CONTACT FOR ST. SHAPTOON WELLS

US. ARMY DIRECTORATE OF PUBLIC WORKS
(APVG - GWE - D)
BLDG 113 WHEELER ARMY AIRFIELD
SCHOFIELD BARRACKS, HI 96857
ATTN: JON MORISATO

PH 656-2942 x 351
656-2946

2053-13
COMMISSION ON WATER RESOURCE MANAGEMENT
Department of Land and Natural Resources
1151 Punchbowl Street, Room 227
Honolulu, Hawaii 96813

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Signature of Person Providing Copies ____________________________ Date ____________

PLEASE MAKE CHECK PAYABLE TO THE
DEPARTMENT OF LAND AND NATURAL RESOURCES
Mr. Victor Lee  
DPW, USAG-HI  
Attn: APVG-GWC-T  
Schofield Barracks, HI 96857

Dear Mr. Lee:

Monthly Reporting Requirement  
Fort Shafter Wells (Well Nos. 2053-10,11,13)

This is in response to your recent telephone inquiry regarding the monthly groundwater data reporting requirement (Condition 11) of your water use permit for Well Nos. 2053-11 & 13.

Pursuant to this condition, approved flowmeters must be installed in each well, and a record of the monthly withdrawals and salinities for each well must be kept and reported to the Commission on Water Resource Management (Commission) on a regular monthly basis.

The requirement for monthly reporting of water temperatures and water levels for Well Nos. 2053-11 & 13 is hereby waived. However, for our purposes of tracking the behavior and response of the aquifer, we request that you measure and report monthly water levels in Well No. 2053-10.

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

Sincerely,

RAE M. LOUI  
Deputy Director

LN:ss
GROUNDWATER USE PERMIT

PERMITTEE

Applicant/Water User
Address: DPW_USAG-HI
ATTN: APVG-GWC-T
SCHOFIELD BARRACKS, HI 96857

Landowner of Source
Address: DEPARTMENT OF ARMY
ATTN: APVG-GWC-T
SCHOFIELD BARRACKS, HI 96857

PERMITTED SOURCE INFORMATION

Island: OAHU
Water Management Area: MOANALUA
Aquifer Sector: HONOLULU
Aquifer System: MOANALUA
System Sustainable Yield: 18 mgd
Well Name: FORT SHAFTER
State Well Nos.: 2053-11 & 13

PERMITTED USE INFORMATION

Reasonable beneficial use: MILITARY
Withdrawal (12 month moving ave.): 1.035 mgd
% of Sustainable Yield: 6%
Location of water use
TMK #: 1-1-8:14
Address: WALKER DR., FORT SHAFTER
State land use classification: URBAN
County zoning classification: MILITARY

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 groundwater 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, used for the reasonable beneficial use described, and 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 groundwater 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 groundwater use here must not interfere with surface or other groundwater rights or reservations.

5. The groundwater 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 March 1, 1995 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.

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 groundwater 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 MOANALUA 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 Moanalua 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 Moanalua Groundwater 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 meeting on March 1, 1995.

Michael D. Wilson, Chairperson
Commission on Water Resource Management

Date of Permit Issuance: May 4, 1995

APPROVED AS TO FORM:

William T. Ham, Deputy Attorney General

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: [Signature] Date: May 4, 1995

Printed Name: DENNIS J. FONTANA

Firm or Title: COL, EN, Director of Public Works

PLEASE SIGN AND RETURN ONE COPY OF THIS PERMIT TO THE COMMISSION AND RETAIN A COPY FOR YOUR RECORD.
EXHIBIT A

Water Use Permit
Groundwater

SPECIAL CONDITIONS

A.  (NO SPECIAL CONDITIONS)
Attn: APVG-GWC-T
Schofield Barracks, HI 96857

Dear Mr. Kishimori:

Approval of Well Construction, Pump Installation, and Water Use Permits for Well Nos. 2053-10, 11, & 13 Moanalua Groundwater Management Area, Oahu

On March 1, 1995, the Commission on Water Resource Management (Commission) approved your well construction/pump installation and water use permit applications for the Fort Shafter battery (Well Nos. 2053-11 & 13) and your well construction permit application to modify Well No. 2053-10.

Enclosed with this letter of approval are the following:

1. Your well construction/pump installation permit for Well No. 2053-13
2. Your well construction permit for Well No. 2053-10
3. Your water use permit
4. Your official monthly water use report form

Please be sure to read the conditions of your approved permits. If you accept these terms, please sign and return one copy of each 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. Additionally, please note that Condition 19 was retroactively applied to your, and all existing, water use permits as directed by the Commission at its October 27, 1993 meeting.
In addition, you are required to submit a water shortage plan to the Commission. Your water shortage plan simply identifies what you are willing to do should the Commission declare a water shortage situation in the Moanalua Groundwater 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 Lenore Nakama at 587-0218.

Sincerely,

RAE M. LOUI
Deputy Director

LN:ss
Attachment
GROUNDWATER USE PERMIT

PERMITTEE

Applicant/Water User
Address: DPW, USAG-HI
ATTN: APVG-GWC-T
SCHOFIELD BARRACKS, HI 96857

Landowner of Source
Address: DEPARTMENT OF ARMY
ATTN: APVG-GWC-T
SCHOFIELD BARRACKS, HI 96857

PERMITTED SOURCE INFORMATION

Island: OAHU
Water Management Area: MOANALUA
Aquifer Sector: HONOLULU
Aquifer System: MOANALUA
System Sustainable Yield: 18 mgd
Well Name: FORT SHAFTER
State Well Nos.: 2053-11 & 13

PERMITTED USE INFORMATION

Reasonable beneficial use: MILITARY
Withdrawal (12 month moving ave.): 1.035 mgd
% of Sustainable Yield: 6%
Location of water use:
TMK #: 1-1-8:14
Address: WALKER DR, FORT SHAFTER
State land use classification: URBAN
County zoning classification: MILITARY

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 groundwater 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, used for the reasonable beneficial use described, and 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 groundwater 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:
GROUND WATER USE PERMIT
DPW, USAG-HI, Well No. 2053-13

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.

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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 March 1, 1995 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.

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 groundwater 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.
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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.

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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.
GROUND WATER USE PERMIT
DPW, USAG-HI, Well No. 2053-13

22. The issuance of this permit was approved by the Commission on Water Resource Management at its meeting on **March 1, 1995.**

[Signature]

MICHAEL D. WILSON, Chairperson
Commission on Water Resource Management

Date of Permit Issuance: **MAY 4 1995**

APPROVED AS TO FORM:

[Signature]

Deputy Attorney General

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.
EXHIBIT A

Water Use Permit
Groundwater

SPECIAL CONDITIONS

A. (NO SPECIAL CONDITIONS)
MEMORANDUM

MAR 31 1995

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

FROM: Cecil Santos, Oahu District Land Agent
Land Management Division

SUBJECT: Well Construction, Pump Installation and Water Use Permit Application for DPW, USAG-HI for Well No. 2053-13, Moanalua Groundwater Management Area, Oahu

The Department of Land and Natural Resource (DLNR) Land Management Division (LMD) Oahu District has reviewed the subject application.

The proposed project does not affect or significantly impact on State-owned land, managed by DLNR Land Management Division.

Thank you for allowing us the opportunity to review and comment on the proposed project. Should you have any questions, please contact Nicholas Vaccaro at 587-0433.
MEMORANDUM

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

FROM: Don Hibbard, Administrator
Historic Preservation Division

SUBJECT: Application for Well Construction, Pump Installation and Water Use Permit for DPW, USAG-HI for Well No. 2053-13, Fort Shafter, Oahu
Kahauiki, Kona, O'ahu
TMK: 1-1-08:014

A review of our records shows that there are no known historic sites at the project location. This project proposes to modify an existing well, install a new pump and drill a new well at a battery of wells. Since this area is in a developed portion of Fort Shafter where it is unlikely that historic sites will be found, we believe that this project will have "no effect" on historic sites.

