Hawaii Supreme Court clarified in its Wal'ahole decision that, prior to making allocations from stream flow, we must determine appropriate instream flows to protect beneficial instream uses.
- The Commission has an application for ground-water withdrawals that affect instream flows in Waikolu Valley. They have given us until April to report progress.
- A 2-year study on Waikolu biology and hydrology has been completed and the results reported to the Commission.

Goal: Develop a long-term policy on water use from Waikolu Valley.

Develop an interim instream flow standard.

Objective: Use the permanent instream flow standard setting process to achieve the interim and long-term goals.

Task 1: ??
Task 2: ??
Task 3: ??

etc.
Waikolu Streamflow Problem Statement

- In June 1993, the Department of Agriculture/Moloka'i Irrigation System applied for a water use permit for 3.36 mgd of groundwater from the dike compartments in Waikolu Valley, for use at Ho'olehua. Public testimony noted the occasional dewatering of part of the stream, and a decision was postponed until a 2-year study could shed light on this issue.

- Dewatering a segment of Waikolu Stream, now referred to as Section III, was first noticed in 1984, occurring for 1-2 months during drought periods. In 1996, a combination of prolonged subnormal rainfall and renewed drought, plus continuing pumpage from the wells, caused the pools in Section III -- some up to 40 feet deep -- to completely dry up for the first time.

- It is now clear that the only segment that gets dewatered is where the invert crosses the dike compartment with two pumping wells. There is a clear 1:1 relationship between groundwater and surface water, in this case meaning that pumpage from the wells lowers the water level below the stream invert (drains the stream), and conversely, resumed flows into the dewatered segment also raise water levels in the wells.

- In the State Supreme Court's decision at Wai'ahole (August 2000), the court clarified that prior to making allocations from streamflow, CWRM must determine appropriate instream flows to protect beneficial instream uses. No one is certain how to define that. What is the measure of instream flow, what are the beneficial uses, and how much flow adequately protects those uses? The Court presumes that the facts in the case -- as well as we may know them -- will yield the answers -- as well as we can formulate them now.

- Action on DoA/MIS' application is once again a current issue, now that the "2-year study" has been completed and the results, along with Moloka'i Water Working Group comments from a September 2000 consultant presentation, reported to the Commission in October 2001. Testimony favored approving as much of the requested 3.36 mgd as possible, as soon as possible, as the prolonged drought was underway. Staff indicated that the sense of urgency was appreciated and that action was a high priority but that the required establishment of streamflow standards had nowhere yet been done (new interim standards have since been completed for streams in the Wai'ahole case). The Commission asked for a progress report in 6 months (for its April meeting).

- The existing system of diversions and wells, tunnel, pipeline, and reservoir, was constructed in the late 1950s and completed in 1962, prior to adoption of the Water Code, and registered as existing use once the Water Commission was created in 1989. The only data gathered prior to construction were flow data to determine development feasibility.

- Under the Interim Streamflow Standard adopted in March 1988, the Commission permitted the then-current 12-month moving average ground-water withdrawal (0.744 mgd). In addition to ground-water use, surface water diversions average a
• Our effort to develop an instream flow standard for Waikolu does not have to be a one-time project, solving all conceivable problems. It should, at minimum, account for the best information and understanding we have now. I propose a two-part approach, in which 1) we take what is now known and do our best to assess the instream flows required to protect the values we know, by April; and 2) we ask the right questions and prepare a path for a more comprehensive, complete, or satisfactory instream flow standard based on some other definition of the values to be protected.

• Who else should be involved in this effort, and at what stage? Presumably, others with an interest are the National Park Service (NPS), USGS, Natural Resource Conservation Service (NRCS); Department of Hawaiian Home Lands (DHHL), DoA/MIS, the Moloka'i Water Working Group (MWWG).
STAFF RESUBMITTAL

for the meeting of the
COMMISSION ON WATER RESOURCE MANAGEMENT

October 17, 2001
Kalamaula, Molokai

State of Hawaii Department of Agriculture
Moloka'i Irrigation System
Waikolu Battery (Well No. 0855-01 to 06), TMK 6-1-1
Existing and Future (Agricultural) Use for 3.36 mgd mgd
Waikolu Ground Water Management Area, Moloka'i

APPLICANT:
Hawaii Department of Agriculture
Moloka'i Irrigation System
P.O.Box 205
Ho'olehua, HI 96829

LANDOWNER:
Same

LOCATION MAP: See Exhibit 1

BACKGROUND:

June 8, 1993 Water Use Permit Application (WUPA) for 3.36 mgd accepted as complete.

September 15, 1993 Commission deferred action to pursue a public hearing due to objections from the Division of Aquatic Resources (DAR) and the National Park Service (NPS)

November 17, 1993 Public hearing conducted on Moloka'i. Testimony focused on the impact of ground water withdrawal upon stream flows.

January 12, 1994 Commission approved interim Water Use Permit No. 220 for 744,000 gpd (12-MAV), denying without prejudice the use of amounts over 0.853 mgd. It deferred approval of the use of amounts between 0.744 and the then-current 12-MAV of 0.853 mgd and deferred use of water from new Wells 5 & 6 pending the completion of a 2-year biological and hydrological study to 1) document the existing system operating procedures and evaluate the effects of pumping alternatives including use of new wells on stream flows, and 2) evaluate the effectiveness of weir modifications in allowing passage of native macrofauna into the stream reach above uppermost Dam #1.

Item 5
Commission modified the interim water use permit approved January 12 to reflect use of new Wells 5 & 6 during the study period for testing purposes only.

DOA requested emergency water use up to 4.0 mgd due to drought. Staff did not approve but stated that enforcement would be stayed, given the circumstances of drought, ability to pump 4.0 mgd, and the ongoing Bio-Hydro Study.

Commission received the proposal for the biological-hydrological study of Waikolu, and subsequently approved it, in consultation with the Division of Aquatic Resources.

Commission received a copy of the Waikolu Stream Biological and Hydrological Monitoring Study (Bio-Hydro Study) ordered January 12, 1994.

Commission received a renewed (identical) application for 3.36 mgd for Wells #22-24 and Wells 5 & 6 of the Waikolu Battery (Well Nos. 0855-01 to 05). It has not been officially accepted, pending complete review of the Bio-Hydro Study.

Six available copies of the Bio-Hydro Study were sent to reviewers on Molokai Water Working Group (MWWG) and the Moloka'i Public Library, and excerpts were sent to additional members of the MWWG (see Exhibit 5).

The Hawaii Supreme Court issued its decision in the appeal from the Commission's decision on the Wai'ahole Ditch Combined Contested Case Hearing, opining in part that the Commission was obligated to apply the best available information in determining instream flow requirements before determining reasonable-beneficial offstream uses.

The Department of Agriculture (DOA) and consultants presented the results of the Bio-Hydro Study to a special meeting of the MWWG for discussion.

DAR responded to the Commission with final written comments on the Bio-Hydro Study results (Exhibit 6).

**ANALYSIS/ISSUES:**

Section 174C-49(a) of the State Water Code establishes seven (7) criteria that must be met to obtain a water use permit. An analysis of the proposed permit in relation to these criteria follows:

1. **Water availability**
   
   Through the Hawaii Water Plan, the Commission has adopted 5 mgd as the sustainable yield for the Waikolu Aquifer System. Individual existing water use permits in this aquifer system are shown in Exhibit 2. A summary of the current ground water conditions in the aquifer is provided in Table 1:
The issues in Waikolu Stream concern the impact of ground water withdrawals upon surface water base flows and the degree that this impact may adversely affect endangered native species and their habitat. Conclusions in the Bio-Hydro Study are succinct:

(Biological Conclusion #4) "A 2,200 ft segment of Waikolu Stream is dewatered at times by groundwater pumping of valley Wells 23 and 24, leaving little or no habitat for native species to survive."

(Hydrological Conclusion #2) "Preliminary tests indicate that pumping new Wells 5 & 6 in the valley will cause some reduction in flow in Section II as dike water is withdrawn, but Section II probably will remain perennial, being fed by Napuleloa Spring, a perennial perched water source unaffected by pumping of dike water."

(Hydrological Conclusion #4) "Pumping Well 22 in the tunnel has no discernable effect on Section III. This is because Well 22 develops ground water from different dike compartments based upon orientation of the dikes and distance from Waikolu Stream, any effect on streamflow will occur in Section IV, if at all."

Therefore, water availability for Well 22, located in the transmission tunnel, is not subject to an instream flow standard and may proceed with availability issues solely from the Waikolu ground water sustainable yield.

(2) Reasonable-beneficial
Section 174C-3 HRS defines "reasonable-beneficial use" is

"...the use of water in such a quantity as is necessary for economic and efficient utilization, for a purpose, and in a manner which is both reasonable and consistent with the state and county land use plans and the public interest."

The Moloka'i Irrigation System has responsibility for serving Hawaiian homesteads and the State Agricultural Park, following State guidelines for allotments, which the Commission uses to assess reasonable-beneficial use. This is over a large area in Ho’olehua where the potential demand far exceeds the potential supply from the MIS. Over a lengthy period, drought allotments have been in effect, so that most customers are cut back substantially from amounts needed for planned crops, and many crops are being sacrificed.
Interference with other existing legal uses
Withdrawals from Waikolu wells may affect each other, and affect diversions from Waikolu’s Lower Dam #4, all part of the MIS collection system, but no other wells or diversions.

Public interest
The primary impact of Waikolu withdrawals is on stream biology, particularly native species. Addressing this matter is a two-year study examining this impact, discussed in some detail as appended in Exhibit 4.

In Wai’ahole, the Supreme Court ruled that instreamflow standards must be determined before off-stream uses can be allocated. Staff believes that the Bio-Hydro Study has sufficient information to develop an acceptable interim instream flow standard.

State & county general plans and land use designations
These proposed uses are consistent with the state and county general plans and land use designations.

County land use plans and policies
These proposed uses are consistent with county land use plans and policies.

Interference with Hawaiian home lands rights
All permits are subject to the prior rights of Hawaiian home lands.

The Department of Agriculture/Moloka’i Irrigation System (MIS) has a water use permit for 0.744 mgd, based on the 12-MAV withdrawn as of October 8, 1988, when the interim instream flow standard was set. The Commission deferred an additional amount up to the then-current 12-MAV of 0.853 mgd based on November 1993. The DOA/MIS has reapplied for a total of 3.36 mgd for 234 metered customers over 5,000 acres as of June 30, 1999. Now that the Bio-Hydro Study is done and comments from DOA have been received, staff is processing the application. However, the current WUPA requires further information and staff is working with the applicant on this.

According to the Supreme Court’s Wai’ahole decision, all permitted diversions are subject to a determination of an instream flow standard. The Bio-Hydro Study provides information that can be used to establish a new interim instream flow standard, subject to further information. This applies to all the MIS wells with the exception of Well 22 (Well No. 0855-01) that resides in the transmission tunnel and has been shown through the Bio-Hydro Study to have no measurable or observable impact on Waikolu Stream. Therefore, this well is independent of instream flow standard issues and can pump more water with little impact to Waikolu.

RECOMMENDATION:

Staff recommends that the Commission:

A. Approve interim Water Use Permit No. 605 for a total of 0.853 mgd from the Waikolu Battery, Well Nos. 0855-01 to 05, subject to standard conditions and the following special conditions:

1. Amounts over 0.744 mgd (0.109 mgd up to a total of 0.853 mgd), may only be pumped from Well 22. Well 22 may be pumped at its installed capacity, up to the
total allocation, pending additional study of water levels and streamflow requirements.

2. The amount permitted from this battery is subject to future modification based upon setting a new interim instream flow standard.

B. Defer any further action on the Department of Agriculture's application or reapplication until an interim instream flow standard is set for Waikolu Stream, Moloka'i.

Respectfully submitted,

LINNEL T. NISHIOKA
Deputy Director

Exhibit(s):

1 (Location Map)
2a-c (Study Area Maps)
3ab (Waikolu Wells Pumpage and 12-MAV; Study Trend Analysis)
4 (Staff Synopsis of Bio-Hydro Study)
5 (Excerpt of Bio-Hydro Study distributed to MWWG)
6 (August 16, 2001 letter from DAR commenting on Bio-Hydro Study)
Always flowing and teeming with life all the way to the sea. Always flowing as a result of perennial flow from the Napuleloa spring, fed by the spring of the same name. Much life traverse the Lower Dam and live in this section. Intermittent throughout most of the year, except during and/or extended rainy periods, when flow is complete. Intermittent with scattered pools. Like Section III, flow occurs during periods of heavy or extended rainfall.

Always flowing because of water supplied from the headwaters. Fish are present, albeit smaller numbers downstream. Shrimp however, are abundant here than in any other part.

**LEGEND**
- Well Location
- Diversion Dam
- Intermittent

**General Layout of Waikolu Valley Diversions & Study Sections**


Figure 2

EXHIBIT 2a
Plan and Profile of Waikolu Stream Between Dams #1 and #4
WAIKOLU VALLEY

Engineering Design
Started 1957

TRANSMISSION/SUPPLY TUNNEL

Tunnel Work
January 1958 - November 1960
Cost: $11 Million

TRANSMISSION FROM THE TUNNEL TO THE RESERVOIR

Transmission Line
Started 1963
Capacity 21 MGD
Pipe Diameters 48" - 30" - 26"

KUALAPUU RESERVOIR

Reservoir Work
1967 - 1969
1.4 Billion Gallons
164 Acres

MOLOKAI IRRIGATION SYSTEM
Adapted by Belt Collins Hawaii
Moloka`i Irrigation System
Waikolu Wells (0855-01,02,03)

monthly pumpage — 12-MAV — WUP

(date (latest data 9/00))

pumpage (mgd)

0 1 2 3 4

88 89 90 91 92 93 94 95 96 97 98 99 00

853 mgd
Overview of Trend Analysis

Figure 15

--- Rainfall (-5 in.) --- Pumpage --- Stream Level --- Groundwater Level
900' El. (in) Well 23 & 24 (mgd) (x1/15 ft) Well 4 (ft)
TESTIMONY
OF
DEPARTMENT OF AGRICULTURE
MOLOKAI IRRIGATION SYSTEM

ON
ITEM NO. 5 - WAIKOLU BATTERY
WATER USE PERMIT APPLICATION

BEFORE THE
COMMISSION ON WATER RESOURCE MANAGEMENT

October 17, 2001
Kalamaula, Molokai, Hawaii

Thank you for the opportunity to submit our testimony concerning the subject agenda item. Our only comment is that the recommended pumpage of 0.853 mgd (12-MAV) is not the present water use, and therefore requires an adjustment.

Molokai has been experiencing a severe drought over the last five years since 1996 and throughout this period, pumps are the only source that has kept the system supplied with water.

The proposed 0.853 mgd was based on water usage in 1993 when Molokai was not in a state of drought. As reported to staff, if the pumping records since 1993 are analyzed, the 12-MAV will show that 0.853 mgd is being exceeded.

Your favorable consideration to effectuate this adjustment for the present drought period is requested. Due to the short timeframe, we are unable to provide you with the present 12-MAV, but trust that staff will be able to calculate the figure from the submitted reports.
Thank you for the opportunity to submit my testimony regarding agenda item 5. First of all I would like to commend all the commissioners and staff in their work towards protecting, controlling and regulating the use of Hawaii’s water resources for the benefit of its people. My love for the island of Molokai is its rich natural beauty, resources and the people. The community I know of which makes Molokai special to me is the community of farmers who are ever so willing to help and who all share a common concern on this particular water issue. The MIS provides the sole water source for the majority of farmers on this island and we do not at this time have any other alternate source. The implementation of emergency pumping during this drought period has provided the farmers with critical relief and the needed help to continue their operations. The proposed 0.853-mgd falls far short of the required amount to meet the 3.6-mgd current user demand. Since the majority of this user requirement is being met through the emergency pumping from the Waikolu Wells this action will drastically impact my farm operations and others as well.

I would like to recommend that the commission at this time not alter the current user demand but to consider working with the DOA, DHHL other State agencies, private sectors and the community to define beneficial and reasonable uses and establish criteria for water use priorities.

Respectfully submitted by Adolph Helm.
Thank you for the opportunity to submit this testimony concerning the agenda item number 5, on the Molokai Irrigation System.

Considering the existing drought conditions, we cannot, for the time being, agree with the Staff's recommended pumpage of 0.853 mgd (12-MAV). This is not adequate to irrigate existing acres.

The Molokai farmers, at great cost, have converted to drip irrigation to conserve water. We have reduced or eliminated irrigation water to our perennial windbreaks – subsequently killing many of them by water-stress.

As designed, the Molokai Irrigation System has a capacity of delivering 21 mgd. From Phase I, Waikolu Valley, the average daily was to be 7.0 mgd. With volunteer restrictions and reduced acres the MIS user demand is currently in the area of 3.6 mgd, 95% of which comes from pumping. A 75% reduction of pumped water going into the reservoir would mean the system (now at 5.5 feet of water in the reservoir, approximately 110 mg) would be out of water in about 40 days. A reduction of this magnitude will not be possible without eliminating more acres and eventually more farms serviced by the MIS. A reduction in acreage will necessitate eliminating markets and once the markets are lost, it is doubtful they can be recovered. Until the drought ends farmers must be able to irrigate what acres they currently have.

We support the Department of Agriculture's’ testimony submitted for this meeting.

Respectfully submitted by the Molokai Farm Bureau.
Thank you for the opportunity to submit our testimony regarding agenda item 5. We are concerned that the proposed 0.853 mgd falls far short of the required amount to meet the 3.6mgd current user demand. Since the majority of this user requirement is being met through the emergency pumping from the Waikolu Battery this action will drastically impact our operations. As we already utilize conservation methods and practices and thus have very little “system savings” to make there will be direct impact from lower water translating into a much reduced acreage. This reduced acreage will in turn seriously impact our ability to support our company’s research effort, and could lead to job loss and/or divestment.

There will also be the indirect impact from lower water use translating into lower user payments available to maintain the MIS. This in turn could lead to serious disruption of service resulting in the same outcome as the direct impacts stated above.

As one of the larger employers on Molokai the impact on this community cannot be overstated. We feel that the use of this water is necessary for the economic benefit of this community and we would strongly urge the Commission on Water Resource Management to continue to allow the emergency pumping of the Waikolu Battery during the current drought situation.

Respectfully submitted by Mycogen Seeds.
Thank you for the opportunity to submit our testimony regarding agenda item 5. We are concerned that the proposed 0.853 mgd falls far short of the required amount to meet the 3.6mgd current user demand. Since the majority of this user requirement is being met through the emergency pumping from the Waikolu Battery this action will drastically impact our operations. As we already utilize conservation methods and practices and thus have very little “system savings” to make there will be direct impact from lower water translating into a much reduced acreage. This reduced acreage will in turn seriously impact our ability to support our company’s research effort, and could lead to job loss and/or divestment.

There will also be the indirect impact from lower water use translating into lower user payments available to maintain the MIS. This in turn could lead to serious disruption of service resulting in the same outcome as the direct impacts stated above.

As one of the larger employers on Molokai the impact on this community cannot be overstated. We feel that the use of this water is necessary for the economic benefit of this community and we would strongly urge the Commission on Water Resource Management to continue to allow the emergency pumping of the Waikolu Battery during the current drought situation.

Respectfully submitted by Mycogen Seeds.
TESTIMONY OF ADOLPH HELM – HOMESTEAD FARMER
ON
ITEM NO. 5- WAIKOLU BATTERY WATER USE PERMIT APPLICATION
BEFORE THE
COMMISSION ON WATER RESOURCE MANAGEMENT

October 17th, 2001
Kalamaula, Molokai, HI

Thank you for the opportunity to submit my testimony regarding agenda item 5. First of all I would like to commend all the commissioners and staff in their work towards protecting, controlling and regulating the use of Hawaii’s water resources for the benefit of its people. My love for the island of Molokai is its rich natural beauty, resources and the people. The community I know of which makes Molokai special to me is the community of farmers who are ever so willing to help and who all share a common concern on this particular water issue. The MIS provides the sole water source for the majority of farmers on this island and we do not at this time have any other alternate source. The implementation of emergency pumping during this drought period has provided the farmers with critical relief and the needed help to continue their operations. The proposed 0.853-mgd falls far short of the required amount to meet the 3.6-mgd current user demand. Since the majority of this user requirement is being met through the emergency pumping from the Waikolu Wells this action will drastically impact my farm operations and others as well.

I would like to recommend that the commission at this time not alter the current user demand but to consider working with the DOA, DHHL other State agencies, private sectors and the community to define beneficial and reasonable uses and establish criteria for water use priorities.

Respectfully submitted by Adolph Helm.
TO: Commission on Water Resource Management  
Meeting on October 17, 2001  
Kalamaula, Molokai, Hawaii

FROM: Senator Jan Yagi Buen, District 4 (Molokai, Lanai, West Maui, Walluku)

SUBJECT: Item No. 5 — Walkolu Battery Water Use Permit — Island of Molokai

I am requesting that the Commission on Water Resource Management do not adjust the pumping of water to 0.85Smgd, which falls far below the demand today.

I represent the Island of Molokai and have worked closely with the residents of the Island. As Chairman of the Senate Agriculture Committee I have attended meetings with the Molokai Water Advisory Committee, Department of Agriculture MIS personnel, DHHL representatives, farmers and residents interested in water issues. This past summer I toured Walkolu Valley, and received a briefing from the MIS and members of the Molokai Water Advisory Committee on all the wells. Water pumped into the MIS is the only source the farmers have on Molokai.

Due to severe drought conditions, the farmers have sought my help in passing legislation to pump more water into the MIS system. The legislature approved $100,000 to pump water to assist the farmers. Some have expended thousands of dollars of their own personal funds to install drip irrigation which cuts into their thin profit margin.

Collectively, the people of Molokai have been finding alternative ways to supply water into the MIS system to meet the increase in demands for farming, and being ever so mindful of the native fauna and animals. I have seen the measures taken to allow for o'opu to climb upstream, flow-back of water from the wells into the streams for the survival of the various species of o'opu and opal and hiihiwai.
With double digit unemployment on the island, making this severe adjustment in water pumping especially now will set Molokai backwards and make it even more difficult in its economic recovery.

I ask for the commission's re-consideration by not adjusting the pumping of water to 0.853 mgd.
August 16, 2001

Ms. Linnel Nishioka, Deputy Director
Commission on Water Resource Management
Department of Land and Natural Resources
P.O. Box 621
Honolulu, Hawaii 96809

Dear Ms. Nishioka:

Subject: Waikolu Biological and Hydrological Study

The Division of Aquatic Resources (DAR) does not support the allocation of an additional amount of water or to include Wells #5 & 6 in the Department of Agriculture/Molokai Irrigation System's battery of production wells. Waikolu Stream once was a perennial stream with an abundant and diverse assemblage of native aquatic macrofauna. To remove additional water and include Wells #5 & 6 would be detrimental to the native macrofauna by further contributing to the loss of stream habitat by the dewatering of Section II, which at present, still has a perennial flow.