EJ:jk
Transmitted for your review and comment are copies of well construction, pump installation, and water use permit applications for DPW, USAG-HI for Well No. 2053-13. Well No. 2053-13 will replace existing Well No. 2053-10, which has been found to be out of plumb and will either be sealed or converted to a monitor well. A copy of the application to modify the existing well is also enclosed for your review. No increase in the existing allocation is being requested. Public notice of the water use permit application will be published in the Honolulu Star Bulletin issues of January 17, 1995 and January 24, 1995.

We would appreciate your review of the attached applications for any conflicts or inconsistencies with the programs, plans, and objectives specific to your division only. Please return this cover memo form by February 7, 1995.

If you have any questions regarding these applications, please contact Lenore Nakama at 587-0218.

DOFAW HAS NO COMMENTS OR OBJECTIONS TO THE PROPOSED REQUEST.

Phone: 587-0166
Date: 1/18/95

MICHAEL G. BUCK
Administrator
TO: Aquatic Resources 
Forestry and Wildlife/Natural Area Reserve System 
Historic Preservation 
Land Management 
Office of Conservation and Environmental Affairs 
State Parks 
Water and Land Development

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

SUBJECT: Request for Comments
Well Construction, Pump Installation, and Water Use Permit Applications
Moanalua Groundwater Management Area, Oahu

Transmitted for your review and comment are copies of well construction, pump installation, and water use permit applications for DPW, USAG-HI for Well No. 2053-13. Well No. 2053-13 will replace existing Well No. 2053-10, which has been found to be out of plumb and will either be sealed or converted to a monitor well. A copy of the application to modify the existing well is also enclosed for your review. No increase in the existing allocation is being requested. Public notice of the water use permit application will be published in the Honolulu Star Bulletin issues of January 17, 1995 and January 24, 1995.

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If you have any questions regarding these applications, please contact Lenore Nakama at 587-0218.

LN:ss
Attachment(s)

Response:

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

Contact person: Bill Sevick
Phone: 587-0170

Signed: D. Daniel
Date: 1-23-95
TO: Honorable Kali Watson, Chairman
   Department of Hawaiian Home Lands

Dr. Lawrence Miike M.D., Director
   Department of Health

Mr. Clayton H. W. Hee, Chairperson
   Office of Hawaiian Affairs

Ms. Esther Ueda, Executive Officer
   Land Use Commission

Mr. Raymond Sato, Acting Manager & Chief Engineer
   Honolulu Board of Water Supply

Mr. Patrick Onishi, Director
   Department of Land Utilization

Ms. Cheryl Soon, Chief Planning Officer
   Planning Department

FROM: Michael D. Wilson, Chairperson
   Commission on Water Resource Management

SUBJECT: Well Construction, Pump Installation,
and Water Use Permit Applications
   Moanalua Groundwater Management Area, Oahu

Transmitted for your review and comment are copies of well construction, pump
installation, and water use permit applications for DPW, USAG-HI for Well No. 2053-13. Well
No. 2053-13 will replace existing Well No. 2053-10, which has been found to be out of plumb
and will either be sealed or converted to a monitor well. A copy of the application to modify the
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We would appreciate your review of the attached applications for any conflicts or
inconsistencies with the programs, plans, and objectives specific to your division only. Please
return this cover memo form by February 7, 1995.

If you have any questions regarding these applications, please contact Lenore Nakama at
587-0218.

Attachment(s)

Response:

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

Contact person: [Signature]
Phone: [Signature]
Signed: [Signature]
Date: [Signature]
TO:
Aquatic Resources
Forestry and Wildlife/Natural Area Reserve System
Historic Preservation
Land Management
Office of Conservation and Environmental Affairs
State Parks
Water and Land Development

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

SUBJECT: Request for Comments
Well Construction, Pump Installation,
and Water Use Permit Applications
Moanalua Groundwater Management Area, Oahu

Transmitted for your review and comment are copies of well construction, pump installation, and water use permit applications for DPW, USAG-HI for Well No. 2053-13. Well No. 2053-13 will replace existing Well No. 2053-10, which has been found to be out of plumb and will either be sealed or converted to a monitor well. A copy of the application to modify the existing well is also enclosed for your review. No increase in the existing allocation is being requested. Public notice of the water use permit application will be published in the Honolulu Star Bulletin issues of January 17, 1995 and January 24, 1995.

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If you have any questions regarding these applications, please contact Lenore Nakama at 587-0218.

Response:

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

Contact person: [Signature]
Phone: 587-0253
Signed: [Signature]
Date: JAN 26 1995
Transmitted for your review and comment are copies of well construction, pump installation, and water use permit applications for DPW, USAG-HI for Well No. 2053-13. Well No. 2053-13 will replace existing Well No. 2053-10, which has been found to be out of plumb and will either be sealed or converted to a monitor well. A copy of the application to modify the existing well is also enclosed for your review. No increase in the existing allocation is being requested. Public notice of the water use permit application will be published in the Honolulu Star Bulletin issues of January 17, 1995 and January 24, 1995.

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If you have any questions regarding these applications, please contact Lenore Nakama at 587-0218.

Response:

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

Contact person: Steve Tanioka
Phone: 587-0385
Signed: 3/1/95
Chairperson and Members
Commission on Water Resource Management
State of Hawaii

Gentlemen:

Directorate of Public Works, USAG-HI
Applications for Well Construction, Pump Installation,
and Water Use Permits for Well No. 2053-13 and
Application to Modify Well No. 2053-10, TMK 1-1-8:14,
Moanalua Groundwater Management Area, Oahu

Applicant:
DPW, USAG-HI
Schofield Barracks, HI 96857

Landowner:
Department of Army
Schofield Barracks, HI 96857

Background:

On December 2, 1994, the Directorate of Public Works, U.S. Army Garrison, Hawaii, filed applications to construct, install a pump, and use water from a new replacement well (Well No. 2053-13) for the Fort Shafter battery (Well Nos. 2053-10 & 11). One of the two existing wells in the Fort Shafter battery, Well No. 2053-10, has been found to be out of plumb; an application to convert Well No. 2053-10 to a monitor well was also submitted on December 2, 1994. The proposed replacement well will operate alternately with Well No. 2053-11.

Analysis and Issues:

The Fort Shafter battery is a major source of water supply for military use at Fort Shafter. The battery has an existing water use permit for 1.035 million gallons per day (mgd). No increase in the allocation is being requested. From the reported monthly water use data, the current 12-month moving average withdrawal is 0.933 mgd.

Well No. 2053-10 is out of plumb and will be converted to a 6 in. monitor well. The new well will be located at the existing well site (shown in Exhibit 1) and will be similarly constructed with respect to proposed component elevations and dimensions. The proposed pump capacity, 1100 gpm, is slightly less than that currently installed in Well No. 2053-10 (1200 gpm).

The applications were sent to the various divisions within the State Department of Land and Natural Resources, the State Land Use Commission and Departments of Health and Hawaiian Home Lands, the Office of Hawaiian Affairs, the Mayor's office, Honolulu Board of Water Supply, Planning Department, Department of Land Utilization, and other interested parties. There have been no objections to the project.

RECOMMENDATION:

Staff recommends that the Commission:

1. Approve the issuance of a well construction permit to modify Well No. 2053-10, subject to the following conditions:
   a. The Commission shall be notified before work commences.
b. The following shall be submitted to the Commission within 30 days after completion of the work:

1. Well Completion Report.
2. As-built sectional drawing of the well.

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

d. The well construction permit application and staff submittal approved by the Commission at its March 1, 1995 meeting are incorporated into the permit by reference.

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

2. Approve the issuance of a well construction/pump installation permit for Well No. 2053-13, subject to the standard well construction/pump installation permit conditions listed in Attachment 1, and the following special condition:

a. The final pump capacity shall be approved by the Chairperson upon completion of the drilling and aquifer testing.

3. Approve the modification of the existing water use permit for the Fort Shafter Battery to specify Well Nos. 2053-11 & 13, subject to the standard conditions for a water use permit listed in Attachment 6.

Respectfully submitted,

RAE M. LOUI
Deputy Director

Attachments

APPROVED FOR SUBMITTAL:

MICHAEL D. WILSON, Chairperson
1. The Commission shall be notified before work commences.

2. The well construction/pump installation permit shall be for construction, testing, and installation of a 1100 gpm capacity, or less, pump in the well, as determined by the pumping test results. The applicant shall coordinate with the Commission and conduct a pumping test in accordance with the attached protocol. A one-inch diameter (minimum) pipe shall be permanently installed, in a manner acceptable to the Commission, to accurately record water levels. The applicant shall submit to the Commission the test results and proposed permanent pump information, based on the test, for approval by the Chairperson.

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

4. 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.

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

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

7. The well construction/pump installation permit application and staff submittal approved by the Commission at its March 1, 1995 meeting are incorporated into the permit by reference.

8. The permit may be revoked if work is not started within six (6) months after the date of issuance or if work is suspended or abandoned for six (6) months, unless otherwise specified. The work proposed in the well construction permit application 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 a 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.
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 March 1, 1995 meeting are incorporated into the permit by reference.

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

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

ATTACHMENT C
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 Moanalua 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 Moanalua 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.
Well no. 2053-10, 11, 13

Exhibit 1
Mr. Michael D. Wilson, Chairperson
Commission on Water Resource Management
Department of Land and Natural Resources
State of Hawaii
P. O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Wilson:


We have no objection to drilling of this well which is a replacement for an existing well.

We return the cover memo form marked accordingly.

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

Very truly yours,

Raymond H. SATO
Acting Manager and Chief Engineer

Attachment
TO: Honorable Kali Watson, Chairman  
Department of Hawaiian Home Lands  
Dr. Lawrence Miike M.D., Director  
Department of Health  
Mr. Clayton H. W. Hee, Chairperson  
Office of Hawaiian Affairs  
Ms. Esther Ueda, Executive Officer  
Land Use Commission  
Mr. Raymond Sato, Acting Manager & Chief Engineer  
Honolulu Board of Water Supply  
Mr. Patrick Onishi, Director  
Department of Land Utilization  
Ms. Cheryl Soon, Chief Planning Officer  
Planning Department

FROM: Michael D. Wilson, Chairperson  
Commission on Water Resource Management

SUBJECT: Well Construction, Pump Installation, and Water Use Permit Applications  
Moanalua Groundwater Management Area, Oahu

Transmitted for your review and comment are copies of well construction, pump installation, and water use permit applications for DPW, USAG-HI for Well No. 2053-13. Well No. 2053-13 will replace existing Well No. 2053-10, which has been found to be out of plumb and will either be sealed or converted to a monitor well. A copy of the application to modify the existing well is also enclosed for your review. No increase in the existing allocation is being requested. Public notice of the water use permit application will be published in the Honolulu Star Bulletin issues of January 17, 1995 and January 24, 1995.

We would appreciate your review of the attached applications for any conflicts or inconsistencies with the programs, plans, and objectives specific to your division only. Please return this cover memo form by February 7, 1995.

If you have any questions regarding these applications, please contact Lenore Nakama at 587-0218.

Response:

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

Contact person: Herbert H. Minakami  
Phone: 527-6183

Signed: Raymond H. Sato  
Acting Manager and Chief Engineer  
Date: 2/9/95
TO: Honorable Kali Watson, Chairman
Department of Hawaiian Home Lands
Dr. Lawrence Miike M.D., Director
Department of Health
Mr. Clayton H. W. Hee, Chairperson
Office of Hawaiian Affairs
Ms. Esther Ueda, Executive Officer
Land Use Commission
Mr. Raymond Sato, Acting Manager & Chief Engineer
Honolulu Board of Water Supply
Mr. Patrick Onishi, Director
Department of Land Utilization
Ms. Cheryl Soon, Chief Planning Officer
Planning Department

FROM: Michael D. Wilson, Chairperson
Commission on Water Resource Management

SUBJECT: Well Construction, Pump Installation, and Water Use Permit Applications
Moanalua Groundwater Management Area, Oahu

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We would appreciate your review of the attached applications for any conflicts or inconsistencies with the programs, plans, and objectives specific to your division only. Please return this cover memo form by February 7, 1995.

If you have any questions regarding these applications, please contact Lenore Nakama at 587-0218.

Attachment(s)

Response: [X] We have no comments
[ ] We have no objections
[ ] Comments attached
[ ] Additional information requested
[ ] Extended review period requested

Contact person: Luis A. Menjivar

Signed: Luis Menjivar

Phone: 594-1935

Date: 01/21/95
January 31, 1995

The Honorable Michael D. Wilson, Chairperson
Commission on Water Resource Management
Department of Land and Natural Resources
State of Hawaii
P.O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Wilson:

Well Construction, Pump Installation,
and Water Use Permit Applications
Moanalua Groundwater Management Area, Oahu

Thank you for giving us the opportunity to review and comment on this set of applications.

We have reviewed the subject applications and have no objections. According to the applications, the Army is seeking to drill a new well to replace the out of plumb well and that the water allocation will not be increased. We understand that this water is necessary for the continuing operation of Fort Shafter.

The Board of Water Supply’s comments are also attached for your information.

Please call Rona Suzuki of our staff at 527-6076 if you have any questions.

Sincerely,

CHERYL D. SOON
Acting Chief Planning Officer

Attachment

cc: The Honorable Jeremy Harris, Mayor
(Mayor’s Control No. 21511)
January 20, 1995

TO: CHERYL SOON, CHIEF PLANNING OFFICER
    PLANNING DEPARTMENT
FROM: RAYMOND H. SATO, ACTING MANAGER AND CHIEF ENGINEER
    BOARD OF WATER SUPPLY
SUBJECT: STATE WATER COMMISSIONS LETTER OF JANUARY 11, 1995 TO
    MAYOR JEREMY HARRIS ON THE WELL CONSTRUCTION PERMIT FOR
    U.S. ARMY FT. SHAFTER WELL (2053-13)

We have no objection to drilling of this well which is a replacement for an existing well.

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

cc: Mayor Jeremy Harris
January 24, 1995

Mr. Michael D. Wilson  
Chairperson  
Commission on Water Resource Management  
P. O. Box 621  
Honolulu, Hawaii 96809

Dear Mr. Wilson:

Subject: Well Construction, Pump Installation, and Water Use Permit Applications - Moanalua Groundwater Management Area, Oahu

We have reviewed the subject applications transmitted with your memorandum dated January 11, 1995, and would like to note that TMK 1-1-08: 14 appears to be located within the State Land Use Urban District.

We have no other comments to offer at this time.

We have enclosed your cover memorandum as requested.

Should you have any questions, please feel free to call me or Kathy Yonamine of our office at 587-3822.

Sincerely,

ESTHER UEDA  
Executive Officer

EU:KY:th  
enclosure
TO: Honorable Kali Watson, Chairman  
Department of Hawaiian Home Lands  
Dr. Lawrence Miike M.D., Director  
Department of Health  
Mr. Clayton H. W. Hee, Chairperson  
Office of Hawaiian Affairs  
Ms. Esther Ueda, Executive Officer  
Land Use Commission  
Mr. Raymond Sato, Acting Manager & Chief Engineer  
Honolulu Board of Water Supply  
Mr. Patrick Onishi, Director  
Department of Land Utilization  
Ms. Cheryl Soon, Chief Planning Officer  
Planning Department  

FROM: Michael D. Wilson, Chairperson  
Commission on Water Resource Management  

SUBJECT: Well Construction, Pump Installation,  
and Water Use Permit Applications  
Moanalua Groundwater Management Area, Oahu  

Transmitted for your review and comment are copies of well construction, pump  
installation, and water use permit applications for DPW, USAG-HI for Well No. 2053-13. Well  
No. 2053-13 will replace existing Well No. 2053-10, which has been found to be out of plumb  
and will either be sealed or converted to a monitor well. A copy of the application to modify the  
existing well is also enclosed for your review. No increase in the existing allocation is being  
requested. Public notice of the water use permit application will be published in the Honolulu  

We would appreciate your review of the attached applications for any conflicts or  
inconsistencies with the programs, plans, and objectives specific to your division only. Please  
return this cover memo form by February 7, 1995.  

If you have any questions regarding these applications, please contact Lenore Nakama at  
587-0218.  