The study asserts that during freshet flows the juvenile fish can migrate upstream. However, during periods of drought or when rainfall volume is low, the period of flow may not be long enough for juvenile fish to traverse the length of the normally dewatered section of the stream and the fish can become trapped in pools. Shrinking pools, along with high densities of oopu caught at the first diversion (dam), may produce detrimental effects to the fishes' welfare and health, by causing stress and making the fish more susceptible to disease, parasites, and predation.

In conclusion, with the limited number of perennial streams statewide containing robust populations of all the native endemic stream animals, the State can ill-afford to allocate additional water or allow pumping from Wells #5 & 6, as this may result in the loss of more stream habitat by dewatering more of the stream length.

Sincerely,

William S. Devick
Administrator
MEMORANDUM

TO: Mr. Bill Devick, Administrator
Division of Aquatic Resources

FROM: Linnel Nishioka, Deputy Director
Commission on Water Resource Management

SUBJECT: Waikolu Biological and Hydrological Study

Please review this sole copy of this study, and prepare comments for the Commission in its consideration of whether the Department of Agriculture/Moloka'i Irrigation System should be allocated an additional amount and to include Wells #5 & 6 in its battery of production wells.

The Commission will be meeting on Moloka'i for decision-making in September, and we will be preparing a submittal one month prior, so your comments are requested by August 15 at the latest. Preferably, we can meet in advance to discuss outstanding issues.

A draft resubmittal has been attached for your information, summarizing our view of the report and its context.

If you have any questions, please call Charley Ice at 587-0251.
To: Bill Devick  
From: Bill Puleloa  
Subject: Response to Charlie Ice  

I remember discussing the report with Charlie Ice over the phone several months back (last year?). At that time we mutually agreed to hold comments in abeyance until CWRM came to terms with the ramifications of the recent Waiahole Supreme Court ruling regarding the maintenance of interim flow levels. Since then, much has happened on Molokai. Similarly with other departments, the DOA was forced to cut back on expenses. As it relates to the Molokai Irrigation System (MIS) the DOA did the following: (1) laid off two workers outright; (2) reduce pumping to save on their electrical bill; and (3) cut back on routine maintenance causing in the near virtual collapse of basic infrastructures such as pumps, transmission lines, electrical cables, meters, etc. Coupled with the ongoing drought, the direct result of these initiatives was a drastic drop in the water level in the Kualapuu Reservoir. Tom Matayoshi, the MIS manager, had little choice but to send out notices to farmers about possible rationing to include perhaps terminating services to certain customers. Here’s where it gets a little complicated. The Molokai Ranch, who is operating at a monthly loss of a million dollars, is desperately trying to unload their holdings on the island. It views any economic setbacks on Molokai as negative incentive to potential buyers, and therefore has coerced the local farm bureau to introduce several $$$ bills in this legislation session to remedy the MIS situation. It appears from Charlie’s comments that CWRM has been asked to provide input to the introduced $$$ bills and wants to incorporate the findings of Dan Lum’s report into their recommendations.

Having bought you up to speed, let me now address Charlie’s comments one by one:
(1) How can we proceed on DOA’s request for more water?
It seems to me that this is a question only CWRM can answer. Since it’s their responsibility to allocate water, I say let them figure it out keeping in mind the recent Supreme Court decision.

(2) What more do we need to do, to learn what will help us make a decision about more pumpage from wells in the Valley?
I’m very comfortable with the conclusions offered by the report as it relates to the aquatic biota. The methodology employed by Ron Englund is sound and consistent with established DAR procedures. His findings appear to be objective and his conclusions plausible, particularly when he says that certain native macrofauna have clearly been negatively impacted by the dewatered section caused by subsurface pumping. In my opinion, any further research would not yield additional information to alter this stated judgement. If you ain’t got water, you can’t have fish and other aquatic organisms. That’s about as straight forward as it can be.

(3) What can be a basis for determining the required flows in Waikolu Stream to protect essential resources?
As implied in the report, enough water occurred above and below the project area throughout the study period to adequately sustain aquatic life. Therefore maintaining flow regimes at these levels should suffice the needs of native macrofauna in these sections. I must assume Charlie’s question refers to the marginal section of Waikolu between dams 1 and 4 (i.e., sections II, III, and IV in the report). If the intent is to foster stream life in this portion of the stream, then of course continuous water flow is necessary. How much? I would say the minimum should be enough to allow the formation of pools with surface flow connecting these pools all the way from dams 1 to 4. How can this be accomplished? No one wants to say it, but it seems obvious to me that subsurface pumping must be curtailed to allow the recharging of underground dikes coupled with a continual release of water from dam 1.

(4) Is the study adequate, or did it miss asking certain questions, or focus on the wrong things?
The study was commissioned to “conduct a two-year biological and hydrological monitoring of a 3,000 ft stretch of Waikolu Stream diverted by the Molokai Irrigation System (MIS)”. To this end the study was successful in
my opinion. As to whether it missed asking certain questions or was wrongly focused depends on the issues CWRM is trying to address. If Charlie is asking if current levels of pumping dries up the stream bed, the hydrologist clearly stated “yes”. Additionally, if Charlie is asking if a dry stream bed negatively impacts the existence of aquatic organisms, the biologist also has clearly stated “yes”. But if Charlie is asking whether both these conditions are something we should sanction, he won’t find the answer in this report. That question needs to be posed not to hydrologists or biologists, but perhaps to someone with a socioeconomic credentials. To that end, this report is indeed wrongly focused.

(5) Does what they did tell us all we need to know?
Again, it all depends on the question you need to answer. If your question deals with the hydrology and biology of Waikolu Stream, the report seems to be more than adequate. However, if Charlie is asking if we should endorse and expand current levels of subsurface pumping in Waikolu, the answer to that question won’t be found in Dan Lum’s report.

(6) How much effort is required to reach a decision, or can we proceed to the first step, understanding that we will learn more and make more informed decisions later?
As far as I’m concern, the decision to proceed or not is not for DAR to make. That call should be made by CWRM, keeping in mind always the implications of the recent Waiahole Supreme Court decision.

In conclusion, allow me to offer the following recommendations for DAR to consider as it pertains to Waikolu:

(a) Our official public stand should be that continuously flowing water be restored back into the Waikolu Stream between dams 1 and 4. Anything less than this would be antithetic to our stated mandate to “sustain stream ecosystems”. This action will restore native aquatic macrofauna and their habitat to pre 1986 conditions. Additionally, modifications should be made to dam 1 to prevent the entire entrapment of larval offsprings released in the upper reaches of Waikolu as currently being the case. Similar modifications should also be considered for dam 4.
If the above is deemed impractical, then we should tolerate (not condone) current conditions provided that flow levels below dam 4 remain at present levels. Preliminary observations suggest that additional pumping in the section between dams 1 and 4 negatively impact water levels below dam 4. A monitoring scheme should be set up below dam 4 as soon as possible to determine baseline flow levels. These flow levels should then be maintained at all cost to avoid additional loss of essential habitat for our native riparian macrofauna. Additionally under these conditions, we should forgo any attempts to artificially repatriate native macrofauna stocks to the stream section above dam 1. Notwithstanding the fact that this 1.5 miles of steam consist of prime habitat, the entire reproductive benefits derived from such repatriated stocks would merely be lost into the perpetual sump that is dam 1. From a biological viewpoint, it makes more sense to restrict diadromous breeding stocks below dam 4 so as to maximize the chances of their progenies reaching the ocean in order to complete their life cycles.
COMMISSION ON WATER RESOURCE MANAGEMENT

FROM: Charley

DATE: 12 October 00

TO:

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| NISHIOKA, L |    | Signature |
| OHYE, M. |      | Information |
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| SUBIA, S. | 2    |     |
| YODA, K. |      |     |

PLEASE:

- See Me
- Review & Comment
- Take Action
- Type Draft
- Type Final
- File
- Xerox copies

WHERE can Glenn and I get a copy?
I want to forward this to Aquatics see Dave's comments, I've made changes Good synopsis.
TO: William Devick, Administrator  
Aquatic Resources Division

FROM: Linnel Nishioka, Deputy Director  
Commission on Water Resource Management

SUBJECT: Waikolu Valley Biological and Hydrological Study  
Special Condition for Water Use Permit No.220  
Waikolu Wells for Moloka'i Irrigation System

We are currently reviewing the captioned report, required by the Commission at its January 12, 1994 meeting concerning the Department of Agriculture's application for a water use permit for 3.36 mgd from Waikolu Wells #22, #23, #24, #5 & #6. The study provides valuable information concerning the impact of pumped withdrawals from the Waikolu Wells upon the stream flows and upon the macrofauna within the stream habitat. It provides an overview of the general management rules or pumping protocols to be used to optimize withdrawals while minimizing impacts to aquatic life.

We are reviewing the report in light of the recent Supreme Court Waiahole decision. It appears that the Waiahole decision requires us to set quantitative instream flow standards for Waikolu Stream prior to granting additional groundwater withdrawals for offstream uses. This will require discussions with the Aquatic Resources Division and consistency with technical work being done in connection with the Waiahole Contested Case Hearing. At this point, we do not have agreement among participating authorities on how to establish instream flow standards as directed by the Supreme Court.

Once we have gotten further into our review, we would like to meet with you to examine ways to move the process forward expeditiously. We do not anticipate being able to take action on the Department of Agriculture's application for additional water use from the Waikolu Wells as soon as anticipated. The existing interim water use permit will remain in place until then. We would support efforts to fund appropriate studies, including maintenance of longitudinal data collection, and request your review of this Study with the explicit purpose of helping to determine appropriate additional studies.

If you have any questions, please call Charley Ice at 587-0251.

CI:ky
Waikolu Resubmittal

Background:

March 19, 1993  WUPA filed
June 8, 1993  WUPA completed
September 15, 1993  CWRM deferred action to pursue a public hearing due to objections from the Division of Aquatic Resources (DAR) and the National Park Service (NPS)

November 17, 1993  Public hearing conducted on Moloka'i. Testimony focused on the impact of ground-water withdrawal upon stream flows.
January 12, 1994  CWRM approved interim water use permit for 744,000 gpd (12-MAV), denying w/o prejudice use of water from new Wells 5 & 6 pending a 2-year biological and hydrological study to 1) document the existing system operating procedures and evaluate the effects of pumping alternatives including use of new wells on stream flows, and 2) evaluate the effectiveness of weir modifications in allowing passage of native macrofauna into the stream reach above uppermost Dam #1.

March 14, 1994  CWRM modified the interim water use permit approved January 12 to reflect use of new Wells 5 & 6 during the study period for testing only.

October 10, 1995  CWRM received the proposal for the biological-hydrological study of Waikolu, and subsequently approved it, in consultation with the Division of Aquatic Resources.

December 1, 1999  CWRM received a copy of the Waikolu Biological and Hydrological Study ordered January 12, 1994.

March 15, 2000  Six available copies sent to reviewers on Moloka'i Water Working Group and the Moloka'i Public Library.

September 25, 2000  DOA and consultants presented the results of the Bio-Hydro Study to a special meeting of the Moloka'i Water Working Group.

Issues and Analysis:

Under natural conditions, Waikolu Stream is a "gaining" stream, meaning that it receives base flows from ground-water storage all along its length, and it is perennial throughout its length. In the upper sections studied for this report, the valley is crossed by dikes, separating the underlying rock into ground-water compartments which overflow or well up into the streambed ("stream invert"). The study area provides the full habitat range of plunge pool (up to 40 feet deep), riffle, and run.
In past years, there was flow along the entire study length except during the summer dry period, sufficient to permit use of the sump pumps 24 hours a day. Since the 1980s the weather has increasingly provided below-normal rainfall, and not until 1996 were there no pools in Section IV at all. The study period provided a wide range of conditions, from freshets providing continuous streamflow throughout the study area to one of the worst drought periods on record.

Unfortunately, we do not have data for the study area from an undisturbed period to use as a baseline, either for the stream characteristics or for the species populations in question. Therefore we do not know whether the protracted or repeated drought characteristics of recent years are responsible for the exhibited distribution of macrofauna, or whether that is a “normal” distribution for species which are known to occupy habitats in different proportions.

Description of Collection System (A labeled diagram of the study area is attached as Exhibit __)

During rainfall events, freshet flows are captured by the infrastructure of the Molokaʻi Irrigation System, consisting of two dams (“Upper” and “Lower”) on the main channel and two on tributary streams entering from the East. Stream flows collected by the upper three dams enter the transmission tunnel by gravity; sump pumps empty a chamber in the Lower Dam (#4). Depending on the volume of rainfall, stream flows continue over the Lower Dam to the undiverted Section I to the ocean.

Gravity flow moves water from the three upper dams through a 5.1-mile tunnel from elevation 990 feet (East Portal) to the West Portal above Kaunakakai at an elevation of 970 feet, into a 48-inch pipe leading to a rectangular concrete culvert about 54” x 40” and thence to another 48” pipeline, which then is connected to a 30” pipeline with a capacity of about 21 million gallons per day (mgd). The combined gravity-flow streamflow-gathering dams and pipelines have a capacity of about 19.8 mgd. The tunnel also collects about 1 mgd ground-water seepage. When the tunnel exit flows measure less than 13 mgd, the electrical monitoring and control (SCADA) system brings additional sources (wells) on-line.

To augment freshet flows, there are two wells/pumps at the upper end of the study area, and two at the lower end. In addition, there is a well in the tunnel transmitting diverted flows from Waikolu Valley to the West Portal above Kaunakakai. An observation well (“Well #4”) lies between “Well #23” and “Well #5”. The report does not identify whether any or all of the wells are in different ground-water compartments, although the map shows five dikes crossing the stream: one at the Lower Dam (#4), one between Wells #5 & #6, and three in Section II, above “Well #24” and “Dam #2”. Therefore it is not apparent from the report whether the observation well measures results in any other particular well compartment. Because water levels are not read in any other wells, it is not apparent whether they interact.

Waikolu Hydrology

With rainfall in the upper valley, the streamflows move through the study area and into Section I below it, even with pumps running. Without rainfall augmentation, the base flow from ground storage is subject to reduction from pumpage, as indicated below.
The report seems to indicate that Well #24 affects only Section IV, and that it can be pumped 45-60 days to eliminate the low flows from Section IV without rainfall augmentation. By contrast, Well #22 apparently only affects Section III, eliminating low flows after only 25-30 days of pumpage without rainfall augmentation.

Section II, below the dry Section III, is continually fed by flows from Napuleloa Spring entering the main Waikolu channel, and therefore flows perennially even when upper sections are dewatered. However, Section II flow levels are reduced by the pumping of new Wells #5 & #6, preventing flows from Napuleloa Spring from reaching Dam #4. Section II ends at the Lower Dam (#4), located at a dike, which collects streamflow in a chamber emptied by sump pumps. Use of the sump pumps, even without using Wells #5 & #6, eliminates normal flow from Napuleloa Spring from crossing Dam #4 and continuing to the coast.

Below the dike, Section I receives ground water overflowing from dike compartments, typical of the entire length of Waikolu, and regardless of rainfall and pumping conditions, the stream has perennial flow all the way to its outlet at the coast. Section V, above Dam #1, similarly has perennial flow. Thus it is clear that pumpage in the study area is responsible for dewatered conditions.

Conversely, after a period of dry weather and dewatering Sections III & IV by pumping Wells #23 & #24, rainfall freshets rapidly restore the ground-water compartments beneath the stream invert, underscoring the direct connection between streamflow and ground-water storage. While the replenishment rate obviously depends on the steadiness and volume of the rainfall, a wet period of a few days may be all that is required. Low flows from transitory rainfall readily percolate down to replenish the dike compartments rather than flowing on down to Section II.

Unique Endemic Fauna

Native macrofauna are found in representative proportions throughout the length of Waikolu Stream, except in Sections III & IV during dry periods. When rainfall augments flows, the macrofauna move upstream normally, excepting species which are unable to climb the upper dam. When low flows are continuous through Sections III & IV, species capable of climbing the dam do so, due to a modification of the weir to permit the lowest flow to cross the dam. Prior to modifications, no water crossed the dam during low flows. Different species arrange themselves along the stream according to their habitat and physiology requirements. We do not know how "normal" this activity is, as this study area has been diverted for many years, and because repeated drought conditions may have altered the recovery expectations of these populations. The report is not clear whether the encouraging response of the macrofauna moving up the stream when flows are restored after drought represents a "vigorous" or adequate response, or whether this response is within the parameters of a "normal" stream situation.

The study identified several species of native macrofauna -- three species of o'opu, one arthropod ('opae), and one univalve (hihiwai) -- as indicator species for measuring habitat health. No other floral or faunal species were studied, although a full ecological understanding would include other species as well. Exotic flora are obvious and common in the study area, while exotic fauna were not identified. In other locations in Hawai'i, aquatic scientists have identified subsurface habitats with unique native species, but the presence of such habitat in Waikolu is unexplored.
Management Perspectives

Biological consultants on this study opine that while freshet flows (episodic storm flows that scour the stream bed) are key features of the Hawai‘i stream ecology to which native species are uniquely adapted, it is still true that minimum flows are essential to habitat health, and that generally speaking more flow is better. This study demonstrates that existing native populations respond quickly to opportune freshet flows, even following lengthy dry periods in certain sections of the stream. Nonetheless, the number of individuals of these species were fewer above Dam #4 than below. Waikolu is now considered to be of greater-than-average native biological importance, now that many other streams of the state are impacted by development.

The Commission staff approved the scope of work for the study as adequate under existing policies, but with gradual improvement of ecological knowledge and continuing new findings, and with directions from the Supreme Court in the Wai‘ahole case, there now exist questions that were not intended to be answered by this study. We do not know how much “more” flow would be a significant benefit, or how much “less” might be a significant detriment. We do not know how long the endangered species will remain viable during low flow periods, nor the effect of eliminating the viable populations now surviving in Section II by pumpage from Wells #5 & #6 over an extended dry period. We have not studied other species (flora or fauna) that may be significant to the studied macrofauna – whether they face long-term risks from dewatering. We have no information on any possible floral species that would be of concern, nor have we explored any other potential “stream values” to be protected by stream flows.

The management plan is designed to minimize operating costs of electricity, as it is very expensive on Moloka‘i. The pumping schedule is therefore not geared specifically to hydrologic criteria. We had hoped to get an understanding of the effect of different pumping schedules, but that has not been part of this effort. The pumps each only operate from 3 to 6 hours per day, in sequence. Wells #5 & #6 were programmed to be the second-to-last pumps in the sequence to start, followed by the sump pumps, and the sequence is reversed to take the pumps off-line. When stream flows reach a sufficient threshold, the sump pumps can run 24 hours per day.

Conclusions

The purpose of this study was to determine whether Wells #5 & 6 could be allocated new water use permits in addition to those made for Wells #22, 23, and 24. We hoped to learn the impact of pumping the various wells, singly and in combination, on stream flows and therefore on native macrofauna, resulting in recommendations for a pumping schedule that would protect instream values and optimize diversions for agricultural irrigation.

A secondary objective was to determine whether a low-flow weir at the Upper Dam (#1) would significantly enable the passage of animals upstream. We learned that it does work when animals can reach the base of the dam, but that issue is often moot because Sections II & IV are dewatered by pumpage from Wells #23 & 24. The question has been raised whether its proper functioning is well-advised if the result is a greater number being entrained into the irrigation system.
Subsequent to those objectives, the Supreme Court has opined that the Commission's responsibility for stream protection goes beyond merely balancing instream and offstream uses. Rather, the responsibility is to determine instream values to be protected prior to any consideration of offstream uses. We are thus in the position to begin asking what permanent instream flow standards are appropriate to Waikolu? What water may be available for offstream use? Does this report answer or begin to answer these questions? Does it throw light onto the problem of asking these questions?

We are encouraged to learn that the drought periods we have faced, and the ongoing diversions from Waikolu, have not eliminated native macrofauna from the stream throughout the study area, although clearly there are periods when they cannot survive in certain sections of the study area. We know that the populations respond normally when freshets return, and that in this sense the populations are “healthy”.

We do not know whether further diversions will maintain this set of circumstances, and we believe that “more” water left in the stream would have a positive effect on those populations. We know that allocations for Wells #5 & 6 could result in dewatering Section II of the study area except in times of freshet flows, although the contributions of Napuleloa Spring help to maintain flows in Section II when Wells #5 & 6 are in use. The critical threshold for this maintenance, from the macrofaunal point-of-view, is unknown.

The conclusion for the time being is that the current pumping regime has some adverse impacts on stream values that are not irreversible – that resilience of instream species supports recovery as rainfall returns. The correlations from this study do not inform us about “permanent” standards, and in fact, suggest that “permanent” refers not to a static gallonage or “minimum stream flow” but to ecological thresholds that are not understood, that may be preserved by assuring that pumping parameters are not exceeded. Perhaps a “permanent” standard would be expressed as a proportion of flow, or a proportion of time diverted, regardless of season or relation to long-term norm.
Waikoloa Mtz (Maloka’i)  Kalame ‘Oiwii, Kalama’ula  
Maloka’i Water Working Group

streambed quite permeable - bypass @ W24 did not restore flow
Nepalolo Spg a perched source (0.5mgd; not measured continuously)
native fauna hatch and go to ocean; after several mos return
- stream to live rest of their lives

alamele, na‘u‘e plentiful (few caught above 84) napili (below Nepalolo)
- open (most common in 55), Wiliwili (few but large in 56, many
more in 51 & 52), Tahitian proa (common in 59)

Glenn questions "success" of weir; if only a few individuals made it
- how many days is water going over the dam

Ron characterizes stream as "average" for undisturbed times, better than average
- now due to remoteness (exotics come by roads)

Don: 30.45 d pumping to dry stream (~900gpm) W23

Waikoloa a gaining stream
Sarah - thought we'd get a complete range of pumpage combinations - not done?

+ Bill - farmers use 2 mgd, getting at thereof parking
- need to know impact of 24% on stream flow (% full range)

Tommy - worst drought ever, twelve past years,
- currently taking 3.4 mgd, using a little more
- optimum under normal conditions - deliver ~6 mgd

Paul - effort to equalize service requires trade-offs for 8 farmers (following)
Bill - how much from 5 or 6? 2.5 (i), 3 or 7 (g)  total capacity ~2.5 mgd (24h)
DeGray - see p.16 - optimizing operational costs while minimizing stream impacts?

Nhelelele - do we know what's a mean flow?

Bill - dilemma - how much can we solve this problem?
- if we get over the hump, will we expand ag
- and get in diapor?