Attachment(s)  
Response:  

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

Contact person: Kathy Yonamine  
Phone: 587-3822  

Signed: ___________________________ Date: 1/24/95
Mr. T. Kishimori  
DPW, USAG-HI  
Attn: APVG-GWC-T  
Schofield Barracks, HI 96857

Dear Mr. Kishimori:

We acknowledge receipt, on December 2, 1994, of your applications for well construction, pump installation and water use permits for Well No. 205Z-13 and your application to modify Well No. 2053-10.

Enclosed is a copy of the public notice for your water use permit application which will be published in the Honolulu Star Bulletin issues of January 17, 1995 and January 24, 1995.

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 Lenore Nakama at 587-0218.

Sincerely,

[Signature]

RAE M. LOUI  
Deputy Director

LN:ss  
Encl.
PUBLIC NOTICE

Applications for Water Use Permits
Groundwater Management Areas

The following applications for 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."

Fort Shafter (Well No. 2053-13)
Applicant: DPW, USAG-HI
   Attn: APVG-GWC-T
   Schofield Barracks, HI 96857
Date Completed Application Received: December 2, 1994
Aquifer: Moanalua System, Honolulu Sector, Oahu
Water Source: Fort Shafter Well (Well No. 2053-13) at Walker Dr., Ft. Shafter, Oahu, Tax Map Key: 1-1-8:14
Quantity Requested: 1,035,000 gallons per day.
Existing Water Use: Military (Well will replace existing Well No. 2053-10, which is out of plumb and will either be sealed or converted to a monitor well. No increase in the existing allocation is being requested.)
Place of Water Use: Walker Dr., Ft. Shafter at Tax Map Key: 1-1-8:14

Kualapuu Mauka (Well No. 0801-03)
Applicant: Maui County Department of Water Supply
   P.O. Box 1109
   Wailuku, Maui, HI 96793
Date Completed Application Received: December 21, 1994
Aquifer: Kualapuu System, Central Sector, Molokai
Water Source: Kualapuu Mauka Well (Well No. 0801-03) at Kualapuu, Molokai, Tax Map Key: 5-2-12:24
Quantity Requested: 660,000 gallons per day.
Existing Water Use: Municipal
Place of Water Use: Kaunakakai-Kawela Water System

Written objections or comments on the above applications 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 (provide TMK information); (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 permit. Written objections must be received by February 7, 1995. Objections must be sent to 1) the Commission on Water Resource Management, P.O. Box 621, Honolulu, Hawaii 96809 and 2) the applicant at the above address.

COMMISSION ON WATER RESOURCE MANAGEMENT

MICHAEL D. WILSON
Chairperson

Dated: JAN - 9 1995

TO: Aquatic Resources
    Forestry and Wildlife/Natural Area Reserve System
    Historic Preservation
    Land Management
    Office of Conservation and Environmental Affairs
    State Parks
    Water and Land Development

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

SUBJECT: Request for Comments
          Well Construction, Pump Installation,
          and Water Use Permit Applications
          Moanalua Groundwater Management Area, Oahu

Transmitted for your review and comment are copies of well construction, pump
installation, and water use permit applications for DPW, USAG-HI for Well No. 2053-13. Well
No. 2053-13 will replace existing Well No. 2053-10, which has been found to be out of plumb
and will either be sealed or converted to a monitor well. A copy of the application to modify the
existing well is also enclosed for your review. No increase in the existing allocation is being
requested. Public notice of the water use permit application will be published in the Honolulu

We would appreciate your review of the attached applications for any conflicts or
inconsistencies with the programs, plans, and objectives specific to your division only. Please
return this cover memo form by February 7, 1995.

If you have any questions regarding these applications, please contact Lenore Nakama at
587-0218.

LN:ss
Attachment(s)

Response:

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

Contact person: ________________________________ Phone: ________________
Signed: ________________________________ Date: ________________
TO: Other Interested Parties  
FROM: Rae M. Loui, Deputy Director  
SUBJECT: Request for Comments  

Transmitted for your review and comment are copies of well construction, pump installation, and water use permit applications for DPW, USAG-HI for Well No. 2053-13. Well No. 2053-13 will replace existing Well No. 2053-10, which has been found to be out of plumb and will either be sealed or converted to a monitor well. A copy of the application to modify the existing well is also enclosed for your review. No increase in the existing allocation is being requested. Public notice of the water use permit application will be published in the Honolulu Star Bulletin issues of January 17, 1995 and January 24, 1995.

We would appreciate your review of the attached applications for any conflicts or interferences with the programs, plans, and objectives of the organization or agency that you represent. Written objections should be made in accordance with Section 13-171-18 of our Administrative Rules and must be filed by the February 7, 1995 deadline.

If you have any questions regarding these applications, please contact Lenore Nakama at 587-0218.

Response:

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

Contact person: ____________________________ Phone: __________________

Signed: ____________________________ Date: __________________
TO: Honorable Kali Watson, Chairman
Department of Hawaiian Home Lands

Dr. Lawrence Miike M.D., Director
Department of Health

Mr. Clayton H. W. Hee, Chairperson
Office of Hawaiian Affairs

Ms. Esther Ueda, Executive Officer
Land Use Commission

Mr. Raymond Sato, Acting Manager & Chief Engineer
Honolulu Board of Water Supply

Mr. Patrick Onishi, Director
Department of Land Utilization

Ms. Cheryl Soon, Chief Planning Officer
Planning Department

FROM: Michael D. Wilson, Chairperson
Commission on Water Resource Management

SUBJECT: Well Construction, Pump Installation,
and Water Use Permit Applications
Moanalua Groundwater Management Area, Oahu

Transmitted for your review and comment are copies of well construction, pump
installation, and water use permit applications for DPW, USAG-HI for Well No. 2053-13. Well
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requested. Public notice of the water use permit application will be published in the Honolulu

We would appreciate your review of the attached applications for any conflicts or
inconsistencies with the programs, plans, and objectives specific to your division only. Please
return this cover memo form by February 7, 1995.

If you have any questions regarding these applications, please contact Lenore Nakama at
587-0218.

Attachment(s)

Response:

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

Contact person: ___________________________ Phone: ________________

Signed: ___________________________ Date: ___________________________
Honorable Jeremy Harris, Mayor
City & County of Honolulu
City Hall
Honolulu, HI 96813

Dear Mayor Harris:

Notice of an Application for Water Use Permit
Moanalua Groundwater Management Area, Oahu

In accordance with the Department of Land and Natural Resources Administrative Rules, Section 13-171-17(a), we are sending you a copy of the public notice for the water use permit application for DPW, USAG-HI for Well No. 2053-13, 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,

MICHAEL D. WILSON

Enclosures
LETTER OF TRANSMITTAL

ROSCOE MOSS HAWAII, C.
91-259A Olai Street
EWA BEACH, HAWAII 96707

Pumps (808) 682-5554  Drilling (808) 682-5856
FAX (808) 682-5866

TO  STATE OF HAWAII
Department of Land and Natural Resources
P.O. Box 621
Honolulu, HI 96809

Department of Army's water use permit
Application and new (replacement)
Well permit for Fort Shafter.

WE ARE SENDING YOU □ Attached  □ Under separate cover via ________________ the following items:

☐ Shop drawings  ☐ Prints  ☐ Plans  ☐ Samples  ☐ Specifications
☐ Copy of letter  ☐ Change order  ☐

<table>
<thead>
<tr>
<th>COPIES</th>
<th>DATE</th>
<th>NO.</th>
<th>DESCRIPTION</th>
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<td>2. Well Modification Application 2053-10</td>
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<td>3. Pump Installation Application 2052-11</td>
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<td>4. Water Use Application 2052-10</td>
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THESE ARE TRANSMITTED as checked below:

☐ For approval  ☐ Approved as submitted  ☐ Resubmit ______ copies for approval
☐ For your use  ☐ Approved as noted  ☐ Submit ______ copies for distribution
☐ As requested  ☐ Returned for corrections  ☐ Return ______ corrected prints
☐ For review and comment  ☐

☐ FOR BIDS DUE ___________________ 19  ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS

SIGNED: [Signature]

COPY TO [Address]

If enclosures are not as noted, kindly notify us at once.
Ms. Rae M. Loui
State of Hawaii
Department of Land and Natural Resources
P. O. Box 621
Honolulu, Hawaii 96809

Dear Ms. Loui:

Enclosed are the Department of Army's water use permit application and new (replacement) well permit for Fort Shafter. Replacement of the existing well has been determined to be the best alternative since one of the existing wells has been found to be out of plumb.

Request processing of this application be completed as soon as possible since the contract for this work has already been awarded.

Sincerely,

[Signature]

Dennis J. Fontana
Colonel, U.S. Army
Director of Public Works

Enclosures
APPLICATION FOR WATER USE PERMIT

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

APPLICATION FOR WATER USE PERMIT

Ground Water or ☐ Surface Water

In order to make a complete application, please return this form with the following information:

1. (a) APPLICANT
   Firm/Name: DPW, USAG-HI
   Contact Person: T. Kishimori Ph.: 655-6383
   Address: Schofield Barracks, HI 96857-5000

2. WATER MANAGEMENT AREA: Honolulu Ground Water Mgt Area
   ISLAND: Dahu

3. (a) EXISTING WELL/DIVERSION NAME AND STATE NUMBER: 2052-10 & 11
   (b) PROPOSED (NEW) WELL/DIVERSION NAME: Fort Shafter Wells 2052-13
   (c) LOCATION: Address: Bldg 509, Walker Dr, Ft Shafter, HI
   Tax Map Key: 1.1.08.14
   (Attach a USGS map, scale 1" = 2000", and a property tax map showing source location referenced to established property boundaries.)

4. SOURCE TYPE (check one): ☐ Stream ☐ Basal ☐ Dike-confined ☐ Perched ☐ Caprock

5. METHOD OF TAKING WATER (check one): ☐ Artesian ☐ Well & Pump ☐ Diverted Surface ☐ Other (explain)

6. LOCATION OF PROPOSED WATER USE: (If possible, show on same maps as source location. Otherwise, attach similar maps)
   (a) Proposed use of water is: ☐ Existing ☐ New ☐ Both existing & new uses
   (b) Tax Map Key: 1.1.08.14
   (c) Address: Bldg 509, Walker Dr, Ft Shafter, HI
   (d) Current Land Use District: ☐ Urban ☐ Agriculture ☐ Conservation ☐ Rural
   (e) Current County Zoning Code: __________________________

7. QUANTITY OF WATER REQUESTED: 1,035 gallons per day (averaged over 1 year)

8. METHOD OF MEASUREMENT: ☐ Flowmeter ☐ Open-pipe ☐ Water Orifice ☐ Other (explain)

9. QUALITY OF WATER REQUESTED: ☐ Fresh ☐ Brackish ☐ Salt ☐ Potable ☐ Non-Potable

10. PROPOSED USE: ☐ Municipal (including hotels, stores, etc.) ☐ Industrial ☐ Other (explain)
    ☐ Individual Domestic ☐ Military
    ☐ Irrigation

For questions 12 & 13: If multiple TMKs are involved, please complete Table 1 on back of application.

11. TOTAL NUMBER OF RESIDENCES TO BE SERVED: __________________________

12. TOTAL ACRES TO BE IRRIGATED AND TYPE OF CROP: (acres) (crop)

13. PROPOSED TIME OF WATER WITHDRAWAL OR DIVERSION: 24 hrs per day (daytime hours of operation, ex. 7 a.m. to 2 p.m.)

14. APPLICANT MUST BRIEFLY DESCRIBE FOLLOWING POTENTIAL RESTRICTIONS ON WATER USE:
   (a) Impact on Sustainable yield (?): __________________________
   (b) Instream Flow Standards affected (?): __________________________
   (c) Hawaiian Home Lands use affected (?): __________________________
   (d) Other existing legal uses affected (?): __________________________
   (e) Other (pending permits, EIS, etc.)(?): __________________________

15. REMARKS, EXPLANATIONS: Well will operate alternately with 2052-11 and will not exceed current allocation. Well #2052-10 will either be (so

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

(Note: The applicant must clearly indicate that the applicant understands that, if a water use permit is granted by the Commission on Water Resource Management, a permit is subject to prior existing permitted uses, changes in sustainabilty 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 usage plan must be submitted showing the Commission requires one.)

Applicant (print) DPW, USAG-HI
Signature: __________________________
Date: __________________________

Landowner (print) Department of Army
Signature: __________________________
Date: __________________________

For Official Use Only:
Date Received __________________________
Date Accepted __________________________
Hydrologic Unit No. __________________________
Division Works No. __________________________
State Well No. __________________________

5/19/93 WUPA Form
TABLE 1. MULTIPLE TMKs TO USE REQUESTED WATER

<table>
<thead>
<tr>
<th>PROJECT NAME</th>
<th>TMK</th>
<th>CURRENT COUNTY ZONING CODE</th>
<th>UNITS or NET ACRES</th>
<th>GDP/UNIT or GPD/acre</th>
<th>TOTAL GDP</th>
<th>% OF TOTAL TO BE USED OVER NEXT 4 YEARS</th>
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</tbody>
</table>
TO: Lynne Lenore
DATE: 8.15

WHILE YOU WERE OUT

Darren Michibata
M of
Army Corp. Engineers
Phone: 438-7826

<table>
<thead>
<tr>
<th>TELEPHONED</th>
<th>PLEASE CALL</th>
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</thead>
<tbody>
<tr>
<td>CALLED TO SEE YOU</td>
<td>WILL CALL AGAIN</td>
</tr>
<tr>
<td>WANTS TO SEE YOU</td>
<td>URGENT</td>
</tr>
</tbody>
</table>

RETURNED YOUR CALL

Message: WCIP & WUP signed by Mr. Fontana (for Public Work). PLZ call for status update. Also wants to come in to sign for owner - no signature on original apps.
<table>
<thead>
<tr>
<th>FROM:</th>
<th>TO:</th>
<th>INIT:</th>
<th>TO:</th>
<th>INIT:</th>
<th>FOR:</th>
<th>PLEASE:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>R. LOUI</td>
<td>S. KOKUBUN</td>
<td>REGULATION BRANCH</td>
<td>E. SAKODA</td>
<td>APPROVAL</td>
<td></td>
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<tr>
<td></td>
<td>S. KOKUBUN</td>
<td>E. HIRANO</td>
<td></td>
<td>R. HARDY</td>
<td>SIGNATURE</td>
<td></td>
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<tr>
<td></td>
<td>F. CHING</td>
<td>S. KOKUBUN</td>
<td></td>
<td>L. NAKAMA</td>
<td>INFORMATION</td>
<td></td>
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<td></td>
<td>S. KUBIA</td>
<td>K. YODA</td>
<td></td>
<td>D. HIGA</td>
<td></td>
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<td>K. OSHIRO</td>
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<td>C. ICE</td>
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<td>SURVEY BRANCH</td>
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<td></td>
<td>E. HIRANO</td>
<td>G. BAUER</td>
<td>PLANNING BRANCH</td>
<td>S. EDMUNDS</td>
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<td></td>
<td></td>
<td>N. FUJII</td>
<td></td>
<td>L. MIZUNO</td>
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<td>FIELD SERVICES &amp; TECHNICAL SUPPORT</td>
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<td>Y. SHIROMA</td>
<td>R. JINNAI</td>
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<td>M. OHYE</td>
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<td></td>
<td>I. KUNIMURA</td>
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<tr>
<td></td>
<td></td>
<td>S. SWANSON</td>
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</tr>
</tbody>
</table>

Available for:

- E. SAKODA
- R. HARDY
- L. NAKAMA
- D. HIGA
- C. ICE

Date: 1/24/94

Handwritten notes:

- Called Darren 1/24/94. He will send contractor down on Monday to sign WCA & provide maps showing new source location. Told him separate WCA should be made for collecting existing well (2053-10) to monitor 01/94.
REGISTRATION OF WELL
AND DECLARATION OF WATER USE

INSTRUCTIONS: Please type or print. If information is not available or not applicable, indicate as N/A. Fill out as completely as possible, sign, and the form with the Division of Water Resource Management, P.O. Box 373, Honolulu, Hawaii 96809. Phone: 548-3948 or 548-7543 for assistance.