DeGray - how much has historically been pumped
- compared or requested amount

Sarah - Nhelelele
Glenn
DeGray
Tom
Harold
Bill Paleloa

<need to characterize
- trade-offs for instream
- values, navigable areas,
- to achieve values

Study does not answer "how much does stream need?" but to understand
- impacts of diversion, means to mitigate
- interim solution to get through drought
- so we can begin to answer harder
- resource questions
quote study requirement/scope
capsulize "
evaluate satisfaction
quote/para phrase/capsulize court charge (public trust)

state issues
recep WUPA
testimony
decision

many exotic flora
unclear value of limn, arthropods, others? "average"
microfauna seem to recover from dry periods
base flow is critical - Sect 3.1.4 often dry
hyporheic habitat unknown
no identifiable min/optimum flow level
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**FROM:** Charley  
**DATE:** 22 Feb 02  
**SUSPENSE DATE:** 14 Dec 00
COMMISSION ON WATER RESOURCE MANAGEMENT

FROM: LINNEL

DATE: AUG 20 2001

SUSPENSE DATE:

TO: BAUER, G.

CHING, F.

DANBARA, S.

FUJII, N.

HARDY, R.

HIGA, D.

HIRANO, E.

ICE, C.

IMATA, R.

JINNAI, R.

INIT.

TO: KUNIMURA, I.

NAKAMA, L.

NAKANO, D.

NISHIOKA, L.

OHYE, M.

SAKODA, E.

SUBIA, S.

SWANSON, S.

UYENO, D.

YODA, K.

INIT.

FOR: Approval

Signature

Information

PLEASE:

See Me

Review & Comment

Take Action

Type Draft

Type Final

File

Xerox copies

Last person - trash

let's discuss

looks like recommendations to deny
WATER USE PERMIT NO. 220

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

Water User: State Department of Agriculture  
P.O. Box 205  
Ho'olehua, HI 96829

Landowner of Source: State Department of Agriculture  
P.O. Box 205  
Ho'olehua, HI 96829

Permitted Withdrawal Rate: 0.853 mgd (Based upon a 12-month moving average)

Water Management Area: Waikolu

Island: Molokai

Aquifer Sector/System: Northeast/Waikolu

System Sustainable Yield: 5 mgd

Water Type: Fresh, Non-Potable

Original CWRM Date: January 12th, 1994

Standard Conditions: 1-11, 13-22, 25

Special Conditions: 5, 24

Water Source

State Well Number(s): 0855-01 thru 0855-06

Well Name: Waikolu #4-6 and #22-24

Water Source TMK Number(s): 2nd Division, 6-1-001:002

State Land Use Classification(s): N/A

County Zoning Classification(s): N/A

Geographical Coordinates:

State Well No. 0855-01  
Latitude 21° 08' 16.0” North  
Longitude 156° 55' 23.0” West

State Well No. 0855-02  
Latitude 21° 08' 35.0” North  
Longitude 156° 55’ 09.0” West

State Well No. 0855-03  
Latitude 21° 08' 27.0” North  
Longitude 156° 55’ 04.0” West
State Well No. 0855-04  Latitude 21° 08' 44.0" North  
Longitude 156° 55' 15.0" West  
State Well No. 0855-05  Latitude 21° 08' 41.0" North  
Longitude 156° 55' 14.0" West  
State Well No. 0855-06  Latitude 21° 08' 39.0" North  
Longitude 156° 55' 10.0" West  

End Use  
End Use TMK Number(s):  2nd Division, Various  
State Land Use Classification(s):  Various  
County Zoning Classification(s):  Various  
Beneficial Use Explanation:  Agricultural irrigation of MIS system  

Background Information  
State Well Nos. 0855-01 thru 0855-06 are part of the Molokai Irrigation System (MIS) that diverts water from Waikolu Valley to Ho'olehua. While some water is drawn directly from the ground, other water diverted from the natural flow of the Waikolu Stream. There are approximately 200 customers that utilize water from the MIS system. No monthly water use reports are being submitted for any of the aforementioned wells.  

Water Use Permit 220 was approved during the January 12th, 1994 Commission on Water Resource Management meeting. Standard conditions 1-11, 13-22, & 25 and special conditions 5 & 24 are the governing conditions for this water use permit. A complete list of all standard and special conditions is given in the final summary report to the Legislature for this 20-year Water Use Permit Review.  

Field Investigation Information  
Contact:  Randy Teruya  
Site Address:  Waikolu Valley  
Molokai, HI  
Brown and Caldwell conducted a field investigation on June 20th, 2008 from 7:30 a.m. until 12:00 p.m. with Mr. Byron Alco, who is the Irrigation District Manager and an associate of Mr. Randy Teruya. During this time, type of water usage was verified, flow meter installation and functionality were documented, and property TMK information was verified. The wellhead, its related appurtenances, and water usage area were visually inspected to assess compliance with permit conditions. Visual inspection of water loss/waste was limited to outdoor areas within the usage boundary. The physical location of this site is in Waikolu Valley at approximately 750-feet
elevation. Reference the TMK and GIS maps in the permit file for a visual representation of the site.

Summary of Findings for Water Use Permit No. 220

State Well Nos. 0855-01 thru 0855-06 are located on TMK parcel (2) 6-1-001:002 at the GPS coordinates given above. Since GPS satellite reception was poor in Waikolu Valley, the listed GPS coordinates were taken from the City GIS system and were not verified during the field investigation. Descriptions of each well are given below

- State Well No. 0855-01 (Pump #22) - 245-feet deep, 75 HP submersible pump
- State Well No. 0855-02 (Pump #23) - 400-feet deep, 100 HP vertical mount motor
- State Well No. 0855-03 (Pump #24) - 400-feet deep, 100 HP vertical mount motor
- State Well No. 0855-04 (Pump #04) - Diversion pump building, two 75-HP and one 150-HP vertical mount motors
- State Well No. 0855-05 (Pump #05) - 250-feet deep, 75 HP vertical mount motor
- State Well No. 0855-06 (Pump #06) - 205-feet deep, 100 HP vertical mount motor

All of the wells except for State Well No. 0855-04 are drilled wells with either submersible or vertically mounted pump motors that draw water from the ground. State Well No. 0855-04 is a diversion pump building that draws water directly from Waikolu Stream. During periods of heavy rain, stream water overflows into a collection ditch that conveys the water into a wetwell. The three pumps draw water from the wetwell as it fills with stream water overflow. All six wells convey flow into 5-mile long gravity irrigation tunnel that channels the water from Waikolu Valley to various reservoirs and end use locations on leeward Molokai where it is used for diversified agricultural purposes. In Hoolehua, a small booster pumping station assists in conveying water to the appropriate locations. Miscellaneous electrical lines are run on the roof of the tunnel to provide power and SCADA system hookups to the six wells. Reference the Appendix for photographs of the various system components.

The MIS system has several flowmeters on various distribution lines that deliver well and stream water to the irrigation tunnel. A central SCADA system interfaces with all the flowmeters and well controls to regulate and monitor water use from Waikolu Valley. During the field investigation, none of the flowmeters were operational. The permittee has advised that water use is currently estimated based upon pump capacity and run time and that the flowmeters were to be replaced shortly. Records on file indicate that no monthly water use reports are available for any of the six constituent wells in the MIS system.
Due to the extensive end use area (nearly 3,000 acres) and the fact that much of the water is utilized on private land, end use TMK's were not verified during this field investigation.

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

(10) An approved flowmeter must be installed to measure monthly withdrawals and a month 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.

Although flowmeters are installed on various distribution lines, none were operational at the time of the field investigation. Since records do not reflect that monthly water use is being reported to the Commission, the permittee is in violation of Standard Condition (10).

**Recommendations**

- Address the following discrepancies between the Commission’s electronic database and actual field investigation findings:
  - Change permittee contact to Randy Teruya at (808) 973-9478 (randy.y.teruya@hawaii.gov)
- Address violation of Standard Condition (10) regarding non-reporting of water use.
20-Year Water Use Permit Review
Water Use Permit No. 220

APPENDIX

Field Investigation Photographs
Figure 1 – State Well No. 0855-01

Figure 2 – Flowmeter, control box, and distribution piping for State Well No. 0855-01
Figure 3 – State Well No. 0855-03

Figure 4 – Flowmeter and distribution piping for State Well No. 0855-03
Figure 5 - State Well No. 0855-02

Figure 6 - State Well No. 0855-06
Figure 7 – State Well No. 0855-05

Figure 8 – Leak at base of State Well No. 0855-05
Figure 9 - Diversion pumps (from left, 150-HP, 75-HP, 75-HP)

Figure 10 - Diversion pump building w/intake grating from Waikolu Stream
Figure 11 - Flowmeter for State Well Nos. 0855-02 and 0855-04 thru 0855-06

Figure 12 - System controls for State Well Nos. 0855-02 and 085-03
Figure 13 - Entrance into Molokai Water Tunnel from Waikolu Valley

Figure 14 - Entrance into Molokai Water Tunnel from Hoolehua side
Figure 15 – Booster pumps

Figure 16 – Booster pump controls
Water Use Permit Survey
(Please complete one survey form for each WUP)

WUP Number: ZZ0
Well Number(s): 0855-01 to 06

Contact Information (of the person who will be present at the visit):
Name: Randy Teruya
Phone (for phone interview): (808) 973-9478 Fax: (808) 973-9467
Email: randy.y.teruya@hawaii.gov
Best time to reach for phone interview: M-F: 7:30 am to 4:00 pm

Property Information (of the water use/well location):
Address: Waikolu Valley (between 730' to 1,000' elevation)
City: Zip:
Well Location TMK (list all if multiple wells present): (2) 6-1-001:002
Water Use TMK (list all if used on multiple lots): (2) 5-2-001; (2) 5-2-011; (2) 5-2-02 to 06; 21 to 27 and 29.

Water Use/Well Information:
Is the water source currently in use? Yes ☑ No ☐
If no, please explain: ____________________________________________

What are you currently using the water for? (example: “Use for 45 acres of diversified agriculture and 3 residences”):
Use for 2,775 acres of diversified agriculture.

Is a flow meter installed and working properly? Yes ☐ No ☑
If no, please explain: Flowmeters are scheduled to be replaced with installed of new SCADA/Telemetry system.

Do you submit monthly water use reports to the State? Yes ☐ No ☑
If no, please explain: Flowmeters are presently inoperative.

Field Investigations:
A representative from Brown and Caldwell will be visiting wells in your area over the next several months between the times of 9:00 am and 5:00 pm. Each site investigation will take approximately 1-2 hours. Please indicate up to three potential days of the week and availability times for an on-site inspection of the well location and verification of water use compliance. The permit holder must provide Brown and Caldwell with at least five (5) working days notice of the need to reschedule.

Option #1 Date (M-F): 03/19/08 Time: 9:00 am ☑ 12:00 pm ☐ 3:00 pm ☐
Option #2 Date (M-F): 03/26/08 Time: 9:00 am ☑ 12:00 pm ☐ 3:00 pm ☐
Option #3 Date (M-F): 04/02/08 Time: 9:00 am ☑ 12:00 pm ☐ 3:00 pm ☐

Once this survey is returned, a Brown and Caldwell representative will be contacting you to conduct a phone interview and finalize the exact date and time of your field investigation. Please fax/mail completed surveys by December 12th, 2007 and direct any questions related to this survey to Mr. Milo Smith of Brown and Caldwell at:
1099 Ala Moana Street, Suite #2400
Honolulu, HI 96813
Tel: (808) 203-2661
Fax: (808) 933-0226
msmith@brownandcald.com

For Official Use Only
Received: 3/10/08 Information Updated: 3/26/08 Phone Interview Complete: ___________________
Notes/Comments: ____________________________
Phone Interview

WUP Number: 220 Well Number(s): 0855-01 thru 03

Contact Name: Randy Teruya Phone Number: (626) 573-9418

Attempt #1: Date/Time: 4/5/08 9:00 am Result: No answer, left message

Attempt #2: Date/Time:

Well Location TMK(s): (2) 6-1-001:002
Water Use TMK(s): Various

Water Source Address: Waikolu Valley

City: ____________________ Zip Code: __________________

Currently using water source? Yes [ ] No [ ]

Notes/Comments: Water source used for irrigation

How often is the water source being used? Daily [ ] Weekly [ ] Monthly [ ]

Notes/Comments: __

How long have you been using this water source?: ________________________

Has there been any rezoning of the water source/water use properties? Yes [ ] No [ ]

Have you reported the rezoning to the State? Yes [ ] No [ ] N/A [ ]

If no, explain: ____________________________________________

Scheduled field investigation day/time: 6/20/08 @ 7:30 a.m.

Notes (Special directions, site conditions, potential hazards, general notes, etc.):

• Meet at Mr. Bassford
• Will send map to Mr. Bassford via email
• Site visit will approximately take 4 hours
• Bryan Alcos will take you to the wells Ph# (567-6891)

Comments To Make:

• Although we prefer that you do not change your scheduled field investigation time, if you require a reschedule, you must provide Brown and Caldwell with at least five (5) working days notice of the need to reschedule.
• A representative from Brown & Caldwell will be making a reminder phone call to you sometime during the week prior to your scheduled field investigation.
• It is very important that you provide access to the site at the day and time agreed upon. Due to a very tight schedule, if you fail to provide access at the agreed upon time and/or do not reschedule with at least a five (5) working day notice, a makeup date will not be allowed.

• If for some reason you don’t know where your well head is located, it would be a good idea to locate it prior to your field investigation to help make the visit go quickly and smoothly.

Interviewed By: _______ Date: 6/6/08 Time: 9:30 am
Field Investigation Checklist

WUP Number: Z20
Well Number(s): 0555-01 thru 165-00

Water Source
Well Location TMK(s): (2) 6-1-001:002
Well Head GPS Coordinates: Latitude: On Back Longitude: On Back
Well Type: Vertically Mounted Pump Meter, Drilled well
Currently using water source? Yes ☑ No ☐
Notes/Comments:

Is there a flow meter installed? Yes ☑ No ☐
Is the flow meter operational Yes ☑ No ☐
Notes/Comments: Flow estimation done by runtime

Water Use
Water Use TMK(s): Various
What is the water being used for? Irrigation

Is the water being used within the permitted boundaries? Yes ☑ No ☐
If no, explain

Is there any observed wasting of water or water loss? Yes ☑ No ☐
If no, explain Small leak at base of Pump #6

Are the permit conditions being complied with? Yes ☐ No ☑
If no, explain: No records on file

Other
Photographs of: Water Source ☑ Water Meter ☑ Usage Area ☐ Pump/Motor ☑

General Notes/Comments:
(1) Pump 22 - Flow estimated by run time
(2) Pump 24 - Flowmeter strap on style on bridge
(3) Pump 23 - Flow estimated via runtime (102 HP, 1500 GPM)
(4) Pump 5 - 11 11 11 (75 HP, 200 GPM)
(5) Pump 6 - 11 11 11
   Small leak at pump base (Est. 50 GPM)
(6) Div. Pump Bldg = Pumps from wetwell when stream water+
   Pumps on a timer system
   150 HP never used = pumps well too fast

Investigated By: M.S. / P.T. Date: 6/29/08 Time: 7:30 a.m.
0855-01: 21°08'16" N, 156°55'23" W
0855-02: 21°08'35" N, 156°55'04" W
0855-03: 21°08'27" N, 156°55'04" W
0855-04: 21°08'44" N, 156°55'15" W
0855-05: 21°08'41" N, 156°55'14" W
0855-06: 21°08'39" N, 156°55'10" W
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 HAWAI’I” 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 TKM’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 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 Malaekahana 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.
PUMP #24  100 HP. 400 FT. DEEP.  (SUBMERSIBLE)

PUMP #23  100 HP. 400 FT. DEEP
DIVERSION PUMP BUILDING

2 75 HP PUMP

PUMP #22  75 HP, 245 FT. DEEP (SUBMERSIBLE)
Ryan,

Per our telephone discussion...this confirms Friday, June 20, 2008, around 7:00 am - 7:30 am; to meet our Irrigation District Manager, Byron Alcos at the MIS baseyard. See the attached map to locate the baseyard office.

Randy Teruya  
Agricultural Asset Manager  
Agricultural Resource Management Division  
Hawaii Department of Agriculture  
Phone: (808) 973-9478, Fax: (808) 973-9467  
E-mail: Randy.Y.Teruya@hawai.gov
Mr. Thomas Matayoshi
State Department of Agriculture
Agricultural Resource Management Division
P.O. Box 205
Hoolehua, HI 96829

Dear Mr. Matayoshi:

Approval of Water Use Permit for Well Nos. 0855-01 to 03
Waikolu Ground Water Management Area, Molokai

This letter transmits your water use permit for Waikolu Wells #22, #23, and #24 (Well Nos. 0855-01 to 03) for use of 0.853 mgd of water on a twelve-month moving average basis. Enclosed with this letter of approval are the following:

1. Your water use permit
2. Your official monthly water use report form

On January 12, 1994, the Commission on Water Resource Management (Commission) approved your application for a water use permit for Waikolu Wells #22, #23, and #24 (Well Nos. 0855-01 to 03) for use of 0.744 million gallons per day (mgd) of water on a 12-month moving average basis. The Commission deferred action on your request for existing uses in excess of 0.744 mgd pending the submittal of a petition to amend the interim instream flow standard for Waikolu Stream. Your application for future uses over 0.853 mgd from Wells #22, #23, #24, #6, #5, and #4 (Well Nos. 0855-01 to 06) was denied without prejudice pending the results of a monitoring program and any further studies.

On March 14, 1995, the Commission approved an amendment of the interim instream flow standard for Waikolu Stream and a modification of the interim water use permit to allow an additional 0.109 mgd of ground water to be withdrawn from Well Nos. 0855-01 to 03.

Please be sure to read the conditions of your approved permit. If you accept these terms, please sign and return one copy of this permit to the Commission and retain a copy for your record.
Be aware that you are required to keep a record of your monthly total pumpage. This information must be submitted to the Commission on a regular monthly basis using the enclosed water use report form. You should make copies of the enclosed report form as needed.

In addition, you are required to submit a water shortage plan to the Commission within thirty (30) days of the issuance date of this permit. Your water shortage plan simply identifies what you are willing to do should the Commission declare a water shortage situation in the Waikolu Ground Water Management Area and can be as short as a one page letter. In a water shortage situation, the Commission may require temporary reductions in pumpage from all sources. The Commission is required, by law, to formulate a plan to implement such area-wide reductions, which should accommodate, include, and be consistent with your plans. Therefore, your help, by submitting your water shortage plan, is greatly needed in formulating the Commission's overall Water Shortage Plan.

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

Aloha,

MICHAEL D. WILSON
Chairperson

Attachments
GROUND WATER USE PERMIT
WUP NO. 220

PERMITTEE

Applicant/Water User: STATE DEPT. OF AGRICULTURE
Address: P.O. BOX 295
HOOLEHUA, HI 96829

Landowner of Source
Address: STATE OF HAWAII
P.O. BOX 295
HOOLEHUA, HI 96829

PERMITTED SOURCE INFORMATION

Island: MOLOKAI
Water Management Area: WAIKOLU
Aquifer Sector: NORTHEAST
Aquifer System: WAIKOLU
System Sustainable Yield: 5 mgd
Well Name: WAIKOLU #22 TO #24
State Well No.: 0855-01 TO 03

PERMITTED USE INFORMATION

Reasonable beneficial use: AGRICULTURE
Withdrawal (12 month moving ave.): 0.853 mgd

Location of water use
TMK #: 5-2-01 TO 06, 21 TO 27
Address: HOOLEHUA
State land use classification: AGRICULTURE
County zoning classification: AG-2

Pursuant to Hawaii's State Constitution, Article XI, Section 7, Hawaii Revised Statutes, Chapter 174C; Hawaii Administrative Rules, Chapters 13-167 through 13-171; and Hawaii decisional law and custom, the applicant is hereby authorized to use ground water from the sources and in the amount and from and upon the locations described above; subject however, to the requirements of law including but not limited to the following conditions:
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 (1992), 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 17 4C-101(a), HRS.

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 January 12, 1994 and March 14, 1995 meetings 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.

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

11. An approved flowmeter(s) must be installed to measure 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 a monthly basis.

12. This permit shall be subject to the Commission's periodic review of the Waikolu 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 Waikolu Aquifer System, or relevant modified aquifer(s), is reduced.

13. 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.

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

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

16. The permittee understands that under HRS § 174C-58(4), that partial or total nonuse, for reasons other than conservation, of the water allowed by this permit for a period of four (4) continuous years of 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 of forfeiture.

17. 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 Waikolu Ground Water Management Area.
18. 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 years of the filing of the application to continue the existing use.

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

20. This permit is subject to the special conditions attached as Exhibit A which are incorporated herein by reference.

21. 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.

22. The issuance of this permit was approved by the Commission on Water Resource Management at its meetings on January 12, 1994 and March 14, 1995.

MICHAEL D. WILSON, Chairperson
Commission on Water Resource Management

Date of Permit 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.
A. The applicant may continue the use of ground water within the limits approved by the Commission, and any delay in receipt of the actual permit document shall not be a reason to interrupt the approved level of use.

B. The applicant shall implement, by December 31, 1995, a biological and hydrologic 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 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.
State of Hawaii
DEPARTMENT OF AGRICULTURE
Division of Agricultural Resource Management
Molokai Irrigation System
P. O. Box 205
Honoapiilani, HI 96720-0205

FAX TRANSMITTAL

DATE: 9-10-93
TO: Roy Handy

FROM: Tom Hamacheck

DEPARTMENT OF AGRICULTURE
MOLOKAI IRRIGATION SYSTEM

SUBJECT: Objectin on Water Use Permit

REMARKS: FOR WUSE 0949-01

Total number of pages (including this page): 6

If you do not receive the total number of pages noted above and/or have problems with our transmission, please contact the sender at (808) 567-6150.
1993 August 30

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

OBJECTIONS TO AND COMMENTS ON WATER USE PERMIT APPLICATIONS
(Public notice of July 27, 1993/Comments due August 30, 1993)

GENERAL OBJECTIONS

We reiterate our general objections to current COHWR water use permit application processing and decisionmaking practices as previously submitted on numerous occasions (10/12/92, 10/21/92, 12/1/92, 6/22/93, & 7/6/93).

We also have specific comments on and objections to several of the applications listed in this notice, particularly those of Maui Department of Water Supply, State Department of Agriculture, L&J Water Co., Inc., and Campbell Estate. In each case NHAC represents water source registrants, water use declarants, water use permit applicants, and others with property interest in land within the hydrologic unit of the source of water supply who would be directly and immediately affected by the proposed water use.

Because of the complexity, importance, and late arrival of some of these applications to our office, we are requesting an extended review period (as provided on your memorandum) to September 3, 1993, when we will submit all objections and comments for both this set of applications and those whose objections due date is September 3.

Thank you for your consideration of this request.

David L. Martin

David L. Martin, Water Claims Manager
1993 September 3

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

OBJECTIONS TO AND COMMENTS ON WATER USE PERMIT APPLICATIONS
(Public notice of July 27, 1993/Comments due August 30, 1993)
(Extension to September 3, 1993 requested on August 30, 1993)

GENERAL OBJECTIONS

We reiterate our general objections to current COWRM water use permit application processing and decisionmaking practices as previously submitted on numerous occasions (10/12/92, 10/21/92, 12/1/92, 6/22/93, & 7/8/93).

SPECIFIC OBJECTIONS

NHAC represents water source registrants, water use declarants, water use permit applicants, and others with property interest in land within the hydrologic units of the sources of water supply who would be directly and immediately affected by the proposed water uses.

1. Ulalapue Shaft 0449-0:

14.(c) Hawaiian Home Lands uses affected

In its final report dated July 1993, the Molokai Working Group recommends that "... DHHL's demonstrable needs which are currently tied to lands at Hoolehua and Kalamaula through 2010, be reserved first."

Since reservations of water to Hawaiian Home Lands have not yet been accomplished, this application should be deferred until that time. Additionally, mechanisms for bulk allocation of water to the Maui Department of Water Supply, similar to those being developed for O'ahu, should be implemented, rather than processing each individual County source under separate water use permit applications.

14.(d) The Molokai Working Group recommends that "Other rights which may exist pertaining to Hawaiians not residing on DHHL lands must also be honored" (Final Report page 6).
The proximity of the Ualapue shaft to shoreline fishponds and Loipunawai raises questions of its impacts upon groundwater flows which nourish these resources. Permitted use of the shaft should be restricted to avoid affecting subsurface flows required to maintain the productivity of nearby fishponds, Loipunawai, and nearshore ecosystems, and to honor the rights of Native Hawaiians to utilize these resources for traditional and customary practices.

2. Waikolu Wells 0655-01 to -06

The combined application for existing and proposed sources is confusing and requires further explanation before objections and comments can be completed. Specific items requiring clarification include:

4. SOURCE LOCATION

While wells 01-03 can be located using existing groundwater indices, new wells 04-06 cannot be located except within a 270' elevational range. In order to assess potential restrictions on use, more detailed locations for the new wells are required.

8. QUANTITY OF WATER REQUESTED

What is the quantity requested from each individual source? From the existing sources combined? From the new sources combined?

15.(a) Impact on sustainable yield

The entry of "7,488,000 GPD" on this line requires further explanation.

15.(b) Permanent or Interim Instream Flow Standards affected

Applicant should specify which sources affect which streams. Permitted use should be restricted to end and avoid any such effects.

15.(c) Hawaiian Home Lands uses affected

Operation of the Molokai Irrigation system was originally intended to be solely for the benefit of Molokai Hawaiian Home Lands. Subsequent State legislation which allowed 1/3 of the system capacity to be used for other purposes violates the spirit and intent of the original enacting federal legislation. Thus use of existing and new sources by the Department of Agriculture affects Hawaiian Home Lands uses, and permitted use should be restricted to avoid any such effects.
15. (d) Other existing legal uses affected

When instream flow standards are affected, other legal uses of streams are also affected. Permitted use should be restricted to end and avoid any such effects.

16. REMARKS, EXPLANATIONS

The Molokai Working Group recommends:

III.L. ... all additional water supply should first be sought in the sector for which it shall be used.

III.P. ... new water supplies should be sought first through conservation.

IV.A.1. The development of new water resources from the undeveloped portions of the Northeast Sector should be held in reserve to maintain the 39 mgd developable yield.

IV.A.3. Development beyond the existing water systems in the Northeast Sector should not be allowed, unless assessments indicate more water can be withdrawn without further impacts to the natural ecosystems.

NHAC believes that applicant's request for proposed new source does not follow the Molokai Working Group recommendations and thus should not be permitted. However, we defer our objections to those of Molokai Hawaiian Home Lands beneficiaries and of the Molokai Working Group.

3. Laie Water Co., Inc. Wells 3855-06 to 08 & 3956-03
Polynesian Cultural Center Lagoon Well 3855-09

NHAC supports the objections filed by Hui Malama 'Aina 'O'La'i'e on August 30, 1993.

4. Campbell Estate Well 3957-01

3. (a) EXISTING SOURCE NAME AND STATE NUMBER

The Public Notice only covers Well 01, while the completed application is for a battery of wells also including Well 02 and 04 to 06. It seems that the Commission must republish this notice with the complete information and allow additional time for objection and comment.

8. QUANTITY OF WATER REQUESTED

One million gpd for 80 acres of various unspecified crops works out to 12,500 gpd. Without greater specification of the proposed crops, it is impossible to compare proposed use with Water Plan
guidelines and to determine if the proposed use is reasonable and beneficial.

Mahalo

David L. Martin, Water Claims Manager

pc: Maui Department of Water Supply
    State Department of Agriculture
    R.E. White, Jr.
    Laie Water Co, Inc.
    Polynesian Cultural Center
    Campbell Estate
1993 August 30

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

OBJECTIONS TO AND COMMENTS ON WATER USE PERMIT APPLICATIONS
/Public notice of July 27, 1993/Comments due August 30, 1993/

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Thank you for your consideration of this request.

David L. Martin
David L. Martin, Water Claims Manager
FAX TRANSMITTAL

DATE: 8/30/93

TO: COWRM

FAX NO.: 587-0219

FROM: Elizabeth Martin
David L. Martin
David C. Penn
Eric Yamamoto
Tina

PHONE: (808) 523-1445

FAX NO: (808) 599-4380

Total Number of Pages: 2

Description of Items FAXED:

Subject: Comments on Water Use Permit Application (8/30/93)

The Information contained in the accompanying transmission is private and confidential. It is intended only for the use of the individual or entity identified above. If the reader of this message is not the intended recipient, you are hereby notified that any dissemination or distribution of the accompanying communication is prohibited. No applicable privilege is waived by the party sending the accompanying document(s). If you have received this communication in error, please notify us immediately by telephone (collect) and return the original message to us at the above address via the U.S. Postal Service. We will reimburse you for postage. Thank you.
1993 August 30

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

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(Public notice of July 27, 1993/Comments due August 30, 1993)

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Thank you for your consideration of this request.

David L. Martin
Water Claims Manager
**DESCRIPTION**


- **WELL**
  - Owner: DLNR
  - Name: Waikolu Well #6
  - Island: Molokai

- **GENERAL LOCATION**
  - Molokai Tunnel

- **DRILLING COMPANY**
  - Roscoe Moss Company

- **TYPE OF RIG**: 60L

**ELEVATION, msl**: Top of drilling platform: 20 ft. Bench mark and method used to determine height of platform above ground surface: 20 ft. elevation:

- **HOLE SIZE**: 20 inch dia. to 202 ft. below drilling platform.
  - 14 inch dia. to 120 ft. below drilling platform.
  - 14 inch dia. to 145 ft. below drilling platform.

- **CASING INSTALLED**: 14 in. I.D. x 312 in. wall solid section to 30 ft. below drilling platform.
  - 14 in. I.D. x 312 in. wall perforated section to 130 ft. below drilling platform.

**HYDROLOGY**

**INITIAL WATER LEVEL**: 0 ft. below drilling platform. Date of measurement:

**INITIAL CHLORIDE**: ppm, total depth of well: 150 ft. below drilling platform.

**PUMPING TESTS**

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<th>Date</th>
<th>Start water level</th>
<th>End water level</th>
<th>Depth of well</th>
<th>Rate (gpm)</th>
<th>Draw-down (ft.)</th>
<th>CI (ppm)</th>
<th>Temp. °F</th>
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- **Elapsed Time (hours)**
  - to 24 hour test
  - to 72 hour test by STATE
  - to With 12 hour Recovery test

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<th>Depth of well</th>
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**SUBSURFACE FORMATION**

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<th>Depth (ft.)</th>
<th>Rock Description &amp; Remarks</th>
<th>Water Level (ft.)</th>
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<th>Rock Description &amp; Remarks</th>
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<td>Hard Rock</td>
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<td>50 to 90</td>
<td>Puka Rock</td>
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**N. REMARKS**: [Redacted]

**FOR DRILLER'S USE**

Job Name: [Redacted]

Job No: [Redacted]

**FOR OFFICIAL USE**

Latitude: 21° 08' 55"

Longitude: 156° 55' 26"

Well No: 0855-04
August 10, 1988

MEMORANDUM FOR THE RECORD

FROM: Mitchell Ohye

SUBJECT: Plumbness and Alignment Test - Television Logging
Waikolu Valley Wells 0855-04-06, Molokai

On August 8, 1988, the plumbness and alignment test and video logging were conducted on the Waikolu Wells 0855-04-06. Testing time for three wells took 3 1/2 hours without any problem.

The television log shows solid and perforated casings in the wells are in good condition. A video cassette of each well is on file along with a summary.

Plumbness and alignment data indicates the drift in all 3 wells are within the limits of the well specifications (see files for complete details and graphs).
WAIKOLU VALLEY WELLS
PLUMBINESS AND ALIGNMENT TEST
AUGUST 8, 1988

OBSG-416 WAIKOLU B-1

T.D. = 900 FT.
CASINO DIAM. = 14 IN., 5/16 IN. WALL THICKNESS

CABLE DESCRIPTION: 3 FT. LONG
8 WIRE RIBS - 13 1/2 IN. O.D.
5/16 IN. CABLE

SUSPENSION POINT: 8 FT. ABOVE TOP OF CASINO. T.D.C. = 2.1 FT. ABOVE BR. SURFACE.
WEATHER: PARTLY CLOUDY
PERSONNEL: JOHN, EARL (Rogola Moss Co.)
G. HARRA, TOMMY, M. MOYE (O.O.W.A.L.D.)

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<td>+.03</td>
<td>+.01</td>
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<td>B = 3.6 X = .9</td>
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<td>B = 3.5 X = 1.2</td>
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<td>+.02</td>
<td>+.01</td>
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<td>B = 3.8 X = 1.6</td>
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DIRECTION

MEAN 1 IN. PER 100 FT.

DEVIATION FROM CENTER LINES

Road

X

Y

A

Stream
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<th>INTERVALS</th>
<th>DEPTH</th>
<th>A</th>
<th>B</th>
<th>X</th>
<th>Y</th>
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<td>8% 61%  X=4.1</td>
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</table>

**TELEVISION LOGGING OF WELL 0866-06**

1715 hrs.

T.O. = 900'
Bottom of solid casing: 30'
Bottom of perf. casing: 130'
Casing dia. = 14''
Open hole = 70'

0' - 31'
Bottom of solid casing observed at 31'
Depth to top of water 37'

31' - 133'
Picture clear, casing in good condition.
Bottom of perforated casing at 133'

Set camera lens to top of casing.
T.O.L. = 2.1' above gr. surface.
**PLUMBNESS and ALIGNMENT**

**Well Name**: Waikolu Valley

**Well No.**: 0855-0604

**Date**: August 8, 1988

** Dummy **

**Total Depth**: 200 ft.

**Casing Dia.**: 14 in. I.D.

**Sol. Cas.**: 30 ft.

**Perf. Cas.**: 100 ft.

**Cage**: 13.5 in. O.D.

**Suspension Pt.**: 8 ft. above T.O.C.

**Personnel**: Weather Partly cloudy

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<th>DIRECTION</th>
<th>HORIZONTAL OFFSET</th>
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<td>.02 X</td>
<td>X=4.1</td>
</tr>
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</table>

**AL5**

![Diagram](image-url)
Mr. Manabu Tagomori  
Deputy for Water Resources Management  
Department of Land and Natural Resources  
Division of Water and Land Development  
P.O. Box 373  
Honolulu, Hawaii 96809

Dear Mr. Tagomori:

Enclosed are the Analytical results for the water sample collected from Waikolu Valley #3 Well 4-0855-06, Island of Molokai.  
The data will be stored in our computers in Reston, Virginia. Please call us if you have any questions.

Sincerely,

William Meyer  
District Chief

Enclosure
## Water Quality Data, Water Year October 1987 to September 1988

<table>
<thead>
<tr>
<th>Nitrate, Nitrite,</th>
<th>Magnesium,</th>
<th>Potassium,</th>
<th>Chloride,</th>
<th>Fluoride,</th>
<th>Silica,</th>
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<td>NO$_2$+NO$_3$</td>
<td>Ca$^{2+}$</td>
<td>S$^{2-}$</td>
<td>SO$_4^{2-}$</td>
<td>Cl$^{-}$</td>
<td>SiO$_2$</td>
</tr>
<tr>
<td>(mg/L)</td>
<td>(mg/L)</td>
<td>(mg/L)</td>
<td>(mg/L)</td>
<td>(mg/L)</td>
<td>(mg/L)</td>
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<tr>
<td><strong>DATE</strong></td>
<td><strong>TIME</strong></td>
<td><strong>NO$_2$</strong></td>
<td><strong>NO$_3$</strong></td>
<td><strong>Ca</strong></td>
<td><strong>S</strong></td>
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<td>00915</td>
<td>00925</td>
<td>00930</td>
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<td>1400</td>
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<td>3.3</td>
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<table>
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<th>Beryllium,</th>
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<th>Manganese,</th>
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<tr>
<td>Barium,</td>
<td>Cadmium,</td>
<td>Molybdenum,</td>
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<td>Li$^+$</td>
<td>Cu$^{2+}$</td>
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<td>(ug/l)</td>
<td>(ug/l)</td>
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<td><strong>DATE</strong></td>
<td><strong>BA</strong></td>
<td><strong>BE</strong></td>
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<tr>
<td>18...</td>
<td>&lt;100</td>
<td>&lt;10</td>
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</table>

<table>
<thead>
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<th>Manganese,</th>
<th>Aluminum,</th>
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<td>Nickle,</td>
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<td><strong>MN</strong></td>
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<td>18...</td>
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</table>
The following changes will be incorporated into the specifications for the subject project:

### A. SPECIFICATIONS

1. SPECIAL PROVISIONS page SP-507-1, DELETE Subsections 507.2 A and B in their entirety and SUBSTITUTE in lieu therefor, the following:

<table>
<thead>
<tr>
<th>Specification</th>
<th>Well &quot;05&quot;</th>
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<tbody>
<tr>
<td>1. Minimum capacity GPM</td>
<td>1000</td>
</tr>
<tr>
<td>2. Minimum I.D. of well casing</td>
<td>14 in.</td>
</tr>
<tr>
<td>3. Top of pump base elevation</td>
<td>777± ft.</td>
</tr>
<tr>
<td>4. Est. static water level of well (elev.)</td>
<td>735 ft.</td>
</tr>
<tr>
<td>5. Est. drawdown w/pump operating (elev.)</td>
<td>695 ft.</td>
</tr>
<tr>
<td>6. Proposed setting of top of pump bowls (elev.)</td>
<td>667 ft.</td>
</tr>
<tr>
<td>7. Maximum size pump (nominal)</td>
<td>12 in.</td>
</tr>
<tr>
<td>8. Elevation of bottom of well casing</td>
<td>647 ft.</td>
</tr>
<tr>
<td>9. Total field pumping head range (does not include column loss and discharge head loss)</td>
<td>300-310</td>
</tr>
<tr>
<td>10. Pump used to specify pump performance characteristics: (Layne 12RKBH) (stages)</td>
<td>5</td>
</tr>
</tbody>
</table>

### B. Discharge Column Assembly

1. Discharge column pipe
   a. Column pipe: ASTM A120
   b. Pipe nominal diameter: 8 inches
   c. Pipe wall thickness: 0.322 inches
2. Discharge column pipe coupling: 8 inches
3. Line Shaft:
   a. Shaft size: 1½ inches
   b. Shaft material: 416 stainless steel
   c. Coupling material: 416 stainless steel
MESSAGE: Wackold Well Pumps

On 5-25-88 George Magnatius asked you for written pump requirements we need to put out a bid for two pumps which we were asked to initiate by Prof. Dev. Br. that morning.

We need that info no later than noon today.

DeeAnn Tinio
Kohala

Well 0855-06

780' ± Hdd 35' - 43' 805' ± 80' - 97' Lef" 14' 130' 130' 1000 gpm 1000 gpm
Mr. Manabu Tagomori
Deputy for Water Resource Management
Division of Water & Land Development
Department of Land & Natural Resources
P. O. Box 373
Honolulu, Hawaii 96809

Subject: Waikolu Pump Test, March 15-18, 1988

Dear Mr. Tagomori:

Based on your recent request, we obtained some streamflow measurements on Waikolu Stream during the pump test of March 15-18, 1988. However, we would like to point out that the discharge measurements made should not be used for the intended analysis.

On March 14, 1988 the stream rose due to rain in the valley. For the period March 15-18, there were 7 inches of rain, resulting in much surface runoff, which masked the effect of pumpage on streamflow. Therefore, making it impossible to evaluate the effect of pumpage on streamflow.

If you have any questions, or need additional information, please contact Richard Nakahara at 541-2827.

Sincerely,

William Meyer
District Chief
1. Pump Test and Recovery Hours for Well 0455-05
   a. Date of test: April 26-27, 1988
   b. Timed 23.5 hours at 700 GPM
   c. Recovery hours: 0
   d. Total hours: 23.5 hours

2. Pump Test and Recovery for Well 0455-06
   b. Feb. 15, 1988. Open hole: 71.5 hrs. 2 hrs. recovery = 73.5 hrs
   c. March K-19, 1988 @ 1000 GPM 71.5 hrs. 13.5 recovery = 85 hrs
   d. March 21, 1988. Cased hole step test 2 hrs. 1 hr. recovery = 4 hrs
   e. Total hours = 196 hrs. (to follow)

Total wells (pump & recovery hrs.) for 0455-05 & 06 = 176 hrs. x #?
April 18, 1987

Mr. William Meyer
District Chief
U.S. Geological Survey
P.O. Box 50166
Honolulu, Hawaii 96850

Attention: Mr. John Yee

Dear Mr. Meyer:

Water Sample, Waikolu Valley #3 Well 0855-06, Molokai

Transmitted under separate cover to Mr. John Yee of your office is a one-gallon water sample taken on March 18, 1988 from the Waikolu Valley #3 Well 0855-06.

We would appreciate your running the usual chemical analyses and forwarding us a copy of the results as soon as they become available.

Sincerely,

MANABU TAGOMORI
Deputy for Water Resource Management

MO:ko
A pumping test was conducted on the subject well from March 15-16, 1986. At a rate of 1000 gallons per minute the water level in the well dropped 43 ft. from a static of 80 ft. The temp. of the water was a steady 60°F. and chlorides at 13 ppm.

On March 16, 1986, 12:00 hrs., 22 hours into the test pump equipment began to make noise. The contractor requested that we stop the test. We resumed testing after a brief 20 minute shut down.

By Mitchell K. Cal
PUMPING TEST RECORD

for

Molokai Valley 3-6 Well 0945-66
(Name) (No.)

Molokai Island 25-9W-6 Project or Job No. 1111-21 1988

Description of Well--
1. Elevation: ground surface _______ ft., top of casing _______ ft.,
   rotary table _______ ft., referenced to _______ benchmark.
2. Total depth of well _______ ft.; or _______ ft. elevation, msl
3. 14 in. solid casing to _______ ft. depth, perforated to _______ ft. depth
4. Static water level on _______ 19: _______ ft. below ground
   surface, top of casing; or _______ ft. elevation msl
   measured _______ method

Description of Pump and Pump Setting--
5. _______ type pump with _______ stage bowl assembly
6. Gasoline ____ diesel, electric, power with _______ horsepower
7. Shaft speed: _______ rpm at _______ gpm flow
8. Depth of pump intake: _______ ft. below grd.; or _______ ft. elev. msl
9. Depth of airline bottom: _______ ft. below grd.; or _______ ft. elev. msl
10. Center of gage: _______ ft. elev., msl. Flow measured with _______ meter
11. Test conducted by _______ (signature)

<table>
<thead>
<tr>
<th>Date &amp; Time</th>
<th>Sample No.</th>
<th>Pumping rate (gpm)</th>
<th>Airline Pressure (Psi)</th>
<th>Drawdown (Psi) Feet</th>
<th>Chlorides (ppm)</th>
<th>Temp. (°F)</th>
<th>Cond. (mhos 25°C)</th>
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<td>94.0 (STATIC)</td>
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<tr>
<td>9900</td>
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<tr>
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<td>700</td>
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Sheet No. 1 of 2 Sheets
## PUMPING TEST RECORD

for

**MAKOKI VALLEY**

Well 0855-60

(name)

(No.)

Molokai Island 25-9W-2

Project or Job No. MEC. 21 1978

<table>
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<tr>
<th>Date &amp; Time</th>
<th>Sample No.</th>
<th>Pumping rate (gpm)</th>
<th>Airline (feet)</th>
<th>Drawdown (feet)</th>
<th>Chlorides (ppm)</th>
<th>Temp. (°F)</th>
<th>Cond. (mhmhos 25°C)</th>
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<td>G.R.M</td>
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**Pump Test**

**WELL #6**

*WAIKOLOA MOLOKAI*
WAIKOLU VALLEY 0855-G6
STEP-DRAWDOWN
MARCH 21, 1988
Csq. Dia. = 14 in.
Csq. Sol. = 30 ft
Csq. Perf. = 130 ft.
Q = 700, 1000, 1400 gpm
T.D. = 202 ft.

Cased Hole
Mar. 21, 1988

Uncased Hole
Feb. 15, 1988

GALLONS PER MINUTE X 100
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**Pump Intake Set:** 120 Feet.

**Air Line Set 1/5 Feet**

**Water Levels Recover**

**Pump Stop 10:05 A.M.**

---

**Pump Test**

**Well #6**

**Wai'olua Molokai**
### Pump Intake Data

**Date:** 2/15/86

| Time (AM) | Open Hole | Flow (GPM) | A.I.R. | Est. Date | Time (AM) | Flow (GPM) | A.I.R. | Pump Intake Set. 120 Feet
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**Water Levels Recovery**

- **Pump Stop 10:05 AM**

**WELL #6**

**Waikolu Molokai**

**Note:** When changing recorder chart write down time.
Wailuku Valley - Job# 35-9W-C

0855-86

#3

Pumped 24 Hrs.
At 1400 GPM.

202'

120'

29'

17' Draw Down

← Stabilized

Note: Not to Scale
Break Through Solid Rock - Hole Discharged.

Solid Rock - 60 ft

100 ft plus - Water
Waikolu Valley Well 0855-06
Waikolu, Molokai, Hawaii

AS BUILT SECTION
Drilled: February 1988
Driller: Roscoe Moss Co.

NOT TO SCALE
PUMPING TEST RECORD
for
WAIKOLOA VALLEY  Well 08033, 1964

(Name)  (No.)