STATE OF HAWAU
COMMISSION ON WATER RESOURCE MANAGEMENT
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF WATER RESOURCE MANAGEMENT

STATE WELL NO.: 2053-10
WELL NAME OR DESIGNATION: FT SHAFTER
SOURCE OR STATION NAME (For a battery of wells): Same

A. WELL OPERATOR
Name: U.S. Army Support Commissio
Contact person: 
Address: A.P.O. FT SHAFTER

B. OWNER OF WELL SITE
Name: Same
Contact person: 
Address: P.O. Box 373, Hawaii

C. WELL LOCATION
Tax Map Key: Town, Place, District:

D. WELL DATA
For Drilled Wells, submit "as-built" drawing, driller's log, and pump test results, and complete items below. For Tunnels and Shafts, submit construction drawings, plot plan, or sketch map.

Ground elevation (mean sea level): 10 ft.
Reference point (used to measure depth to water):
Elevation: N/A ft.
Description: 

Depth to water (Below reference point): N/A ft.
Maximum recorded chloride: N/A ppm
Minimum recorded chloride: 61 (1964) ppm
Maximum chloride in 1987: N/A ppm

Year drilled or constructed: N/A
Well contractor: 
Casing diameter: N/A in.
Solid casing depth (Below ground): N/A ft.
Perforated casing depth (Below ground): N/A ft.
Total depth of well: 30 ft.
Minimum chloride in 1987: N/A ppm

E. INSTALLED PUMP DATA
Pump type: Vertical shaft
Power: Diesel, HP
Pump capacity: 2-3 gal per minute
Pump installation contractor: 

(continued over)

For Official Use Only:
Date received: 
Date accepted: 
Field checked by: 
Latitude: 
Longitude: 
Hydrologic Unit: 
State Well No.: 

References: Hawaii Revised Statutes, Chapter 174C.
Hawaii Administrative Rules, Chapters 13-167 to 13-171.
F. DECLARATION OF WATER USE

NOTE: The purpose of the Declaration of Water Use is to obtain information necessary for the management of the State’s water resources. The Declaration does not confer a legal right to water or its use.

Water use data are recorded: Daily □ Weekly □ Monthly □ Other (describe): 

Method of measurement: □ Flow Meter □ Orifice □ Other (describe): RUN TIME

Quantity of Use (Report metered or estimated monthly water use from the well described on the reverse side of this form, for the calendar years 1983 through 1987. For a battery of wells which are not individually metered, but which are connected to a single meter or other measuring device, report total use from the battery):

WATER USE, IN GALLONS x 1000

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>January</td>
<td>2,3700</td>
<td>3,0075</td>
<td>2,9075</td>
<td>2,6775</td>
<td>2,6775</td>
</tr>
<tr>
<td>February</td>
<td>2,9700</td>
<td>2,7350</td>
<td>2,1525</td>
<td>2,9375</td>
<td>2,2425</td>
</tr>
<tr>
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<td>36225</td>
<td>35015</td>
<td>2,2925</td>
<td>2,7750</td>
<td>2,7300</td>
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<td>2,1225</td>
<td>2,9000</td>
<td>2,1700</td>
<td>2,3925</td>
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<td>35255</td>
<td>3,1600</td>
<td>2,5700</td>
<td>2,7525</td>
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<td>4,9750</td>
<td>3,6200</td>
<td>3,1200</td>
<td>2,3925</td>
<td>2,5200</td>
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<td>3,0750</td>
<td>34555</td>
<td>2,4700</td>
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<td>3,4650</td>
<td>3,2325</td>
<td>3,1500</td>
<td>2,4775</td>
<td>2,5275</td>
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<td>3,1505</td>
<td>3,2700</td>
<td>3,0375</td>
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<td>2,9775</td>
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<td>29150</td>
<td>33675</td>
<td>2,9725</td>
<td>2,9725</td>
<td>2,4750</td>
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<td>3,1135</td>
<td>3,4635</td>
<td>2,5130</td>
<td>2,1500</td>
<td>19515</td>
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<td>33100</td>
<td>2,4975</td>
<td>2,9150</td>
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<td>19675</td>
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<td>310,875</td>
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</tbody>
</table>

Minimum day’s use: ___________ gallons Maximum day’s use: ___________ gallons

Typical times of usage:

Type of Use (check all category boxes that apply and provide additional information as indicated):

<table>
<thead>
<tr>
<th>Category</th>
<th>Additional Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Municipal (including resorts, hotels, businesses)</td>
<td>Number of service connections:</td>
</tr>
<tr>
<td>□ Domestic (systems serving 25 people or less)</td>
<td>Acres Irrigated:</td>
</tr>
<tr>
<td>□ Irrigation</td>
<td>Crop(s): □ Sugar □ Pineapple</td>
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<td>□ Other (specify):</td>
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<tr>
<td></td>
<td>Non-Crop: □ Landscape □ Golf Course</td>
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<tr>
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<td>Method: □ Drip □ Furrow □ Sprinkler</td>
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<tr>
<td>□ Industrial</td>
<td>□ Cooling □ Manufacturing □ Mill</td>
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<td>□ Other (specify):</td>
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<td>□ Military</td>
<td>Specify (livestock, aquaculture, etc.):</td>
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<tr>
<td>□ Other</td>
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</tbody>
</table>

I declare that the contents of the above Declaration of Water Use are, to the best of my knowledge and belief, true, correct, and complete.

Water User’s Signature: __________________________ Date: ____________

Printed Name: __________________________

Firm or Title (Well Owner, etc.): __________________________
STATE OF HAWAII
COMMISSION ON WATER RESOURCE MANAGEMENT
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF WATER RESOURCE MANAGEMENT

REGISTRATION OF WELL
AND
DECLARATION OF WATER USE

INSTRUCTIONS: Please type or print. If information is not available or not applicable, indicate as N/A. Fill out as completely as possible, sign, and file form with the Division of Water Resource Management, P.O. Box 373, Honolulu, Hawaii 96806. Phone 548-3946 or 548-7543 for assistance.

BATTERY OF WELLS: For a battery of wells, on the surface, in a tunnel, or in a shaft, submit a registration form for each well together with a single map or plot plan showing layout of wells.

STATE WELL NO.: 2053-11
WELL NAME OR DESIGNATION: FT SHAFT

A. WELL OPERATOR OR FACILITIES ENG.
Contact person: 
Address: P.O. Ft Shaft
Zip: 96858 Phone: 

B. OWNER OF WELL SITE
Firm name: 
Contact person: 
Address: 
Zip: 
Phone: 

C. WELL LOCATION
Tax Map Key: Town, Place, District: 

D. WELL DATA
For Drilled Wells, submit "as-built" drawing, driller's log, and pump test results, and complete items below:
For Tunnels and Shafts, submit construction drawings, plot plan, or sketch map.

Ground elevation (Mean sea level): 
Reference point (Used to measure depth to water):
Elevation: 
Description: 

Depth to water (Below reference point): 
Maximum recorded chloride: ppm
Minimum recorded chloride: ppm
Maximum chloride in 1987: ppm

E. INSTALLED PUMP DATA
Pump type: Vertical shaft
Submersible
Power: Diesel, HP
Gas, HP
Pump capacity: gallons per minute
Pump installation contractor: 

For Official Use Only:
Date received: Date accepted: 
Field checked by: Date: Latitude: 
Comments: Longitude: State Well No.: 

References: Hawaii Revised Statutes, Chapter 174C.
Hawaii Administrative Rules, Chapters 13-167 to 13-171.
F. DECLARATION OF WATER USE

NOTE: The purpose of the Declaration of Water Use is to obtain information necessary for the management of the State's water resources. The Declaration does not confer a legal right to water or its use.