WAIKOLOA Island  Project or Job No. 19

Description of Well--
1. Elevation: ground surface ft., top of casing ft., rotary table ft., referenced to benchmark.
2. Total depth of well 200 ft.; or ft. elevation, msl
3. 14 in. solid casing to 50 ft. depth, perforated to 150 ft. depth
4. Static water level on March 16, 1964: 34 ft. below ground surface, top of casing; or -- ft. elevation msl
   measured -- method

Description of Pump and Pump Setting--
5. type pump with stage bowl assembly
6. Gasoline (diesel), electric, power with ___ horsepower
7. Shaft speed: ____ rpm at ____ gpm flow
8. Depth of pump intake: 170 ft. below ground; or ___ ft. elev. msl
9. Depth of airline bottom: 115 ft. below ground; or ___ ft. elev. msl
10. Center of gage: ___ ft. elev., msl. Flow measured with ___

Date & Sample Pumping Airline Drawdown Chlorides Temp. Cond.
Time No. rate (gpm) psi (feet) psi (feet) (ppm) (°F) (mmhos 25°C)

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<th>Sample No.</th>
<th>Pumping rate (gpm)</th>
<th>Airline psi (feet)</th>
<th>Drawdown psi (feet)</th>
<th>Chlorides (ppm)</th>
<th>Temp. (°F)</th>
<th>Cond. (mmhos 25°C)</th>
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START PUMPING - ADJUST TO 1000 GPM

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<th>Drawdown psi (feet)</th>
<th>Chlorides (ppm)</th>
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# Pumping Test Record

**Project or Job No.:** 19  
**Well No.:** 0855-84

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<th>Drawdown (feet)</th>
<th>Chlorides (ppm)</th>
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**STOP PUMPING - ENGINE TROUBLE**

**Elapsed Time:** 1000 GPM  
**MIN. Q = 9.8 GPM**

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**START PUMP - ADJUST TO 1000 GPM**

| 12:40       | 20.0    | 16.0     | 34.7      |

---

**Comments:**

- **Note:** The pump was stopped due to engine trouble. The minimum flow rate (Q) was recorded as 9.8 gpm for the recorded data. The pump was then adjusted to 1000 gpm. The recorded data includes measurements for pump rate, air line distances, drawdown, chlorides, temperature, and conductivity.
## PUMPING TEST RECORD

**For:**

**WAIKOLOA VALLEY Well 08/16-2404**

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**Rain:**

- Rain gauge: 0.00
- Rain: [Additional notes]
# PUMPING TEST RECORD

**for**

**WINLOW VALLEY**

**Well 0966-85-04**

**Malakoff Island**

**Project or Job No.** 19

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**Notes:**
- Rain Date: 1/6
- Adjust Rate
- Water Eroding
- Stop Pumping - Recovery
- Test Pumped
- We. @ 954 gpm
- For 49.6 hrs.
# PUMPING TEST RECORD

for

**WAIVOLL VALLEY**  
(name)  

Well **056-04**  
(No.)  

**MALOON** Island  
Project or Job No. **19**

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**1 ADD**  
STOP PUMPING - RECOVERY

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Sheet No. 5 of 8 sheets
PUMPING TEST RECORD

for

Weston Valley

(date)

Well 0856-DE-04

(name)

(project or job no.)

Sheet No. 4 of 4 sheets

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WAIKOLU WELL 0855-0904
March 18-19, 1988
RECOVERY after 72 hours pumping at 1000 gpm
WAIKOLU VALLEY WELL 0855-064
Waikolu, Molokai, Hawaii

AS BUILT SECTION
Drilled: February 1988
Driller: Roscoe Moss Co.

NOT TO SCALE

Job No. 35-9W-C
Mr. Manabu Tagomori
Division of Water and Land Development
P.O. Box 373
Honolulu, Hawaii 96809

Dear Mr. Tagomori:

We are pleased to inform you that your Conservation District Use Application for drilling test wells at TMK: 6-1-01: 2, Waikolu Valley, Molokai, was approved on June 26, 1987 subject to the following conditions:

1. The applicant shall comply with all applicable statutes, ordinances, rules and regulations of the Federal, State and County governments, and applicable parts of Section 13-2-21, Administrative Rules, as amended;

2. The applicant, its successors and assigns, shall indemnify and hold the State of Hawaii harmless from and against any loss, liability, claim or demand for property damage, personal injury and death arising out of any act or omission of the applicant, its successors, assigns, officers, employees, contractors and agents under this permit or relating to or connected with the granting of this permit;

3. Since this approval is for use of conservation lands only, the applicant shall obtain appropriate authorization through the Division of Land Management, State Department of Land and Natural Resources for the occupancy of State lands;
4. If any unanticipated sites or remains of historic or prehistoric interest (such as shell, bone or charcoal deposits, human burials, rock or coral alignments, paving, or walls) are encountered during construction, the applicant shall stop work and contact the Historic Preservation Office at 548-7460 or 548-6408 immediately;

5. The applicant shall comply with all applicable Public Health Regulations;

6. A fire contingency plan, acceptable to the Division of Forestry and Wildlife, Department of Land and Natural Resources, shall be implemented during and after construction;

7. Any construction, alteration, moving, demolition and repair of any building or other improvement on lands within the Conservation District, authorized by the Board, shall be subject to the building and grading codes of the respective counties in which the lands are located; provided that prior to the commencement of any construction, alteration, or repair of any building or other improvement, four (4) copies each of the final location map, plans, and specifications shall be submitted to the Chairperson, or his authorized representative, for approval of which three (3) copies will be returned;

8. Any work or construction to be done on the land shall be initiated within one (1) year of the approval of such use, and all work and construction must be completed within three (3) years of the approval of such use. Failure to comply with this condition shall render this application null and void;

9. The applicant shall flag the terraces near Well Site #2 with a 30-foot buffer zone to avoid inadvertent damage to archaeological sites as a result of construction. The applicant shall also flag the retaining wall in the vicinity of Well Site #3 and inform the construction crew of its existence;

10. The applicant shall provide a water connection to facilitate movement of stream macrofauna over the dry portion of the stream in consultation with the Division of Aquatic Resources and the U.S. Fish and Wildlife Service;
11. The applicant shall develop monitoring plans in consultation with the Division of Aquatic Resources, the U.S. Fish and Wildlife Service, and the U.S. Geological Survey. The applicant shall monitor the wells and the effect of the wells upon the streamflow and the stream macrofauna during and after test pumping to avoid negative impact upon Waikolu Stream and the native Hawaiian macrofauna which inhabit the stream. One copy of the monitoring report shall be sent to the Office of Conservation and Environmental Affairs;

12. If monitoring indicates that the streamflow and aquatic macrofauna are negatively impacted by the test drilling, the applicant shall cease pumping at once;

13. Should the test wells prove successful, the applicant shall submit a new Conservation District Use Application and an Environmental Impact Statement for development of the wells;

14. If the wells prove unsatisfactory, the applicant shall seal them properly so as not to cause any detrimental effects to the ground water resources of the area;

15. That failure to comply with any of these conditions shall make this Conservation District Land Use application null and void; and

16. Other terms and conditions as prescribed by the Chairperson.

Please acknowledge receipt of this permit, with the above noted conditions, in the space provided below. Please sign two copies. Retain one and return the other.
Should you have any questions on any of these conditions, please feel free to contact our Office of Conservation and Environmental Affairs staff at 548-7837.

Very truly yours,

WILLIAM W. PATY, Chairperson
Board of Land and Natural Resources

Receipt acknowledged

Applicant's Signature

cc: Maui Board Member
    Maui Land Agent
    Maui County Depts. of Planning,
    Public Works, Water Supply
    Dept. of Hawaiian Home Lands
    U.S. Fish and Wildlife Service
    National Park Service
    DOH/OEQC/EC/OHA/DPED
WELL DRILLING PERMIT

for

Waikolu Valley Exploratory Wells
State Well Nos. 0855-04 to 06
Waikolu, Molokai

TO: Division of Water and Land Development
P.O. Box 373
Honolulu, Hawaii 96809

In accordance with Chapter 166 of Title 13, "Rules for the Control of Ground Water Use in the State of Hawaii," your application to drill Waikolu Valley Exploratory Wells, State Well Nos. 0855-04 to 06 is approved subject to compliance with all applicable rules, ordinances, and laws.

APR 14 1987

Date of Issuance
cc: USGS
Dept. of Health,
    Drinking Water Program
    Maui Dept. of Water of Supply

Willian W. Paty
Chairperson of the Board
WELL DRILLING PERMIT

for

Waikolu Valley Exploratory Wells
State Well Nos. 0855-04 to 06
Waikolu, Molokai

TO: Division of Water and Land Development
P.O. Box 373
Honolulu, Hawaii 96809

In accordance with Chapter 166 of Title 13, "Rules for the Control of Ground Water Use in the State of Hawaii," your application to drill Waikolu Valley Exploratory Wells, State Well Nos. 0855-04 to 06 is approved subject to compliance with all applicable rules, ordinances, and laws.

APR 14 1987

Date of Issuance
cc: USGS
Dept. of Health,
Drinking Water Program
Maui Dept. of Water of Supply

WILLIAM W. PATY
Chairperson of the Board
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 Molokai Tax Map Key . Attach a plot plan showing well location referenced to established property boundaries.

2. WATER USER Molokai Irrigation System Telephone ____________________________

3. PROPOSED DRILLING COMPANY: ____________________________

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):

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 _____ gallons ☐ Monthly _____ gallons ☐ Yearly _____ gallons

7. PROPOSED PUMP OR FLOW CAPACITY: ____________________________ gallons per minute

Signature: ____________________________ Date: ____________________________

Water User

Signature: ____________________________ Date: ____________________________

Landowner of Well Site

For Official Use:

State Well No. 0855-04, 05, 06

DLNR Permit No. ____________________________

DLNR Application No. ____________________________
February 26, 1986

MEMORANDUM FOR THE FILES

FROM: Dan Lum

SUBJECT: Proposed Waikolu Valley Wells, Molokai

No. of Wells . . . . . . . . . . . . Three
T.D. of each . . . . . . . . . . . . 200 feet
Casing Size . . . . . . . . . . . . 14-inch
Solid Casing (in alluvium) . . . . . . 0 - 30+ feet
Screen Casing (in basalt) . . . . . . 30+ ft. - 130 ft.
Open Hole . . . . . . . . . . . . 130 - 200 ft.
Drilled Hole Size . . . . . . . . . . . 20 inch, 0 - 30+ ft.
16 inch, 30+ ft. - 200 ft.
Maximum Depth of Well . . . . . . 300 feet
Pumping Test . . . . . . . . . . . . 150 hrs. each well
Test Range . . . . . . . . . . . . 300 to 1400 gpm

DANIEL LUM
**DRILLING LOG**

**RUSCOE MOSS COMPANY**
630 AHUA STREET • HONOLULU, HAWAII 96819
TELEPHONE (808) 839-6988 • 833-1444

---

**Date:** MARCH-17-1988  
**Job No.:** 15-86  
**Hole No.:**  
**Elevation:** ft.  

**Customer:** DLAIR  
**Location:** WAIKOUI, MOLOKAI

---

**Driller:** L. MOALEI  
**Hrs.:** 12  
**Rig:**  

**Helper:** E. CHING  
**Hrs.:** 12  
**Gas:**  
**Oil:**  
**Repairs:**

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

---

**Bit-Size:**  
**Type:**

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

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

---

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

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**Remarks:**

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**Signed:**

---

**Date:** MARCH-17-1988
**Date:** MARCH-16-1988  
**Job No.:** 15-86  
**Hole No.:**  
**Elevation:**  
**Customer:** DLNR  
**Location:** WAIKOUI, MOLOKAI

**Driller:** L. MOAHLII  
**Hrs.:** 12  
**Rig:**  
**Helper:** E. CHING  
**Hrs.:** 12  
**Gas:**  
**Oil:**  
**Repairs:**

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

**Bit-Size:**  
**Type:**  
**Casing-Size:** in., Length in hole ft., in., Amt. Perforated ft., in.  
**Depth Start:** ft., Depth Stop ft., Feet Drilled  
**Water Levels, Time:** M ft., Time M ft.

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>Top</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Run Pump Test</td>
<td></td>
</tr>
</tbody>
</table>

**Remarks:**

---

**Signed:**  
**Date:** MARCH-16-1988
**DRILLING LOG**

**Date:** MARCH-15-1988  
**Job No.:** 15-86  
**Hole No.:**  
**Elevation:** ft.  

**Customer:** DLNR  
**Location:** WAIKULU, MOLOKAI

<table>
<thead>
<tr>
<th>Driller</th>
<th>Helper</th>
<th>Hrs.</th>
<th>Rig</th>
<th>Hrs.</th>
<th>Gas</th>
<th>Oil</th>
<th>Hrs.</th>
<th>Repairs</th>
<th>Hrs.</th>
<th>Or. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>L. MOAULI</td>
<td>E. CHING</td>
<td>8</td>
<td></td>
<td>12</td>
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<table>
<thead>
<tr>
<th>Bit-Size</th>
<th>Type</th>
<th>Casing-Size</th>
<th>in., Length in hole</th>
<th>ft.</th>
<th>in., Amt. Perforated</th>
<th>ft.</th>
<th>in.</th>
<th>Depth Start</th>
<th>ft., Depth Stop</th>
<th>ft., Feet Drilled</th>
<th>Water Levels, Time</th>
<th>M</th>
<th>ft., Time</th>
<th>M</th>
<th>ft.</th>
</tr>
</thead>
</table>

**Measurements**

<table>
<thead>
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<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>Top</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>WAIT IN THE TUNNEL</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>WAIT FOR THE STATE PEOPLE, START PUMP</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>TEST 2:00 P.M.</td>
<td></td>
</tr>
</tbody>
</table>

**Remarks:**

**Signed:** Leilani MOAULI  
**Date:** MARCH-15-1988
**Date:** March 14, 1988  
**Job No.:** 15-86  
**Hole No.:**  
**Customer:** DLNR  
**Location:** Waikouli, Molokai

<table>
<thead>
<tr>
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<th>L. Moanalii</th>
<th>8 Hrs.</th>
<th>Rig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Helper</td>
<td>E. Ching</td>
<td>8 Hrs.</td>
<td>Gas</td>
</tr>
<tr>
<td>Arv. Job</td>
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<tr>
<td>Lv. Job</td>
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<tr>
<td>Hrs.</td>
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<td></td>
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<tr>
<td>Repairs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Or. No.</td>
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<table>
<thead>
<tr>
<th>Bit-Size</th>
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<th>Type</th>
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<tbody>
<tr>
<td>Casing-Size</td>
<td>in.,</td>
<td>Length in hole ft.</td>
</tr>
<tr>
<td>Drilled Depth</td>
<td>ft.,</td>
<td>Depth Stop ft.,</td>
</tr>
<tr>
<td>Water Levels, Time</td>
<td>M ft.,</td>
<td>Time M ft.</td>
</tr>
</tbody>
</table>

**Measurements**

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>PICK UP OIL, WENT UP THE TUNNEL, WAIT FOR THE WATER TO COME DOWN, WATER TO HIGH, WENT IN THE TUNNEL, WAIT FOR THE STATE PEOPLE TO RUN THE TEST, STATE PEOPLE HAVE TROUBLE IN THE TUNNEL, COME OUT THE TUNNEL.</td>
</tr>
</tbody>
</table>

**Remarks:**

Signed: L. Moanalii  
**Date:** March 14, 1988
Date: MARCH-12-1988
Job No.: 15-86
Location: WAIKOLU, MOLOKAI

Customer: DLNR

Driller: L. MOAALII
Helper: E. CHING
Arv. Job: _______ Hrs.

Hole No.: _______ Elevat. ft.

Rig: _____________________________
Gas: _____________________________
Oil: _____________________________
Repar.: ____________________________

Or. No.: __________________________

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

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>FINISH HOOK UP DISCHARGE LINE, CUT TREES TO HOLD LINE UP. RUN THE PUMP TO SEE IF THE DISCHARGE LINE STAY UP.</td>
</tr>
</tbody>
</table>

Remarks:

Signed: FRED WOODCUTTER
Date: MARCH-12-1988
Date: **MARCH-10-1988**  
Job No.: **15-86**  
Hole No.:  
Elevation:  

Customer: **DLNR**  
Location: **WAIKOLEU MOLOKAI**

<table>
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<tr>
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<tbody>
<tr>
<td>L. MOALII</td>
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<th>Casing-Size</th>
<th>in.</th>
<th>Length in hole</th>
<th>in.</th>
<th>Amt. Perforated</th>
<th>in.</th>
<th>Depth Start</th>
<th>ft.</th>
<th>Depth Stop</th>
<th>ft.</th>
<th>Feet Drilled</th>
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<tbody>
<tr>
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<table>
<thead>
<tr>
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<th>ft.</th>
<th>Time</th>
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<th>ft.</th>
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<tr>
<td></td>
<td>FINISH LEVELS JOB SITE #1</td>
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<table>
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<th>B</th>
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**Remarks:**

**Signed:**  
**Leslie Uloaahi**  
**Date:** **MARCH-10-1988**
**DRILLING LOG**

Date: **MARCH-9- 1988**  
Job No: **15-86**  
Hole No:  
Elevation:  

Customer: **DINR**  
Location: **WAIKOLU, MOLOKAI**

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<tr>
<th>Driller</th>
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<tbody>
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<table>
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<th>Depth Stop</th>
<th>ft.</th>
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<th>M</th>
<th>ft.</th>
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<tbody>
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<td>A</td>
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<table>
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<th>Formation</th>
<th>Remarks</th>
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**LEVELS JOB SITE #1**
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<tbody>
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<td><strong>FINISH LEVELS JOB SITE</strong></td>
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<tr>
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<td><strong># 2, WORKING ON SITE #1</strong></td>
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Remarks:

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<th>Air. R.</th>
<th>Date</th>
<th>Time</th>
<th>GPD</th>
<th>Air. R.</th>
<th>Pump Intake Set.</th>
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<tbody>
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<td>MM:SS</td>
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<td>YYYY</td>
<td>MM:SS</td>
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<td>120 Feet.</td>
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<td>12:30PM</td>
<td>1000</td>
<td></td>
<td>03/16</td>
<td>3:00PM</td>
<td>1400</td>
<td></td>
<td>Pump Stop 10:05 AM</td>
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<tr>
<td>1:00PM</td>
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<td>3:00PM</td>
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<td>Time</td>
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<td>1000</td>
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<td>3:30PM</td>
<td>1400</td>
<td>7</td>
<td>A.I.R.</td>
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<td>1200</td>
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<td>4:00PM</td>
<td>1400</td>
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<td>10 SEC.</td>
</tr>
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<td>1200</td>
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<td>1400</td>
<td>675</td>
<td>3:00 PM</td>
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<td>1400</td>
<td>9</td>
<td></td>
<td>5:30AM</td>
<td>1400</td>
<td>675</td>
<td>4:00 PM</td>
</tr>
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<td>3:00PM</td>
<td>1400</td>
<td>8</td>
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<td>6:00AM</td>
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<td>675</td>
<td>5:00 PM</td>
</tr>
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<td>3:30PM</td>
<td>1400</td>
<td>8</td>
<td></td>
<td>6:30AM</td>
<td>1400</td>
<td>675</td>
<td>6:00 PM</td>
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<tr>
<td>4:00PM</td>
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<td>7:00 AM</td>
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<td>4:30PM</td>
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<td>650</td>
<td>8:00 AM</td>
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<td></td>
<td>8:00AM</td>
<td>1400</td>
<td>650</td>
<td>9:00 AM</td>
</tr>
<tr>
<td>5:30PM</td>
<td>1400</td>
<td>8</td>
<td></td>
<td>8:30AM</td>
<td>1400</td>
<td>650</td>
<td>10:00 AM</td>
</tr>
<tr>
<td>6:00PM</td>
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<td>10:30 AM</td>
</tr>
<tr>
<td>6:30PM</td>
<td>1400</td>
<td>8</td>
<td></td>
<td>9:30AM</td>
<td>1400</td>
<td>650</td>
<td>11:00 AM</td>
</tr>
<tr>
<td>7:00PM</td>
<td>1400</td>
<td>8</td>
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<td>10:00AM</td>
<td>1400</td>
<td>650</td>
<td>11:30 AM</td>
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<tr>
<td>7:30PM</td>
<td>1400</td>
<td>8</td>
<td></td>
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<td>1400</td>
<td>650</td>
<td>12:00 AM</td>
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<td>2:00 PM</td>
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<td>2:00AM</td>
<td>1400</td>
<td>725</td>
<td>4:00 PM</td>
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</tbody>
</table>

**Pump Test**

WELL #6

Waikouli Molokai
## DRILLING LOG

**Date:** 3 - 4 - 1988  
**Job No.:** 15-86  
**Hole No.:**  
**Customer:** DLNR  
**Location:** WAIKOUI MOLOKAI

<table>
<thead>
<tr>
<th>Driller</th>
<th>10 Hrs.</th>
<th>Rig</th>
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</thead>
<tbody>
<tr>
<td>L. Moralii</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Helper</td>
<td>9 Hrs.</td>
<td>Gas</td>
<td>Oil</td>
</tr>
<tr>
<td>E. Ching</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Helper</td>
<td>9 Hrs.</td>
<td>Repairs</td>
<td></td>
</tr>
<tr>
<td>P. Kuwamura</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Remarks:

- **Carry pipe by hand between two stream.**
- **Hook up discharge line, make 10 inch flange to fit discharge line. The other flange was 8".**

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

**Measurements:**

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

**Remarks:** ONE HOUR TRAVELING

**Signed:** LaFaro Moralii  
**Date:** 3 - 4 - 1988
Date: 3-3-1988  Job No: 15-86  Hole No: Elevation ft.
Customer: DLNR  Location: WAILEA-MOLOKAI

Driller: L. IYODAII  10 Hrs.  Rig: 
Helper: E. CHING  10 Hrs.  Gas: Oil: 
Helper: PAUL KUWAIKURA  10 Hrs.  Repairs: 

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

Bit-Size: Type: 
Depth Start: ft., Depth Stop: ft., Feet Drilled: 

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>PICK UP PIPE FROM THE PIER. MAKE TWO</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TRIP IN THE TUNNEL.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>UNLOAD PIPE BY HAND.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CARRY DOWN TO THE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>LEVELS FROM THE TOP.</td>
</tr>
</tbody>
</table>

Signed:  Leonard U. Sasaki  Date: 3-3-1988
### DRILLING LOG

**Customer:** DLNR  
**Location:** WAIKOUI MOLOKA'I

<table>
<thead>
<tr>
<th>Date: 3 - 2 - 1988</th>
<th>Job No.: 15-86</th>
<th>Hole No.</th>
<th>Elevation (ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer: DLNR</td>
<td>5601</td>
<td>Location: WAIKOUI MOLOKA'I</td>
<td></td>
</tr>
</tbody>
</table>

| Driller: L. MORAALU | Hrs: 3 | Rig:  
|--------------------|-------|-----|
| Helper: E. CHING   | Hrs: 2 | Gas:  
| Helper:            | Hrs:   | Oil:  
|                   | Hrs:   | Repairs:  

|----------|---------|---------|

<table>
<thead>
<tr>
<th>Bit-Size</th>
<th>Type</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Casing-Size</th>
<th>in.</th>
<th>Length in hole (ft.)</th>
<th>in.</th>
<th>Amt. Perforated</th>
<th>ft.</th>
<th>in.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Depth Start</th>
<th>ft.</th>
<th>Depth Stop</th>
<th>ft.</th>
<th>Feet Drilled</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Water Levels, Time</th>
<th>M</th>
<th>ft.</th>
<th>Time</th>
<th>M</th>
<th>ft.</th>
</tr>
</thead>
</table>

#### Measurements

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

*WENT IN THE TUNNEL WITH GEORGE TO LOOK AT THE PIPE LINE. *

*PUT ON NEW STARTER FOR PKUP TRUCK. EXTEND TRAILER TO HAUL LONG PIPE.*

#### Remarks:

**Signed:** L. MORAALU  
**Date:** 3 - 2 - 1988
Date: MARCH 1-1 1988  Job No.: 15-86  Hole No.: 86  Elevation: 90 ft.
Customer: DLNR  Location: WAILEA, MOLOKAI

Driller: L. MOHALI  B Hrs.  Rig: 
Helper: E. CHING  B Hrs.  Gas:  
Helper:  Hrs.  Repairs: 

<table>
<thead>
<tr>
<th>Bit-Size</th>
<th>Type</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Casing-Size</th>
<th>in., Length in hole</th>
<th>ft.</th>
<th>in., Amt. Perforated</th>
<th>ft.</th>
<th>in.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Depth Start</th>
<th>ft., Depth Stop</th>
<th>ft., Feet Drilled</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Water Levels, Time</th>
<th>M</th>
<th>ft., Time</th>
<th>M</th>
<th>ft.</th>
</tr>
</thead>
</table>

Measurements

Depth  | Formation  | Remarks  | Top  |
---|---|---|---|

WENT IN THE TUNNEL
TURN THE TEST PUMP AROUND, FIX TRAILER
TO CARRY LONG PIPE
WENT OUT THE TUNNEL

Remarks:

---

Signed: Leialoha Ukaalii Date: 3-1-1988
## DRILLING LOG

**Date:** FEB. 29- 1988  
**Job No.:** 15-86  
**Hole No.:**  
**Elevation:** __________ ft.  
**Customer:** DLNR  
**Location:** MOLOKAI

<table>
<thead>
<tr>
<th></th>
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<th></th>
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</thead>
<tbody>
<tr>
<td>L. Morali</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Hrs.</td>
<td></td>
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<table>
<thead>
<tr>
<th>Rig</th>
<th>Hrs.</th>
<th>Hrs.</th>
<th>Hrs.</th>
<th>Hrs.</th>
<th>Or. No.</th>
</tr>
</thead>
<tbody>
<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bit-Size</th>
<th>Type</th>
<th>Casing-Size</th>
<th>in., Length in hole</th>
<th>ft.</th>
<th>in., Amt. Perforated</th>
<th>ft.</th>
<th>in.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Depth Start</th>
<th>ft.</th>
<th>Depth Stop</th>
<th>ft.</th>
<th>Feet Drilled</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Water Levels, Time</th>
<th>M</th>
<th>ft.</th>
<th>Time</th>
<th>M</th>
<th>ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Remarks:**
WENT TO GEORGE OFFICE, WANT TO LOOK FOR DISCHARGE LINE. PICK UP BOX FROM THE AIRPORT

**Depth** | **Formation** | **Remarks** | **Top** | **A** | **B** |
|-----------|---------------|-------------|---------|------|------|

<table>
<thead>
<tr>
<th>Remarks:</th>
</tr>
</thead>
</table>

**Signed:** Date FEB. 29- 1988
**DRILLING LOG**

**Date:** March 22, 1988  
**Job No.:** 15-86  
**Hole No.:**  
**Elevation:** ft.  
**Customer:** DLIR  
**Location:** WAIKOLU MOLOKAI

<table>
<thead>
<tr>
<th>Driller</th>
<th>Helper</th>
<th>Rig</th>
<th>Gas</th>
<th>Oil</th>
<th>Repairs</th>
<th>Or. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>L. Moraikii</td>
<td>E. Ching</td>
<td>10 Hrs.</td>
<td>10 Hrs.</td>
<td>Gas</td>
<td>Oil</td>
<td>Repairs</td>
</tr>
<tr>
<td>Helper</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Bit-Size**  
**Type**

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

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

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>Top</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>FINISH PULL OUT TEST</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>PUMP, BRAKE DOWN</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>DRILL TOOL, WELD 2 FT.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>CASING TO THE WELL</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>CASING, LAY DOWN THE</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>RIG, START MOVE TO</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>THE # 2 WELL</td>
<td></td>
</tr>
</tbody>
</table>

**Measurements**

**Remarks:**

**Signed:** Seakwie M. Kaloali   
**Date:** 3-22-1988
**Date**: March 21, 1988  
**Job No.**: 15-86  
**Hole No.**:  
**Elevation**: ft.  
**Customer**: DLNR  
**Location**: Waikolu, Molokai

**Driller**: L. Moraalii  
**Rig**:  
**Helper**: E. Ching  
**Gas**:  
**Oil**:  
**Hrs.**: 10  
**Repairs**:  
**Arv. Job**:  
**Lv. Job**:  
**Or. No.**:  
**Hrs.**:

<table>
<thead>
<tr>
<th>Bit-Size</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Casing-Size</th>
<th>in., Length in hole</th>
<th>ft.</th>
<th>in., Amt. Perforated</th>
<th>ft.</th>
<th>in.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
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<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Depth Start</th>
<th>ft.</th>
<th>Depth Stop</th>
<th>ft.</th>
<th>Feet Drilled</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Water Levels, Time</th>
<th>M</th>
<th>ft.</th>
<th>Time</th>
<th>M</th>
<th>ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hook up engine to pump and discharge line, start the test pump 9:30 am. Shot down 12:30 pm. Pull out test pump</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Formations</th>
</tr>
</thead>
<tbody>
<tr>
<td>HOOK UP ENGINE TO PUMP AND DISCHARGE LINE, START THE TEST PUMP 9:30 AM. SHOT DOWN 12:30 PM. PULL OUT TEST PUMP</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jack recovery for the well from 12:30 PM to 1:20 PM</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Signed</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>L. Moraalii</td>
<td>3-21-1988</td>
</tr>
<tr>
<td>Date</td>
<td>Time</td>
</tr>
<tr>
<td>----------</td>
<td>---------</td>
</tr>
<tr>
<td>3-21-88</td>
<td>9:30 AM</td>
</tr>
<tr>
<td></td>
<td>10:00</td>
</tr>
<tr>
<td></td>
<td>10:30</td>
</tr>
<tr>
<td></td>
<td>10:31</td>
</tr>
<tr>
<td></td>
<td>11:00</td>
</tr>
<tr>
<td></td>
<td>11:30</td>
</tr>
<tr>
<td></td>
<td>11:31</td>
</tr>
<tr>
<td></td>
<td>12:00 PM</td>
</tr>
<tr>
<td></td>
<td>12:30</td>
</tr>
</tbody>
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**Recovery**

<table>
<thead>
<tr>
<th>Time</th>
<th>PSI</th>
</tr>
</thead>
<tbody>
<tr>
<td>12:32</td>
<td>32.0</td>
</tr>
<tr>
<td>12:34</td>
<td>32.50</td>
</tr>
<tr>
<td>12:36</td>
<td>32.75</td>
</tr>
<tr>
<td>12:38</td>
<td>33.0</td>
</tr>
<tr>
<td>12:45</td>
<td>33.0</td>
</tr>
<tr>
<td>1:10</td>
<td>33.75</td>
</tr>
<tr>
<td>1:20</td>
<td>34</td>
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</table>

**WHOLE WEL.**

15-86P.
<table>
<thead>
<tr>
<th>Time</th>
<th>P&amp;I Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:30 PM</td>
<td>125</td>
</tr>
<tr>
<td>1:30 PM</td>
<td>175</td>
</tr>
<tr>
<td>1:30 PM</td>
<td>150</td>
</tr>
<tr>
<td>1:30 PM</td>
<td>175</td>
</tr>
<tr>
<td>1:30 PM</td>
<td>175</td>
</tr>
<tr>
<td>1:30 PM</td>
<td>150</td>
</tr>
<tr>
<td>1:30 PM</td>
<td>175</td>
</tr>
<tr>
<td>1:30 PM</td>
<td>175</td>
</tr>
<tr>
<td>1:30 PM</td>
<td>150</td>
</tr>
<tr>
<td>1:30 PM</td>
<td>175</td>
</tr>
</tbody>
</table>

**NOTE:**

Mr. Rummells please call Mitchell. Give him this paper. Report for the well recovery.

Thanks, Morr

Received Mar 22, 1988
Date: **MARCH 19 1988**  Job No: **15-P6**  Hole No:  
Customer: **OIL AIR**  Location: **WAIKOLI YOLOKAI**

<table>
<thead>
<tr>
<th>Driller</th>
<th>Helper</th>
<th>Rig</th>
<th>Gas</th>
<th>Oil</th>
</tr>
</thead>
<tbody>
<tr>
<td>L. MOAALI</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Helper</td>
<td>Helper</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Gas</td>
<td>Oil</td>
<td></td>
</tr>
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<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

**Bit-Size**

**Casing-Size** in., Length in hole ft., in., Amt. Perforated ft., in.

**Depth Start** ft., Depth Stop ft., Feet Drilled 

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

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>Top</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><strong>JACK RECOVER FOR THE WELL. RECOVER THE WELL 4:00 AM.</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Remarks:**

**Signed:** Lelio Manalo  **Date:** **MARCH 19-1988**
**DRILLING LOG**

**RUSCO MOSS COMPANY**

830 AHUA STREET • HONOLULU, HAWAII 96819
TELEPHONE (808) 839-6888 • 833-1444

---

**Date**: MARCH 18, 1988  
**Job No.**: 15-86  
**Hole No.**:  
**Elevation**: ft.  
**Location**: WAIKOI W LOLOA

---

**Customer**: DLNR  
**Rig**:  
**Gas**:  
**Oil**:  
**Repairs**:  
**Or. No.**:  

---

**Driller**: L. MOAALI  
**Helper**: E. CHING  
**Arv. Job**:  
**Ld. Job**:  
**Hrs.**

---

**Bit-Size**  
**Type**

---

**Casing-Size** in., **Length in hole** ft., **Depth Start** ft., **Depth Stop** ft., **Feet Drilled** ft.

---

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

---

### Depth Formations

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Run Pump Test, Plumb Test Shot Down 2:000 P.M. EJACK Recover For The Well</td>
</tr>
</tbody>
</table>

---

**Signed**:  
**Sealsia M. Uonolii**  
**Date**: MARCH 18, 1988
### Drilling Log

**Date:** FEB. 24 - 1988  
**Job No.:** 15-86  
**Hole No.:** 15-86  
**Elevation:** _______ ft.  
**Customer:** DLNR  
**Location:** WAIKOLI, MOLOKAI

<table>
<thead>
<tr>
<th>Driller</th>
<th>B Hrs.</th>
<th>Rig</th>
<th>Gas</th>
<th>Oil</th>
</tr>
</thead>
<tbody>
<tr>
<td>L. MOAALII</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Helper</th>
<th>B Hrs.</th>
<th>Repairs</th>
<th>Or. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>E. CHING</td>
<td>8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Bit-Size</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Casing-Size</th>
<th>in., Length in hole</th>
<th>ft.</th>
<th>Amt. Perforated</th>
<th>ft.</th>
<th>in.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Depth Start</th>
<th>ft., Depth Stop</th>
<th>ft., Feet Drilled</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Water Levels, Time</th>
<th>M</th>
<th>ft., Time</th>
<th>M</th>
<th>ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measurements</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

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

Remarks:  

ADJUST THE BELT ON THE RIG, CLEAN UP TOOLS, WENT OUT THE TUNNEL, PUT ON LIGHTS FOR THE BIG TRUCK

Signed: Laialii Okalani  
**Date:** FEB. 24 - 1988
# Drilling Log

**Ruscoe Moss Company**

830 Ahua Street • Honolulu, Hawaii 96819
Telephone (808) 839-6888 • 833-1444

**Date:** Feb. 23 - 1988  
**Job No.:** 15-86  
**Hole No.:**  
**Elevation:** ft.

**Customer:** DLNR  
**Location:** Waikolli Molokai

**Driller:** L. Moreau  
**Helper:** E. Ching

**8 Hrs.**  
**Rig:**  
**Gas:**  
**Oil:**  
**Hrs.**  
**Repairs:**  
**Hrs.**  
**Or. No.:**

**Arv. Job:**  
**Lv. Job:**  
**Hrs.:**

**Bit-Size:**  
**Type:**

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

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

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

<table>
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<th>Formation</th>
<th>Remarks</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td><strong>Build up drill bit</strong></td>
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<td></td>
<td></td>
<td><strong>Mix &amp; bag cement to</strong></td>
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<tr>
<td></td>
<td></td>
<td><strong>Fix outside the tunnel</strong></td>
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<tr>
<td></td>
<td></td>
<td><strong>Cement slap brake by the cat</strong></td>
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**Depth in:**  
**Formation:**  
**Remarks:**  
**Top:**

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**Remarks:**

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**Signed:** Seabourn Wee-Pal  
**Date:** Feb. 23 - 1988
## DRILLING LOG

### RUSCOE MOSS COMPANY

**830 AHUA STREET • HONOLULU, HAWAII 96819**
**TELEPHONE (808) 839-6688 • 833-1444**

<table>
<thead>
<tr>
<th>Date</th>
<th>FEB. 22-1988</th>
<th>Job No.</th>
<th>15-86</th>
<th>Hole No.</th>
<th>Elevation</th>
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<tbody>
<tr>
<td>Customer</td>
<td>DLNR</td>
<td>Location</td>
<td>WAIKOLU MOLOKAI</td>
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</tr>
<tr>
<td>Driller</td>
<td>L. MOHALI</td>
<td>8 Hrs.</td>
<td>Rig</td>
<td>Gas</td>
<td>Oil</td>
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<tr>
<td>Helper</td>
<td>E. CHING</td>
<td>8 Hrs.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Help.</td>
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<td></td>
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<td>Repairs</td>
<td></td>
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<tr>
<td>Or. No.</td>
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<tr>
<td>Bit-Size</td>
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</tr>
<tr>
<td>Casing-Size</td>
<td></td>
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<td>ft.</td>
<td>in., Amt. Perforated</td>
<td>ft.</td>
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<tr>
<td>Depth Start</td>
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<td>ft., Depth Stop</td>
<td>ft., Feet Drilled</td>
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</tr>
<tr>
<td>Water Levels, Time</td>
<td>M</td>
<td>ft., Time</td>
<td>M</td>
<td>ft.</td>
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### Remarks:

- PICK UP WATER METER FROM THE PIER, WENT IN THE TUNNEL HOOKUP AND THE AIR LINE WELL #3, MAKE A FORK TO THE CAT TO LEFT HEAVY LOAD.

### Measurements

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

### Signatures

- Signed: L. MOHALI Date: FEB. 22-1988
Date: FEB. 20- 1988  Job No. 15-86  Hole No. 6  Elevation ft.
Customer: DLNR  Location: WAIKOLE MOLOKAI

Driller: L. MOAALII  6 Hrs.  Rig: ____________________________
Helper: E. CHING   6 Hrs.  Gas: ____________________________
Arv. Job: ____________________________  Or. No.: ____________________________
Lv. Job: ____________________________  Hrs.  Repairs: ____________________________

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

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<th>Remarks</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>CHANGE OIL ON THE RIG AND FILTER. ADJUST CLUTCH ON SANLINE. NOT WORKING RIGHT. CUT OFF OLD BAR 18&quot;. HIT PUT ON NEW ONE. READY FOR NEXT HOLE.</td>
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Remark: ____________________________

Signed: LEOALII  Date: FEB. 20- 1988
Date: **FEB. 19 - 1988**  
Job No.: **15-86**  
Hole No.: **6**  
Elevation: **ft.**

Customer: **DLNR**  
Location: **WAIKOLI MOLOKAI**

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<td>L. Morallii</td>
<td>10</td>
<td></td>
<td>E. Ching</td>
<td>10</td>
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Bit-Size: __________________ Type: __________________


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

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

### Measurements

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<td></td>
<td><strong>FINISH INSTALL TEST</strong></td>
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<td></td>
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<td><strong>PUMP, HOE UP ENGINE</strong></td>
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<td></td>
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<td><strong>AND DISCHARGE LINE</strong></td>
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<td></td>
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<td><strong>AND AIR LINE.</strong></td>
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Remarks:

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Signed: **Leonard Leonardi**  
Date: **FEB. 19 - 1988**
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<th>10 Hrs.</th>
<th>Rig</th>
<th>Gas</th>
<th>Oil</th>
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<tbody>
<tr>
<td>Helper</td>
<td>E. CHING</td>
<td>10 Hrs.</td>
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<td>Arv. Job</td>
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<tbody>
<tr>
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<td>in., Length in hole</td>
<td>ft.</td>
<td>in.</td>
<td>ft.</td>
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<tr>
<td>Depth Start</td>
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<td>ft., Depth Stop</td>
<td>ft., Feet Drilled</td>
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<th>Water Levels, Time</th>
<th>M</th>
<th>ft., Time</th>
<th>M</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>MIX 1/1 BAG CEMENT TO GROUT THE CASING.</td>
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<td></td>
<td></td>
<td>MOVE THE PUMP BACK. START INSTALL PUMP</td>
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<thead>
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<th>Measurements</th>
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Remarks:

Signed: DILSON D. ULEONI | Date: FEB. 18-1988
Date: FEB. 17- 1988   Job No. 15-86   Hole No. 6   Elevation _______ ft.
Customer: DLNR   Location: WAIKOULU, MOLOKAI

Driller: L. MORALI        10 Hrs.   Rig: ________
Helper: E. CHING           10 Hrs.   Gas: ________
Hydraulic: ________ Hrs.   Oil: ________

Bit-Size: ________   Type: ________
Casing-Size: 14 in., Length in hole: 130 ft. in., Amt. Perforated: 100 ft. in.
Depth Start: ______ ft., Depth Stop: ______ ft., Feet Drilled: ______
Water Levels, Time: ______ M ft., Time: ______ M ft.

Measurements

Depth  | Formation  | Remarks |
--------|------------|---------|
        |            | MOVE THE PUMP OUT THE WAY, MOVE IN CASING PULL OUT 50 FEET CASING WAS IN THE HOLE, WELD IN CASING SHOE AND CASING GUIDE, CEMENT BASKET SET 14 FEET BELOW GROUND LEVELS, EARL WENT OUT TO PICK UP CEMENT MIX 4 RAG CEMENT TO SEAL THE BASKET.

Water: ______ M ft., Time: ______ M ft.

Signed: L. MORALI   Date: FEB. 17- 1988
**DRILLING LOG**

**RUSCOE MOSS COMPANY**

830 AHUA STREET • HONOLULU, HAWAII 96819
TELEPHONE (808) 839-6888 • 833-1444

Date: FEB. 16 - 1988  Job No. 15-86  Hole No. 6  Elevation ft.

Customer: DLNR  Location: WAIKOU MOLOKAI

<table>
<thead>
<tr>
<th>Driller</th>
<th>L. MOAALII</th>
<th>12 Hrs.</th>
<th>Rig</th>
</tr>
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<tbody>
<tr>
<td>Helper</td>
<td>E. CHING</td>
<td>12 Hrs.</td>
<td>Gas</td>
</tr>
<tr>
<td>Helper</td>
<td></td>
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<td>Repairs</td>
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<tr>
<td>Arv. Job</td>
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<td>Lv. Job</td>
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<td>Hrs.</td>
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<td>Or. No.</td>
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</table>

Bit-Size: __________________________  Type: __________________________


Depth Start: ___________ ft., Depth Stop: ___________ ft., Feet Drilled: __________________________

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

**Remarks:**

- RUN PUMP TEST.
- STOP 10:05 AM, CHECK.
- RECOVERY FOR 2 HOUR.
- PULL OUT TEST PUMP.

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
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<tbody>
<tr>
<td></td>
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<td>RUN PUMP TEST.</td>
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<td>STOP 10:05 AM, CHECK</td>
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<td>RECOVERY FOR 2 HOUR</td>
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<td>PULL OUT TEST PUMP</td>
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<tbody>
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<td>B</td>
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Remarks:

Signed: L. MOAALII  Date: FEB. 16 - 1988
## DRILLING LOG

**RUSCOE MOSS COMPANY**

830 AHUA STREET • HONOLULU, HAWAII 96819
TELEPHONE (808) 839-5555 • 833-1444

---

**Date:** FEB. 15-1988  
**Job No.:** 15-86  
**Hole No.:**  
**Location:** WAIKOUI, MOLOKAI

---

**Customer:** DLNR  
**Elevation ft.:**

---

**Driller:** J. Moraliu  
**Hrs. Rig:**

**Helper:** E. Ching  
**Hrs. Gas:**

**Helper:**

**Hrs. Oil:**

**Arv. Job:**

**Lv. Job:**

**Hrs. Repairs:**

**Or. No.:**

---

**Bit-Size:**

**Type:**

---

**Casing-Size:**

**in., Length in hole:**

**ft., Amt. Perforated:**

**ft., in.:**

---

**Depth Start:**

**ft., Depth Stop:**

**ft., Feet Drilled:**

---

**Water Levels, Time:**

**M ft., Time:**

**M ft.:**

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### Measurements

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<tr>
<td></td>
<td></td>
<td>Run Pump Test</td>
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<tr>
<td></td>
<td></td>
<td>START 12:30 PM.</td>
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<td></td>
<td></td>
<td>Pick up fuel, Make</td>
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<tr>
<td></td>
<td></td>
<td>Two Trip In and Out</td>
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<td></td>
<td></td>
<td>The Tunnel</td>
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**Remarks:**

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**Signed:** Lenticula  
**Date:** FEB. 15-1988
<table>
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<th>GPM</th>
<th>A.L.R.</th>
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</table>

**Pump Test**

WATER LEVELS MEASURED:
- Pump Stop 10:05 AM.

**Air Line Reading**

- Air Line Set 180 FEET.
Date: **FEB. 13 - 1988**  
Job No.: **15-86**  
Hole No.:  
Elevation __________ ft.  

Customer: **DLNR**  
Location: **WAIPAHU MOLOKAI**

Driller: **L. MOOALII**  
**8** Hrs.  
Rig:  

Helper: **E. CHING**  
**8** Hrs.  
Gas:  
Oil:  
Repairs:  

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

---

Bit-Size:  
Type:  

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

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

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

---

### Remarks:

- **HOOK UP DISCHARGE LINE, AIRLINE RUN THE PLUMB 6 HOUR TO CLEAN THE WELL**

---

**Signed:** **Leslie Woodin**  
**Date:** **FEB. 13 - 1988**
Customer: DL AIR  Location: WAIKOLOA MOLOKAI

Driller: L. MOAALI  10 Hrs.  Rig
Helper: E. CHING  10 Hrs.  Gas


Bit-Size  Type

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

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

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

<table>
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<tr>
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<th>Remarks</th>
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<tr>
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<td>FINISH INSTALL PUMP</td>
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<tr>
<td></td>
<td></td>
<td>WENT OUT THE TUNNEL</td>
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<tr>
<td></td>
<td></td>
<td>PICK UP DISCHARGE LINE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AND FUEL, WENT BACK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IN THE TUNNEL</td>
</tr>
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</table>

Signed: L. MOAALI  Date: FEB. 12 - 1988
Date: FEB. 11 - 1988  
Job No. 15-86  
Hole No.  
Elevation: ft.  