Water use data are recorded: □ Daily □ Weekly □ Monthly
□ Other (Describe): ____________________________

Method of measurement: □ Flow Meter □ Orifice
□ Other (Describe): ____________________________

Quantity of Use (Report metered or estimated monthly water use from the well described on the reverse side of this form, for the calendar years 1983 through 1987. For a battery of wells which are not individually metered, but which are connected to a single meter or other measuring device, report total use from the battery):

WATER USE, IN GALLONS x 1000

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</tbody>
</table>

Minimum day's use: ___________ gallons
Maximum day's use: ___________ gallons

Typical times of usage: ____________________________

Type of Use (Check all category boxes that apply and provide additional information as indicated.):

Category | Additional Information
----------|-----------------------------------
□ Municipal (including hotels, businesses) | ____________________________
□ Domestic (systems serving 25 people or less) | ____________________________
□ Irrigation | Number of service connections: ____________________________
□ Agricultural (large farms) | Acres Irrigated: ____________________________
□ Crop(s): □ Sugar □ Pineapple
□ Other (specify): ____________________________
□ Non-Crop: □ Landscape □ Golf Course
□ Other (specify): ____________________________
□ Method: □ Drip □ Furrow □ Sprinkler
□ Industrial | ____________________________
□ □ Cooling □ Manufacturing □ Mill
□ Other (specify): ____________________________
□ Military | ____________________________
□ □ Other (specify): ____________________________
□ Other | Specify (livestock, aquaculture, etc.): ____________________________

I declare that the contents of the above Declaration of Water Use are, to the best of my knowledge and belief, true, correct, and complete.

Water User's Signature: ____________________________ Date: ________
Printed Name: ____________________________
Firm or Title (Well Oper. etc.): ____________________________
Chairman and Members
Board of Land and Natural Resources
State of Hawaii
Honolulu, Hawaii

Gentlemen:

RESUBMITTAL

Terms of Water withdrawal and Use Permits

The Department's Administrative Rules on ground water control require that the Board specify the period or duration of permits and the commencement and completion dates for the construction of ground water sources. After investigation and study of this matter, DOWALD is ready to make specific recommendations for adoption by the Board of Land and Natural Resources.

The Ground Water Use Law specifies that permits may be issued up to a maximum of 50 years and allows for extension of the permit after one-half of the permit period has lapsed. The staff is recommending that the duration of each permit be established at twenty (20) years with a review every five years by the Board to determine compliance with provisions of the permit. The staff feels that 20 years is a reasonable time for regulating ground water withdrawals and uses at this early stage of the program. As the Department gains experience in ground water regulation, the duration of the permits may be reviewed and adjusted as appropriate in the future.

On the commencement and completion dates, the staff recommends that a period of 24 months be established for completing the development of the ground water source. This construction period is a reasonable time for drilling, testing, and for the installation of permanent pumps and controls to fully bring the ground water source into operation. The period may be extended upon a showing of good cause and good faith performance. The permit and construction dates should commence on the date the permit is issued by the Department.

It is recommended that the above terms be standardized for all water withdrawal and use permits issued by the Board, subject to adjustments required by the Board for any permit.

RECOMMENDATION:

That the Board establish the terms of ground water withdrawal and use permits at 20 years from the date of issuance of the permit with a five-year Board review to determine compliance with the provisions of the permit and that the development of the ground water source be completed within 24 months from the date of permit issuance for all permits issued by the Board, subject to adjustments required by the Board for any permit.

Respectfully submitted,

[Signature]
ROBERT T. CHUCK
Manager-Chief Engineer

APPROVED FOR SUBMITTAL

[Signature]
SUCCMU ONO, Chairman

Approved by the Board of Land and Natural Resources at the meeting held on

[Date]

ITEM D-1

B12
State of Hawaii  
DEPARTMENT OF LAND AND NATURAL RESOURCES  
Division of Water and Land Development  
Honolulu, Hawaii  

September 11, 1981

Chairman and Members  
Board of Land and Natural Resources  
State of Hawaii  
Honolulu, Hawaii

Gentlemen:

Certification of Ground Water Withdrawals and Uses,  
Honolulu Ground Water Control Area, Oahu

The Honolulu Ground Water Control Area was designated by the Board of Land and Natural Resources on February 27, 1981 under authority of Chapter 177, HRS, and Chapter 188 of Title 13, Administrative Rules entitled "Rules for the Control of Ground Water Use in the State of Hawaii." The Department's regulatory procedures provide for water users to declare their existing water uses within a ninety-day period which ended June 4, 1981 and allows the Board 180 days to certify the declared uses.

The recommended certification of total annual, average daily, and maximum daily withdrawals for individual wells and/or well fields is tabulated in the attachment, "Certification of Ground Water Withdrawals and Uses, Honolulu Ground Water Control Area", for the Moanalua-Kaimuki Subarea and Waialae-Hawaii Kai Subarea. A comparison of the recommended quantity for certification and the sustainable yield adopted by the Board on July 24, 1981 is tabulated below:

<table>
<thead>
<tr>
<th>Subarea</th>
<th>Sustainable Yield (mgd)</th>
<th>Recommended Certification (mgd)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moanalua-Kaimuki</td>
<td>55</td>
<td>41.827</td>
</tr>
<tr>
<td>Waialae-Hawaii Kai</td>
<td>5</td>
<td>1.100</td>
</tr>
</tbody>
</table>

The remaining ground water supplies may be withdrawn by obtaining permits from the Board of Land and Natural Resources.

RECOMMENDATION:

That the Board certify the existing withdrawals and uses for each well tabulated on the attached "Certification of Ground Water Withdrawals and Uses, Honolulu Ground Water Control Area" dated September 11, 1981, subject to any special conditions and applicable laws, rules and regulations.

Respectfully submitted,

ROBERT T. CHUCK  
Manager-Chief Engineer

APPROVED FOR SUBMITTAL:  

SUSUMU ONO, Chairman

Approved by the Board of Land & Natural Resources at the meeting held on  

ITEM D-4
# DEPARTMENT OF LAND AND NATURAL RESOURCES

## CERTIFICATION OF GROUND WATER WITHDRAWALS AND USES

**HONOLULU GROUND WATER CONTROL AREA**

### MOANALUA-KAIMUKI SUBAREAS

#### Board of Water Supply

<table>
<thead>
<tr>
<th>User/Source</th>
<th>State Well No.</th>
<th>Total Wells</th>
<th>Use</th>
<th>Source Capacity (mgd)</th>
<th>3-yr. Ave Withdrawal (mgd)</th>
<th>Use</th>
<th>Maximum Daily Withdrawal (mgd)</th>
<th>Total Annual Withdrawal (mgd)</th>
<th>Average Daily Withdrawal (mgd)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kaimuki Station</td>
<td>1904-03 to 10</td>
<td>2</td>
<td>Mun.</td>
<td>2.232</td>
<td>3.027</td>
<td>Mun.</td>
<td>14.14</td>
<td>1,136.85</td>
<td>3.39</td>
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<tr>
<td>Palolo Well</td>
<td>1947-01</td>
<td>1</td>
<td>Mun.</td>
<td>1.51</td>
<td>1.31</td>
<td>Mun.</td>
<td>1.70</td>
<td>476.15</td>
<td>1.51</td>
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<tr>
<td>Wilder Station</td>
<td>1947-12 to 16</td>
<td>4</td>
<td>Mun.</td>
<td>10.06</td>
<td>5.75</td>
<td>Mun.</td>
<td>10.08</td>
<td>2,938.75</td>
<td>5.75</td>
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<tr>
<td>Honolulu Station</td>
<td>1951-12, 13, 24, 25 to 25, 26, 27</td>
<td>9</td>
<td>Mun.</td>
<td>22.55</td>
<td>6.64</td>
<td>Mun.</td>
<td>18.14</td>
<td>2,423.90</td>
<td>6.64</td>
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<tr>
<td>Kalihi Pump</td>
<td>1953-06 to 08, 18 to 19, 22</td>
<td>8</td>
<td>Mun.</td>
<td>14.12</td>
<td>4.93</td>
<td>Mun.</td>
<td>11.62</td>
<td>1,726.25</td>
<td>4.93</td>
</tr>
<tr>
<td>Kalihi Shaft</td>
<td>2053-08</td>
<td>1</td>
<td>Mun.</td>
<td>17.26</td>
<td>8.11</td>
<td>Mun.</td>
<td>17.28</td>
<td>2,862.68</td>
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<tr>
<td>Moanalua Subarea</td>
<td>2153-10 to 12</td>
<td>2</td>
<td>Mun.</td>
<td>6.018</td>
<td>3.29</td>
<td>Mun.</td>
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<tr>
<td><strong>Subtotal (WWS Wells)</strong></td>
<td></td>
<td>34</td>
<td></td>
<td>93.889</td>
<td>33.62</td>
<td></td>
<td>79.228</td>
<td>12,271.30</td>
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</table>