Customer: DLNR  
Location: WAIKOLOA MOLOKAI  

Driller: L. MORAII  
10 Hrs.  

Helper: E. CHING  
10 Hrs.  

Location:  

Arv. Job:  
Lv. Job:  
Hrs.:  

Or. No.:  

Bit-Size:  
Type:  

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

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

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

Measurements:  
A  |  B  
---|---

<table>
<thead>
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<tbody>
<tr>
<td></td>
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<td>INSTALL TEST PUMP</td>
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</table>

Remarks:  

Signed: Leonard C. Weilbacher  
Date: FEB. 11 - 1988
**Drilling Log**

**Ruscoe Moss Company**

830 Ahua Street • Honolulu, Hawaii 96819
Telephone (808) 839-6888 • 833-1444

---

**Date:** Feb. 10 - 1988  
**Job No.:** 15-86  
**Hole No.:**  
**Elevation:** __________ ft.

**Customer:** DLNR  
**Location:** Waikoloa Molokai

**Driller:** L. MOKALI  
**Hrs.:** 10 Hrs.  
**Rig:**

**Helper:** E. CHING  
**Hrs.:** 10 Hrs.  
**Gas:**  
**Oil:**

**Helper:**  
**Hrs.:**  
**Repairs:**

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

---

**Bit-Size:**  
**Type:**

**Casing-Size:** 14 in., Length in hole 50 ft. in., Amt. Perforated 50 ft. in.

**Depth Start:** __________ ft., **Depth Stop:** __________ ft., **Feet Drilled:**

**Water Levels, Time:** M __________ ft., **Time:** M __________ ft.

---

**Depth** | **Formation** | **Remarks** | **Top**
--- | --- | --- | ---

**Bail the hole clean.**

**Brake down drill bit.**

**Cut down conductor pipe.**

**Run 50 ft. casing.**

**Move casing out of the way.**

**Move in pump ready to install.**

---

**Remarks:**

---

**Signed:** L. MOKALI  
**Date:** Feb. 10 - 1988
## DRILLING LOG

**Date:** Feb. 9 - 1988  
**Job No.:** 15-86  
**Hole No.:**  
**Elevation:** ______ ft.  
**Customer:** DLNR  
**Location:** WAIKOLU MOLOKAI

### Driller

- **Name:** L. MOHALU  
- **Hrs.:** 10  
- **Rig:**  
- **Gas:**  
- **Oil:**  
- **Repairs:**

### Helper

- **Name:** E. CHING  
- **Hrs.:** 10  
- **Gas:**  
- **Oil:**

### Arv. Job

- **Hrs.:**

### Lv. Job

- **Hrs.:**

### Or. No.

### Bit-Size

- **Type:**

### Casing-Size

- **in., Length in hole:** __________ ft. __________ in.,  
- **Amt. Perforated:** __________ ft. __________ in.

### Depth

- **Start:** 185 ft.  
- **Stop:** 202 ft.  
- **Feet Drilled:** 17

### Water Levels, Time

- **M ft., Time:** __________ M ft.

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<th>Formation</th>
<th>Remarks</th>
<th>Top</th>
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<tr>
<td>185</td>
<td>PUKA ROCK</td>
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<tr>
<td>199</td>
<td>BLUE ROCK</td>
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### Measurements

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### Remarks:

---

**Signed:** Leonard MOHALU  
**Date:** Feb. 9 - 1988
## DRILLING LOG

**Date:** Feb. 8 - 1969  
**Job No.:** 15-86  
**Hole No.:**  
**Customer:** DLNR  
**Location:** Waikolu Molokai

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<tbody>
<tr>
<td>L. Moraliu</td>
<td></td>
<td>E. Ching</td>
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<th>Or. No.</th>
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<th>Or. No.</th>
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<table>
<thead>
<tr>
<th>Or. No.</th>
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</table>

**Rig:**  
**Gas:**  
**Oil:**  
**Repairs:**  
**Or. No.:**

---

**Bit-Size:**  
**Type:**

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

**Depth Start:** 175 ft., **Depth Stop:** 185 ft., **Feet Drilled:** 10

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

### Measurements

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<td>Blue Rock</td>
<td><strong>Build up drill bit.</strong></td>
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<td>185</td>
<td>Puka Rock</td>
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**Remarks:**

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**Signed:**  
**Date:** Feb. 8 - 1969

---
**DRILLING LOG**

**RUSCONE MOSS COMPANY**

830 AHUA STREET • HONOLULU, HAWAII 96819

TELEPHONE (808) 839-6888 • 833-1444

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<table>
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<th>Job No.</th>
<th>15-86</th>
<th>Hole No.</th>
<th>Elevation ft.</th>
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<td>Location</td>
<td>WAIKOLE MOLOKAI</td>
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<tr>
<td>Driller</td>
<td>L. MOKALI</td>
<td>Rig</td>
<td></td>
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<tr>
<td>Helper</td>
<td>E. CHING</td>
<td>Gas</td>
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<td>Helper</td>
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<td>Hrs.</td>
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<td>Hrs.</td>
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<td>Type</td>
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<tr>
<td>Casing-Size</td>
<td></td>
<td>in., Length in hole</td>
<td>ft.</td>
<td>in., Amt. Perforated</td>
<td>ft.</td>
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<tr>
<td>Depth Start</td>
<td>170 ft.</td>
<td>Depth Stop</td>
<td>175 ft.</td>
<td>Feet Drilled</td>
<td>5</td>
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<tr>
<td>Water Levels, Time</td>
<td>M</td>
<td>ft., Time</td>
<td>M</td>
<td>ft.</td>
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<tr>
<td>170</td>
<td>BLUE ROCK</td>
<td>BUILD UP BIT.</td>
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**Remarks:**

Signed: [signature]

Date: FEB. 6 - 1988
DRILLING LOG

Date: FEB. 5 - 1988  Job No.: 15-86  Hole No.: 1  Elevation: 170 ft.
Customer: DL AIR  Location: WAIKOLU MOLOKAI

Driller: L. MOAALII  10 Hrs.  Rig: 
Helper: E. CHING  10 Hrs.  Gas: 
Helper: ___________________  Hrs.  Oil: 

<table>
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<th>Bit-Size</th>
<th>Type</th>
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|-------------|---------------------|-----|----------------|-----|

Depth Start: 165 ft.  Depth Stop: 170 ft.  Feet Drilled: 5

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

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<th>Formation</th>
<th>Remarks</th>
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<tr>
<td>165</td>
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<tr>
<td>170</td>
<td>BLUE ROCK</td>
<td>BUILD UP DRILL BIT.</td>
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Measurements

<table>
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<tr>
<th>Measurements</th>
<th>A</th>
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</thead>
</table>

Remarks: EARL WENT OUT PICK UP FUEL  CHANGED OIL & BLOWS FOR THE PICK UP TRUCK.

Signed: ____________________________________________  Date: FEB. 5 - 1988
Date: FEB. 4 - 1988  Job No.: 15-86  Hole No.:  Location: WAIKOLOA Made in Hawaii
Customer: DLAIR  Elevation:

Driller: L. MOHALI  10 Hrs.  Rig:
Helper: E. CHING  10 Hrs.  Gas:
Helper:  Hrs.  Oil:

Bit-Size:  Type:
Depth Start: 160 ft., Depth Stop: 165 ft., Feet Drilled: 5
Water Levels, Time: M ft., Time: M ft.

Depth  Formation  Remarks  Top  Measurements

169  165 BLUE ROCK  BUILD UP DRILL BIT.

Remarks:

Signed:  Date: FEB. 4 - 1988
Date: Feb. 3 - 1986  
Job No.: 15-86  
Hole No.:  
Elevation: ft.  

Customer: DLNR  
Location: WAIKOU MOLOKAI

Driller: L. Moraili  
10 Hrs. Rig:  

Helper: F. Ching  
10 Hrs. Gas:  
Oil:  

Helper:  
Hrs. Repairs:  

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

Bit-Size:  
Type:  


Depth Start: 157 ft., Depth Stop: 160 ft., Feet Drilled: 3

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

**Measurements**

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<th>Depth</th>
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<th>Remarks</th>
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<tr>
<td>157</td>
<td>BLUE ROCK</td>
<td>Build Up Bit</td>
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<tr>
<td>160</td>
<td>BLUE ROCK</td>
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</table>

Remarks:  
1. BAILER STUCK IN THE HOLE FOR 3 HOUR.  
2. ROCK FALL FROM ABOVE MAKE THE HOOK WITH THE SHAFT WELDED TO THE BIT WENT DOWN LOOSE UP BAILER, LOST 1500 SANG LINE. BAILER COME OUT.

Signed: Leland W. Moss  
Date: Feb. 3 - 1986
Date: **FEB. 2-19-88**  
Job No.: **15-86**  
Hole No.: **DNR**  
Elevation: **ft.**  
Location: **WAILEA-MOLOKAI**  

**Customer:** DRNR  
**Driller:** L. MAALII (10 Hrs.)  
**Helper:** E. CHING (10 Hrs.)  
**Arv. Job:**  
**Lv. Job:**  
**Hrs.:**  
**Rig:**  
**Gas:**  
**Oil:**  
**Hrs. Repairs:**  
**Or. No.:**  

**Bit-Size:**  
**Type:**  
**Casing-Size:** **in.**  
**Length in hole:** **ft.**  
**Amt. Perforated:** **ft.**  
**Depth Start:** **152 ft.**  
**Depth Stop:** **157 ft.**  
**Feet Drilled:** **5**  

**Water Levels:**  
**Time:** **M ft.**  
**Time:** **M ft.**  

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<th>Depth</th>
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<tbody>
<tr>
<td>152</td>
<td><strong>BLUE ROCK</strong></td>
<td><strong>BUILD UP DRILL BIT.</strong></td>
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**Remarks:**  

**Signed:**  
**L. MAALII**  
**Date:** **FEB. 2-1988**
Customer: DLNR  Location: WAIALU MALOKAI

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<th>Driller</th>
<th>10 Hrs.</th>
<th>Rig</th>
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<tbody>
<tr>
<td>Helper</td>
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<td>Gas</td>
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<tr>
<td>Helper</td>
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<td>Oil</td>
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<tr>
<td>Arv. Job</td>
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<td>Lv. Job</td>
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</tr>
<tr>
<td>Hrs.</td>
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<tr>
<td>Or. No.</td>
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<table>
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<th>Type</th>
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<tr>
<th>Casing-Size</th>
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<th>in., Amt. Perforated</th>
<th>ft.</th>
<th>in.</th>
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<tbody>
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<table>
<thead>
<tr>
<th>Depth Start</th>
<th>Depth Stop</th>
<th>Feet Drilled</th>
</tr>
</thead>
<tbody>
<tr>
<td>145 ft.</td>
<td>152 ft.</td>
<td>7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Water Levels, Time</th>
<th>ft., Time</th>
<th>M.</th>
<th>ft.</th>
<th>M.</th>
<th>ft.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Measurements</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>Top</th>
</tr>
</thead>
<tbody>
<tr>
<td>145</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>152</td>
<td>BLUE ROCK</td>
<td>BUILD UP DRILL BIT.</td>
<td></td>
</tr>
</tbody>
</table>

Remarks:

<table>
<thead>
<tr>
<th>Remarks:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

Signed: LEO L. WATANABE  Date: Feb. 1 - 1988
**DATE:** JAN. 30 - 1988  
**Job No.:** 15-86  
**Elevation:** ft.

**Customer:** DLNR

**Location:** WAIKOLE MOLOKAI

**Driller:** L. MORALII  
**10 Hrs.**

**Helper:** E. CHING  
**10 Hrs.**

**Arv. Job**

**Lv. Job**

**Hrs.**

**Or. No.**

---

**Bit-Size**

**Type**

**Casing-Size** in., **Length in hole** ft.  
**in., Amt. Perforated** ft. in.

**Depth Start:** 136 ft., **Depth Stop:** 145 ft., **Feet Drilled:** 9

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

---

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>Top</th>
</tr>
</thead>
<tbody>
<tr>
<td>136</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>138</td>
<td>BLUE ROCK</td>
<td>BUILD UP DRILL BIT.</td>
<td></td>
</tr>
<tr>
<td>145</td>
<td>GUKA ROCK</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Measurements**

---

**Remarks:**

---

**Signed:** Le'aanaa Ueuala  
**Date:** JAN. 30 - 1988
Date: JAN 29 - 1968  
Job No.: 15-06  
Customer: DLAIR  
Location: WAIKOLU MOLOKAI

<table>
<thead>
<tr>
<th>Driller</th>
<th>10 Hrs.</th>
<th>Helper</th>
<th>8 Hrs.</th>
<th>Helper</th>
<th>8 Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>L. MOAALII</td>
<td></td>
<td>E. CHING</td>
<td></td>
<td>PAUL KIWARUMA</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rig</th>
<th>Gas</th>
<th>Oil</th>
<th>Repairs</th>
<th>Or. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bit-Size</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Casing-Size</th>
<th>Length in hole</th>
<th>Amt. Perforated</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Depth Start</th>
<th>Depth Stop</th>
<th>Feet Drilled</th>
</tr>
</thead>
<tbody>
<tr>
<td>131 ft.</td>
<td>136 ft.</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Water Levels, Time</th>
<th>M</th>
<th>ft., Time</th>
<th>M</th>
<th>ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>Top</th>
</tr>
</thead>
<tbody>
<tr>
<td>131</td>
<td>Blue Rock</td>
<td>Build up Bit.</td>
<td></td>
</tr>
<tr>
<td>136</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Remarks: MAKE ONE TRIP IN THE TUNNEL, WATER HIGH, MOVE IN CASING CLOSE TO THE RIG.

Signed: Leonard Udall  
Date: JAN 29 - 1968
Date: Jan 28 - 1988  
Job No.: 15-86  
Hole No.:  
Elevation: ______ ft.  

Customer: DLNR  
Location: WAIKOLU MOLOKAI  

Driller: L. MOAALII  
Hrs.: 10 Hrs.  

Helper: E. CHING  
Hrs.: 10 Hrs.  

Helper: PAUL KUWAMURA  
Hrs.: 8 Hrs.  

Arm Job: T.  
Job: S49FOA  
Hrs.: 6 Hrs.  

Bit-Size:  
Type:  

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

Depth Start: 126 ft., Depth Stop: 131 ft., Feet Drilled: 5  

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

---  

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>Top</th>
</tr>
</thead>
<tbody>
<tr>
<td>126</td>
<td>BLUE ROCK</td>
<td>Build up Bit.</td>
<td></td>
</tr>
<tr>
<td>131</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Remarks:  
MAKE TWO TRIP IN AND OUT THE TUNNEL  
PICK UP PUMP PARTS, WATER HIGH.  

Signed: LEOALII MOAALII  
Date: Jan 28 - 1988
<table>
<thead>
<tr>
<th>Date</th>
<th>JAN. 27- 1988</th>
<th>Job No.</th>
<th>15-86</th>
<th>Hole No.</th>
<th>Elevation</th>
<th>ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer</td>
<td>DLNR</td>
<td></td>
<td></td>
<td></td>
<td>Location</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>WAIKOLU</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>MOLOKAI</td>
<td></td>
</tr>
<tr>
<td>Driller</td>
<td>L. MOAALII</td>
<td>10 Hrs.</td>
<td>Rig</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Helper</td>
<td>E. CHING</td>
<td>10 Hrs.</td>
<td>Gas</td>
<td></td>
<td>Oil</td>
<td></td>
</tr>
<tr>
<td>Helper</td>
<td>PAUL KUWAMURA</td>
<td>8 Hrs.</td>
<td>Repairs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Or. No.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bit-Size</td>
<td></td>
<td></td>
<td>Type</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Casing-Size</td>
<td></td>
<td></td>
<td>in., Length in hole</td>
<td>ft.</td>
<td>in., Amt. Perforated</td>
<td>ft.</td>
</tr>
<tr>
<td>Depth Start</td>
<td>125</td>
<td>ft.</td>
<td>Depth Stop</td>
<td>126</td>
<td>ft.</td>
<td>Feet Drilled</td>
</tr>
<tr>
<td>Water Levels, Time</td>
<td>M</td>
<td>ft., Time</td>
<td>M</td>
<td>ft.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Measurements**

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>Top</th>
</tr>
</thead>
<tbody>
<tr>
<td>125</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>126</td>
<td>BLUE ROCK</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>BRACE DOWN THE BIT. PUT ON NEW BAR.</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Remarks:**

MAKE TWO TRIP IN AND OUT THE TUNNEL
PICK UP PUMP PARTS, WATER TO HIGH.

**Signed:** [Signature]
**Date:** JAN. 27- 1988
Date: JAN. 26 - 1988  
Job No.: 15-B6  
Hole No.:  
Elevation: ft.  
Customer: DLNR  
Location: WAIKOULU, MOLOKAI

Driller: L. MOALII  
4 Hrs.  
Rig:  
Helper: E. CHING  
4 Hrs.  
Gas:  
Oil:  
Helper: T. SIAFOA  
4 Hrs.  
Repairs:  
Arv. Job:  
Lv. Job:  
Hrs.:  
Or. No.:  

Bit-Size:  
Type:  
Casing-Size: in., Length in hole ft. in., Amt. Perforated ft. in.  
Depth Start: ft., Depth Stop: ft., Feet Drilled:  
Water Levels, Time: M ft., Time: M ft.  

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>Top</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>LOAD UP TRAILERS WITH THE PUMP, READY TO MOVE IN THE TUNNEL.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>RAIN OUT. NO CAN GO IN THE TUNNEL. WATER TO HIGH.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Remarks:

Signed: Seacoast, Date: JAN. 26 - 1988
Date: Jan. 25-1988  
Job No.: 15-86  
Hole No.:  
Elevation:  

**Customer:** DLNR  
**Location:** Waikolu Molokai

**Driller:** L. Mobaui  
**Helper:** E. Ching  
**Helper:** I. Suafol  

**Time:**  
- Rig:  
- Gas:  
- Oil:  
- Repairs:  

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

**Rebecca**

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>129</td>
<td></td>
<td>Build up Drill Bit.</td>
</tr>
<tr>
<td>125</td>
<td>Blue Rock</td>
<td></td>
</tr>
</tbody>
</table>

**Remarks:** Early & Suafol stay out the tunnel. Pick up pump from the pier. Load up the red truck ready to ship back to Honolulu.

**Signed:** Lealani Ueopali  
**Date:** Jan. 25-1988
Date: **Jan. 23- 1988**  
Job No.: **15-86**  
Hole No.: **15-86**  
Elevation: **ft.**  
Customer: **DLNR**  
Location: **WAIKOLE MOLOKAI**

<table>
<thead>
<tr>
<th>Driller</th>
<th>L. MOAOLII</th>
<th>10 Hrs.</th>
<th>Rig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Helper</td>
<td>E. CHING</td>
<td>10 Hrs.</td>
<td>Gas</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Oil</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Driller</th>
<th>L. MOAOLII</th>
<th>10 Hrs.</th>
<th>Rig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Helper</td>
<td>E. CHING</td>
<td>10 Hrs.</td>
<td>Gas</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Oil</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Arrv. Job</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lv. Job</td>
</tr>
<tr>
<td>Hrs.</td>
</tr>
<tr>
<td>Or. No.</td>
</tr>
</tbody>
</table>

**Bit-Size**

<table>
<thead>
<tr>
<th>Type</th>
</tr>
</thead>
</table>

**Casing-Size**

<table>
<thead>
<tr>
<th>in.</th>
<th>Length in hole</th>
<th>ft.</th>
<th>in.</th>
<th>Am. Perforated</th>
<th>ft.</th>
<th>in.</th>
</tr>
</thead>
</table>

**Depth Start**: **113 ft.**  
**Depth Stop**: **120 ft.**  
**Feet Drilled**: **7**

**Water Levels**

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

**Measurements**

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formaion</th>
<th>Remarks</th>
<th>Top</th>
</tr>
</thead>
<tbody>
<tr>
<td>113</td>
<td>HARD ROCK</td>
<td>BUILD UP DRILL BIT</td>
<td></td>
</tr>
</tbody>
</table>

**Remarks:**

- -

**Signed**

**Leu Fenui MOAOLII Date Jan. 23- 1988**
## DRILLING LOG

**Date:** Jan. 22, 1988  
**Job No.:** 15-86  
**Hole No.:** ______  
**Elevation:** ______ ft.

**Customer:** DLNR  
**Location:** WAIKIKI, MOLOKAI

**Driller:** L. MORAII  
**Helper:** E. CHING  
**Arv. Job:** ______  
**Lv. Job:** ______  
**Hrs.:** ______

**Rig:** ______  
**Gas:** ______

**Oil:** ______  
**Hrs. Repairs:** ______  
**Or. No.:** ______

**Depth Start:** 105 ft.  
**Depth Stop:** 118 ft.  
**Feet Drilled:** 8

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

### Measurements

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>105</td>
<td>HARD ROCK</td>
<td>EARL WENT OUT THE TUNNEL PICK UP FUEL. BUILD UP DRILL BIT.</td>
</tr>
</tbody>
</table>

**Remarks:**

---

**Signed:** T. W. Grosvenor  
**Date:** Jan. 22, 1988
Date: Jan. 21, 1988  
Job No.: 15-86  
Hole No.:  

**Customer:** DLNR  
**Location:** WAIKOULI, MOLOKAI

**Driller:** L. MOALII  
**Hrs.:** 10 Hrs.  
**Rig:**  

**Helper:** E. CHING  
**Hrs.:** 10 Hrs.  
**Gas:**  
**Oil:**  

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

<table>
<thead>
<tr>
<th>Bit-Size</th>
<th>Type</th>
</tr>
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<tbody>
<tr>
<td></td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Casing-Size</th>
<th>in., Length in hole ft.</th>
<th>Amt. Perforated ft.</th>
<th>in.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Depth Start: 97 ft.  
Depth Stop: 105 ft.  
Feet Drilled: 8

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

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>97</td>
<td>HARD ROCK</td>
<td>BUILD UP DRILL BIT</td>
</tr>
<tr>
<td>105</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Remarks:**  

Signed:  
Date: Jan. 21, 1988
**DRILLING LOG**

**RUSCOE MOSS COMPANY**

830 AHUA STREET • HONOLULU, HAWAII 96819

TELEPHONE (808) 539-6888 • 833-1444

Date: **JAN. 20-1988**  
Job No.: **15-86**  
Hole No.:  
Elevation:  
Location: **WAIKOU MOLOKAI**

<table>
<thead>
<tr>
<th>Customer</th>
<th>DRNK</th>
</tr>
</thead>
</table>

**Driller:** L. MOOALILU  
**Helper:** E. CHING  
**Arv. Job:**  
**Lv. Job:**  
**Or. No.:**

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

<table>
<thead>
<tr>
<th>Bit-Size</th>
<th>Type</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Casing-Size</th>
<th>in., Length in hole</th>
<th>ft., in., Amt. Perforated</th>
<th>ft. in.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Depth Start</th>
<th>ft.</th>
<th>Depth Stop</th>
<th>ft.</th>
<th>Feet Drilled</th>
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</thead>
<tbody>
<tr>
<td>90</td>
<td></td>
<td>97</td>
<td></td>
<td>7</td>
</tr>
</tbody>
</table>

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

**Measurements**

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>Top</th>
</tr>
</thead>
<tbody>
<tr>
<td>90</td>
<td>HARD ROCK</td>
<td>Build up Drill Bit.</td>
<td></td>
</tr>
</tbody>
</table>

**Remarks:**

Signed: **LEONARD ULEHALI**  
Date: **JAN. 20-1988**
**Date:** JAN. 19 - 1988  
**Job No.:** 15-86  
**Hole No.:**  
**Elevation:** [ft.]  
**Customer:** DLNR  
**Location:** Waikolū Molokai

<table>
<thead>
<tr>
<th>Driller</th>
<th>10 Hrs.</th>
<th>Rig</th>
<th>Helper</th>
<th>10 Hrs.</th>
<th>Gas</th>
<th>Oil</th>
<th>Helper</th>
<th>Hrs.</th>
<th>Repairs</th>
<th>Or. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>L. Moorell</td>
<td></td>
<td></td>
<td>F. Ching</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

|----------|-----|-----|---------|------|-----|---------|-----|---------|---------|

| Casing-Size | in., Length in hole ft. in., Amt. Perforated ft. in. | Depth Start | ft. | Depth Stop | ft. | Feet Drilled | 10 |
|-------------|--------------------------------------------------------|-------------|-----|------------|-----|---------------|
| 80          | 90                                                     | Yuka Rock   |     |            |     |               |    |

**Remarks:**  
Earl went out the tunnel, pick up mud from the pier, build up drill bit.

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>Top</th>
</tr>
</thead>
<tbody>
<tr>
<td>80</td>
<td>Yuka Rock</td>
<td></td>
<td></td>
</tr>
<tr>
<td>90</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Water Levels, Time:** M ft, Time M ft

**Remarks:**

---

**Signed:** Leilani Ueakaliele  
**Date:** Jan. 19 - 1988
## DRILLING LOG

**Date:** Jan. 18-1988  **Job No.:** 15-86  **Hole No.:**  
**Customer:** DLNR  **Location:** Waikolu Molokai

<table>
<thead>
<tr>
<th>Driller</th>
<th>Hours</th>
<th>Rig</th>
<th>Helper</th>
<th>Hours</th>
<th>Gas</th>
<th>Oil</th>
<th>Helper</th>
<th>Hrs.</th>
<th>Repairs</th>
<th>Arv. Job</th>
<th>Lv. Job</th>
<th>Hrs.</th>
<th>Or. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>L. Morali</td>
<td>10</td>
<td></td>
<td>E. Ching</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bit-Size</th>
<th>Type</th>
<th>Rig</th>
<th>Gas</th>
<th>Oil</th>
<th>Repairs</th>
<th>Or. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Casing-Size</th>
<th>in., Length in hole</th>
<th>in., Amt. Perforated</th>
<th>ft.</th>
<th>in.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Depth Start</th>
<th>Depth Stop</th>
<th>Feet Drilled</th>
</tr>
</thead>
<tbody>
<tr>
<td>70 ft.</td>
<td>80 ft.</td>
<td>10</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Water Levels, Time</th>
<th>M ft.</th>
<th>Time</th>
<th>M ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>Top</th>
</tr>
</thead>
<tbody>
<tr>
<td>70</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>80</td>
<td>Puka Rock</td>
<td>Build up drill bit.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measurements</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
</tr>
<tr>
<td>B</td>
</tr>
</tbody>
</table>

**Remarks:**

---

**Signed:** Leilani  **Date:** Jan. 18-1988
**DRILLING LOG**

**RUSCOE MOSS COMPANY**

**630 ANUA STREET • HONOLULU, HAWAII 96819**

**TELEPHONE (808) 839-6888 • 932-1444**

---

**Date:** Jan 15 - 19 88  
**Job No:** 15-86  
**Hole No:**  
**Elevation:**  

**Customer:** DRIR  
**Location:** WAIKOU MOLOKAI

**Driller:** L. MOHALU  
**Helper:** E. CHING

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

**Hrs.**  
**Hrs.**  
**Hrs.**

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

---

**Bit-Size:**  
**Type:**

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

**Depth Start:** 60 ft., **Depth Stop:** 70 ft., **Feet Drilled:** 10

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

---

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>Top</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td>70</td>
<td>Puka Rock</td>
<td>Build up Bit</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Went out Side Tunnel</td>
</tr>
</tbody>
</table>

---

**Remarks:**

---

**Signed:**  
**Date:** Jan 16 - 19 88
### Drilling Log

**Date:** July 15, 1988  
**Job No.:** 15-86  
**Hole No.:** 88  
**Elevation:**  

**Customer:** DLNR  
**Location:** Waikou Molokai

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Li, I.</td>
<td>E, Chu</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rig</th>
<th>Gas</th>
<th>Oil</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Helper</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hrs.</th>
<th>Hrs.</th>
<th>Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Driller</th>
<th>Helper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Li, I.</td>
<td>E, Chu</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bit-Size</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Casing-Size</th>
<th>in., Length in hole</th>
<th>ft.</th>
<th>in., Amt. Perforated</th>
<th>ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Depth Start</th>
<th>Depth Stop</th>
<th>Feet Drilled</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Water Levels, Time</th>
<th>M</th>
<th>ft., Time</th>
<th>M</th>
<th>ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>Top</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>Puka Rock</td>
<td>Build up bit</td>
<td></td>
</tr>
<tr>
<td>60</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Remarks:**

**Signed:** Section Chief, Date: Jan. 15, 1988
**DRILLING LOG**

**RUSCOE MOSS COMPANY**

830 AHUA STREET • HONOLULU, HAWAII 96819
TELEPHONE (808) 839-6688 • 833-1444

---

**Date** Jan. 14-19 88  **Job No.** 15-86  **Hole No.**  **Elevation** ft.

**Customer** DLNR  **Location** WAIKULU MOLOKAI

**Driller** L. HONOLULI  **10 Hrs.** Rig

**helper** E. CHING  **10 Hrs.** Gas

**helper**  **Hrs.** Repairs

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

<table>
<thead>
<tr>
<th>Bit-Size</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Casing-Size</th>
<th>in., Length in hole</th>
<th>ft.</th>
<th>in., Amt. Perforated</th>
<th>ft.</th>
<th>in.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Depth Start** 45 ft., **Depth Stop** 50 ft., **Feet Drilled** 5

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

**Remarks:** _______________________________________

---

**Depth** | **Formation** | **Remarks** | **Top** |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>45/50</td>
<td>BLUE ROCK</td>
<td>Build up Bit</td>
<td></td>
</tr>
</tbody>
</table>

**Remarks:**

---

**Signed:** Leslie Leoden  **Date** Jan. 14-19 88
**Date:** Jan. 13-1988  **Job No.:** 15-86  **Hole No.:**  
**Customer:** OLNIR  **Location:** WAIKOU MOLOKAI

**Driller:** L. Moaalii  10 Hrs.  **Rig:** 
**Helper:** E. Ching  10 Hrs.  **Gas:** 
**Helper:**  **Oil:** 
**Arv. Job:**  **Lv. Job:**  **Hrs. Repairs:**  **Or. No.:** 

**Bit-Size:**  **Type:** 
**Casing-Size:** in., Length in hole ft. in., Amt. Perforated ft. in. 
**Depth Start:** 40 ft., Depth Stop 45 ft., Feet Drilled 5 
**Water Levels, Time:** M ft., Time M ft. 

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>Top</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>45</td>
<td>BLUE ROCK</td>
<td>BUILD UP DRILL BIT.</td>
</tr>
</tbody>
</table>

**Remarks:**

---

**Signed:** RUSCOE MOSS COMPANY  **Date:** Jan. 13-1988
Date: Jan. 12 - 1988  
Job No.: 15-86  
Hole No.:  
Elevation:  

Customer: DRNR  
Location: WAIKOLE, MOLOKAI  

Driller: L. MORAII  
10 Hrs.  
Rig:  

Helper: E. SHING  
10 Hrs.  
Gas:  
Oil:  

Helper:  
Hrs.  
Repairs:  

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

Bit-Size:  
Type:  

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

Depth Start: 30 ft., Depth Stop: 40 ft., Feet Drilled: 10  

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

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>Top</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td></td>
<td>Build Up Drill Bit</td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>HARD ROCK</td>
<td>Build Up Drill Bit</td>
<td></td>
</tr>
</tbody>
</table>

Remarks:  

Signed:  
Date: Jan. 12 - 1988
**DRILLING LOG**

**Date:** JAN 11 - 1988  
**Job No.:** 15-86  
**Hole No.:**  
**Elevation:** ft.

**Customer:** DLNR  
**Location:** WAIAKALU, MOLOKAI

**Driller:** L. MOAustralia  
**Helper:** E. CHING  
**Arv. Job:**  
**Lv. Job:**  
**Hrs.:**  
**Rig:**  
**Gas:**  
**Oil:**  
**Repairs:**  
**Or. No.:**

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

**Depth Start:** 25 ft., **Depth Stop:** 30 ft., **Feet Drilled:** 5

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

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>Top</th>
</tr>
</thead>
<tbody>
<tr>
<td>25/30</td>
<td>HARD ROCK</td>
<td>BUI Builders keep coming in the hole. Build up drill bit.</td>
<td></td>
</tr>
</tbody>
</table>

**Remarks:**

---

**Signed:**  
**Date:** JAN 11 - 1988
### Drilling Log - Jan 9, 1968

**Date:** Jan 9, 1968  
**Job No.:** 15-66  
**Location:**  
**Customer:** DLNR

<table>
<thead>
<tr>
<th>Driller</th>
<th>Morali</th>
<th>10 Hrs.</th>
<th>Rig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Helper</td>
<td>E. Ching</td>
<td>9 Hrs.</td>
<td>Gas</td>
</tr>
<tr>
<td>Helper</td>
<td></td>
<td></td>
<td>Oil</td>
</tr>
<tr>
<td>Arv. Job</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lv. Job</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Job No.: 15-66**  
**Hole No.:**  
**Elevation:** ft.

**Bit-Size:**  
**Type:**  
**Casing-Size:** in., Length in hole: ft., in., Amt. Perforated: ft., in.  
**Depth Start:** 20 ft., Depth Stop: 25 ft., Feet Drilled: 5 ft.

**Water Levels, Time:** M ft., Time: M ft.,  
**Measurements:**

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>HARD ROCK</td>
<td>Boulders keep coming in the hole. Build up bit.</td>
</tr>
</tbody>
</table>

**Remarks:** 1 HOUR TRAVELING

**Signed:** Leonard Morali  
**Date:** Jan 9, 1968
**DRILLING LOG**

RUSCOE MOSS COMPANY

830 AHUA STREET • HONOLULU, HAWAII 96819 0855-06

TELEPHONE (808) 839-6888 • 833-1444

---

Date: **JAN. 8 - 1988**  
Job No.: **15-86**  
Hole No.:  
Elevation:  

Customer: **DLNR**  
Location: **WAIALUA/YOLOKAI**

Driller: **L. MOAALU**  
Hrs: **10**  
Rig:  

Helper: **E. CHING**  
Hrs: **10**  
Gas:  
Oil:  

Helper: **I. SUAFOA**  
Hrs: **10**  
Repairs:  

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

---

Bit-Size:  
Type:  

Casing-Size: **in.**  
Length in hole: **ft.**  
Amt. Perforated: **in.**

Depth Start: **15 ft.**  
Depth Stop: **20 ft.**  
Feet Drilled: **5**

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

---

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>Top</th>
</tr>
</thead>
<tbody>
<tr>
<td>15/20</td>
<td><strong>HARD ROCK</strong></td>
<td><strong>BOULDER KEEP COMING IN THE HOLE, TRY PUT IN MORE CASING. NO PAN. FIX THE ROAD.</strong></td>
<td>A</td>
</tr>
</tbody>
</table>

---

Remarks:  

---

Signed: **Leleiwa Moaali**  
Date: **JAN. 8 - 1988**
**DRILLING LOG**

**RUSCOE MOSS COMPANY**

830 AHUA STREET • HONOLULU, HAWAII 96819

TELEPHONE (808) 839-6888 • 833-1444

---

**Date:** JAN 7 - 1988  **Job No.:** 15-B6  **Hole No.:** 830  **Elevation:** ft.

**Customer:** DLNR  **Location:** WAIKOLU, MOLOKAI

**Driller:** L. MOAALII  **Rig:**

**Helper:** E. CHING  **Gas:**

**Helper:** T. SUAXOA  **Oil:**

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

**Hrs.:**

**Location:**

---

**Bit-Size:**

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

**Depth Start:** 10 ft., Depth Stop 15 ft., Feet Drilled 5

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

---

**Depth**  | **Formation**  | **Remarks**  | **Top**
---| ---| ---| ---
10 | HARD ROCK | Boulders keep coming in the hole, fix the road |
15 |  |  |  

---

**Remarks:**

---

**Signed:** LEO MOAALII  **Date:** JAN 7 - 1988
DRILLING LOG

Date: Jan. 6 - 1988  Job No.: 15-86  Hole No.: 3  Elevations: __________ ft.
Customer: DL AIR  Location: WAIKOLE MOLOKA'I

Driller: M. MOALII  10 Hrs.  Rig: ________
Helper: E. CHUNG  10 Hrs.  Gas:__________  Oil:__________
Helper: T. SUIFOA  10 Hrs.  Repairs:________

Bit-Size:__________  Type:__________
Depth Start: 5  ft., Depth Stop: 10  ft., Feet Drilled: 5

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

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>Top</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>HARD ROCK</td>
<td>Boulders Keep Coke IN THE HOLE, HARD TIME PUT IN CONDUCTOR PIPE, FIX THE ROAD</td>
<td></td>
</tr>
</tbody>
</table>

Remarks:

Signed: [Signature]  Date: Jan. 6 - 1988
### Drilling Log

**Customer:** DLNR  
**Location:** WAIKULI, MOLOKAI

| **Date** | JAN. 5 - 1988 | **Job No.** | 15-B6 | **Hole No.** | Elevation | ft. |
|----------|---------------|-------------|-------|--------------|-----------|

**Driller:** L. MOAALU  
**Helper 1:** E. CHING  
**Helper 2:** I. SCIAPORA

<table>
<thead>
<tr>
<th><strong>Arv. Job</strong></th>
<th><strong>Lv. Job</strong></th>
<th><strong>Hrs.</strong></th>
</tr>
</thead>
</table>

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

**Bit Size:**  
**Type:**

**Casing Size:** in., Length in hole ft., in., Amt. Perforated ft., in.

**Depth Start:** 2 ft., Depth Stop 5 ft., Feet Drilled 3

**Water Levels, Time:**

<table>
<thead>
<tr>
<th><strong>Depth</strong></th>
<th><strong>Formation</strong></th>
<th><strong>Remarks</strong></th>
<th><strong>Top</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>2/5</td>
<td>HARD ROCKS</td>
<td>Boulders keep cofie in the hole. Build up bit. Sand earl our side the tunnel. Fix the road.</td>
<td></td>
</tr>
</tbody>
</table>

**Remarks:** TWO HOUR TRAVELING

**Signed:**  
**Date:** JAN. 5 - 1988
**DRILLING LOG**

630 AHUA STREET • HONOLULU, HAWAII 96819
TELEPHONE (808) 839-6286 • 833-1444

---

**Date** Jan 4 - 1966

**Job No.** 15-86

**Hole No.**

**Elevation** ft.

**Customer** DI AIR

**Location** WAIKULU MOLOKAI

**Driller** L. MOAALII 10 Hrs.

**Rig**

**Helper** E. CHING 10 Hrs.

**Gas**

**Oil**

**Repairs**

**Arv. Job**

**Lv. Job**

**Hrs.**

**Or. No.**

**Bit-Size** 18

**Casing-Size** in., Length in hole ft., in., Amt. Perforated ft., in.

**Depth Start** 0 ft., Depth Stop 2 ft., Feet Drilled 2

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

**Measurements**

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>HARD Boulders</td>
<td>HAVEING HARD TIME DRIVE UP TO THE TUNNEL, ROAD WAS OUT BY THE RAIN, MAKE UP DRILL TOOL, RESET THE RIG, UNDER THE RIG ALL WAS OUT BY THE WATER, TAKES 2 HOUR TO COME OUT THE TUNNEL WATER TO HIGH, START TO DRILL</td>
</tr>
</tbody>
</table>

**Signed** L. MOAALII

**Date** Jan 4 - 1966
Measurements on Waikolu Stream

<table>
<thead>
<tr>
<th>Date</th>
<th>Measurement Description</th>
<th>Level (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/5/61</td>
<td>Rl. Br. Waikolu Stream (1st Fall below Dam site)</td>
<td>0.355</td>
</tr>
<tr>
<td></td>
<td>Waikolu Stream, 25 ft above Tunnel Portal (gulch stream)</td>
<td>1.33</td>
</tr>
<tr>
<td></td>
<td>Rl. Br. Waikolu Stream (2nd Fall below Dam site)</td>
<td>0.392</td>
</tr>
<tr>
<td></td>
<td>Waikolu Stream (USGS Elev. 900) including tunnel pumping</td>
<td>3.83</td>
</tr>
<tr>
<td>3/6/61</td>
<td>1,000 ft below Station (probably pump not operating)</td>
<td>4.78</td>
</tr>
<tr>
<td></td>
<td>above Big Spring</td>
<td>5.19</td>
</tr>
<tr>
<td></td>
<td>below Big Spring</td>
<td>5.50</td>
</tr>
<tr>
<td></td>
<td>above Kalumapa intake</td>
<td>6.59</td>
</tr>
<tr>
<td></td>
<td>(USGS Elev. 253)</td>
<td>8.14</td>
</tr>
</tbody>
</table>

Measurements on Molokai Irrigation Tunnel

2-3rd Pumping out of Tunnel into Waikolu Stream at East Portal

<table>
<thead>
<tr>
<th>Date</th>
<th>Level (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>de 257+00</td>
<td>1.42</td>
</tr>
<tr>
<td>de 249+50</td>
<td>0.31</td>
</tr>
<tr>
<td>de 247+50</td>
<td>0.96</td>
</tr>
<tr>
<td>de 244+50</td>
<td>1.15</td>
</tr>
<tr>
<td>de 244+50</td>
<td>1.74</td>
</tr>
<tr>
<td>de 240+60</td>
<td>1.85</td>
</tr>
<tr>
<td>de 237+00</td>
<td>1.90</td>
</tr>
<tr>
<td>de 233+50</td>
<td>0.51</td>
</tr>
</tbody>
</table>

Rain Fall Waikolu Stream at Elev 900 (6/61 to 3/26/61) 19.7 x 2 = 39.4
Pepoagae, head of Waikolu Valley (6/61 to 3/26/61) 90 x 5 = 470

Nojoine Matsumura
<table>
<thead>
<tr>
<th>8/30/91</th>
<th>Flume MLD 400</th>
<th>Rainbow Fall</th>
<th>Waikoloa Stream 54 ft</th>
<th>7:00</th>
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<tbody>
<tr>
<td>3.2</td>
<td>3.75</td>
<td>2.4</td>
<td>2.5</td>
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<tr>
<td>0.3</td>
<td>0.85</td>
<td>0.7</td>
<td>0.8</td>
<td>7.0</td>
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<tr>
<td>0.0</td>
<td>0.4</td>
<td>0.3</td>
<td>0.5</td>
<td>7.0</td>
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<td>1.5</td>
<td>1.0</td>
<td>1.5</td>
<td>7.0</td>
</tr>
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<td>4.3</td>
<td>3.0</td>
<td>7.0</td>
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<td>6.0</td>
<td>9.0</td>
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<td>2.4</td>
<td>2.0</td>
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<td>7.0</td>
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<td>7.3</td>
<td>7.0</td>
<td>7.5</td>
<td>7.0</td>
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</tbody>
</table>

Measurements in Waikoloa Irrigation Tunnel:

- Waikoloa Stream above Tunnel Portal 3.75 ft below
- Waikoloa Stream below Tunnel Portal 3.75 ft below
- August 1991
- Location:

8/31/88

August 1991
Measurements on Waikolu Stream

<table>
<thead>
<tr>
<th>Date</th>
<th>Location and Details</th>
<th>M.G.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>8-61</td>
<td>Waikolu Stream, 25 ft. below Dam site</td>
<td>0.730</td>
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<tr>
<td></td>
<td>Right Branch Waikolu Stream, at 2nd Fall</td>
<td>0.120</td>
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<tr>
<td></td>
<td>Waikolu Stream (U.S.G.S) at Elev. 900 (Tunnel pumping into Waikolu Stream)</td>
<td>3.04</td>
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<tr>
<td>1-10-61</td>
<td>Waikolu Stream (U.S.G.S.) at elev. 900 (Tunnel not pumping into stream) (Tunnel pumping into stream)</td>
<td>3.64</td>
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<tr>
<td></td>
<td>at above Spring on Right branch</td>
<td>4.60</td>
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<tr>
<td></td>
<td>at below</td>
<td>2.23</td>
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<tr>
<td></td>
<td>Old U.S.G.S. Station site</td>
<td>3.13</td>
</tr>
<tr>
<td></td>
<td>above Kalaupapa Intake</td>
<td>3.14</td>
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<td>(U.S.G.S.) at elev 253</td>
<td>4.85</td>
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<td>6.40</td>
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Measurements on Molokai Irrigation Tunnel

<table>
<thead>
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<th>Date</th>
<th>Details</th>
<th>G.H.T.</th>
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<tbody>
<tr>
<td>1-8-61</td>
<td>Pumping out of Tunnel into Waikolu Stream at East Portal</td>
<td>1.44</td>
</tr>
<tr>
<td></td>
<td>257 + 00</td>
<td>0.189</td>
</tr>
<tr>
<td></td>
<td>255 + 00</td>
<td>0.542</td>
</tr>
<tr>
<td></td>
<td>250 + 00</td>
<td>0.860</td>
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<tr>
<td></td>
<td>247 + 20</td>
<td>1.11</td>
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<tr>
<td></td>
<td>244 + 50</td>
<td>1.49</td>
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<tr>
<td></td>
<td>240 + 00</td>
<td>1.78</td>
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<tr>
<td></td>
<td>237 + 50</td>
<td>2.05</td>
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<tr>
<td></td>
<td>233 + 00</td>
<td>0.511</td>
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<td>q. h.t. 0.07</td>
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<tr>
<td></td>
<td>Rainfall Waikolu at Elev 900 (11/27/60 to 1/8/61)</td>
<td>12.782</td>
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<td>Rainfall Pepeopae, head of Waikolu Valley (11/27/60 to 1/4/61)</td>
<td>4.445</td>
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<td>22.0</td>
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