#### Private Users

<table>
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<tr>
<th>User/Source</th>
<th>State Well No.</th>
<th>Total Wells</th>
<th>Use</th>
<th>Source Capacity (mgd)</th>
<th>3-yr. Ave Withdrawal (mgd)</th>
<th>Use</th>
<th>Maximum Daily Withdrawal (mgd)</th>
<th>Total Annual Withdrawal (mgd)</th>
<th>Average Daily Withdrawal (mgd)</th>
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</thead>
<tbody>
<tr>
<td>Amamori H.D. &amp; D.</td>
<td>2053-05</td>
<td>1</td>
<td>Ind.</td>
<td>0.576</td>
<td>0.139</td>
<td>Ind.</td>
<td>0.576</td>
<td>50.74</td>
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<tr>
<td>Army - Ft. Shafter</td>
<td>2053-10, 11</td>
<td>2</td>
<td>Dom.</td>
<td>2.6</td>
<td>1.035</td>
<td>Dom.</td>
<td>2.6</td>
<td>377.70</td>
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<tr>
<td>Army - Tripler</td>
<td>2153-07, 08</td>
<td>2</td>
<td>Dom.</td>
<td>1.555</td>
<td>0.009</td>
<td>Dom.</td>
<td>1.555</td>
<td>222.28</td>
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<td>Bishop Trust</td>
<td>1953-16</td>
<td>1</td>
<td>Ind.</td>
<td>1.15</td>
<td>0.006</td>
<td>Ind.</td>
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<td>21.90</td>
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<td>Del Monte Corp.</td>
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<td>1</td>
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<td>1.396</td>
<td>0.244</td>
<td>Ind.</td>
<td>1.396</td>
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<tr>
<td>Castle &amp; Cooke Foods</td>
<td>1953-11, 12, 20, 21</td>
<td>4</td>
<td>Ind.</td>
<td>Nat.</td>
<td>Nat.</td>
<td>Nat.</td>
<td>7.117</td>
<td>730.00</td>
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<td>Hawaii Meat Co., Ltd.</td>
<td>2053-00</td>
<td>1</td>
<td>Ind.</td>
<td>0.144</td>
<td>0.082</td>
<td>Ind.</td>
<td>0.144</td>
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<td>Ind.</td>
<td>14.6</td>
<td>912.50</td>
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<td>Honolulu Int. C.C.</td>
<td>2154-01</td>
<td>1</td>
<td>Ind.</td>
<td>Nat.</td>
<td>Nat.</td>
<td>Nat.</td>
<td>No data</td>
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<td>Kamuela High School</td>
<td>2053-07, 11</td>
<td>2</td>
<td>Dom.</td>
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<td>0.189</td>
<td>Dom.</td>
<td>1.728</td>
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<td>Kawailoa Church</td>
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<td>1</td>
<td>Irr.</td>
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<td>0.100</td>
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<tr>
<td>Kokua Kogyo</td>
<td>1749-19</td>
<td>1</td>
<td>Dom.</td>
<td>0.570</td>
<td>0.326</td>
<td>Dom.</td>
<td>0.570</td>
<td>122.64</td>
<td>0.326</td>
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<tr>
<td>Love's Bakery</td>
<td>1974-18</td>
<td>1</td>
<td>Ind.</td>
<td>No data</td>
<td>0.043</td>
<td>Ind.</td>
<td>No data</td>
<td>15.70</td>
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<tr>
<td>MTL, Inc.</td>
<td>1951-20</td>
<td>1</td>
<td>Ind.</td>
<td>No data</td>
<td>No data</td>
<td>Ind.</td>
<td>0.83</td>
<td>7.30</td>
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<tr>
<td>Pacific Beach Hotel</td>
<td>1750-09</td>
<td>1</td>
<td>Oth.</td>
<td>No data</td>
<td>No data</td>
<td>Oth.</td>
<td>No data</td>
<td>7.30</td>
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<tr>
<td>Pacific Club</td>
<td>1951-07</td>
<td>1</td>
<td>Dom.</td>
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<td>Pacific Laundry</td>
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<td>1</td>
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<td>0.370</td>
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<tr>
<td>Palama Settlement</td>
<td>1953-15</td>
<td>1</td>
<td>Oth.</td>
<td>No data</td>
<td>0.024</td>
<td>Oth.</td>
<td>No data</td>
<td>8.76</td>
<td>0.024</td>
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<tr>
<td>Punahou School</td>
<td>1949-10</td>
<td>1</td>
<td>Dom.</td>
<td>0.720</td>
<td>0.142</td>
<td>Dom.</td>
<td>0.720</td>
<td>51.83</td>
<td>0.142</td>
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<tr>
<td>Queen's Mod. Cnr</td>
<td>1951-54</td>
<td>1</td>
<td>Dom.</td>
<td>1.080</td>
<td>0.237</td>
<td>Dom.</td>
<td>1.080</td>
<td>86.50</td>
<td>0.237</td>
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<tr>
<td>S.M. Damon Estate</td>
<td>2153-02</td>
<td>1</td>
<td>Oth.</td>
<td>0.144</td>
<td>0.021</td>
<td>Oth.</td>
<td>0.144</td>
<td>7.66</td>
<td>0.021</td>
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<tr>
<td><strong>Subtotal (Private Users)</strong></td>
<td></td>
<td>27</td>
<td></td>
<td>27.809</td>
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<td></td>
<td>25.625</td>
<td>2,955.55</td>
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</table>

### MAILE-HAWAI'I KAI SUBAREAS

#### Board of Water Supply

<table>
<thead>
<tr>
<th>User/Source</th>
<th>State Well No.</th>
<th>Total Wells</th>
<th>Use</th>
<th>Source Capacity (mgd)</th>
<th>3-yr. Ave Withdrawal (mgd)</th>
<th>Use</th>
<th>Maximum Daily Withdrawal (mgd)</th>
<th>Total Annual Withdrawal (mgd)</th>
<th>Average Daily Withdrawal (mgd)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aina Koe</td>
<td>1746-01</td>
<td>1</td>
<td>Mun.</td>
<td>0.504</td>
<td>0.40</td>
<td>Mun.</td>
<td>0.504</td>
<td>166.00</td>
<td>0.40</td>
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<td>Wailuku Iki Station</td>
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<td>Mun.</td>
<td>0.504</td>
<td>0.19</td>
<td>Mun.</td>
<td>0.504</td>
<td>60.60</td>
<td>0.19</td>
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<tr>
<td>Waihale Shaft</td>
<td>1747-02</td>
<td>1</td>
<td>Mun.</td>
<td>2.590</td>
<td>0.24</td>
<td>Mun.</td>
<td>0.69</td>
<td>87.60</td>
<td>0.24</td>
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<td><strong>Subtotal (WWS Wells)</strong></td>
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<td>3</td>
<td></td>
<td>3.599</td>
<td>0.83</td>
<td></td>
<td>1.656</td>
<td>302.85</td>
<td>0.83</td>
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#### Private User

<table>
<thead>
<tr>
<th>User/Source</th>
<th>State Well No.</th>
<th>Total Wells</th>
<th>Use</th>
<th>Source Capacity (mgd)</th>
<th>3-yr. Ave Withdrawal (mgd)</th>
<th>Use</th>
<th>Maximum Daily Withdrawal (mgd)</th>
<th>Total Annual Withdrawal (mgd)</th>
<th>Average Daily Withdrawal (mgd)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wai'alea Country Club</td>
<td>1646-01</td>
<td>1</td>
<td>Irr.</td>
<td>0.064</td>
<td>0.270</td>
<td>Irr.</td>
<td>0.064</td>
<td>98.55</td>
<td>0.270</td>
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<tr>
<td><strong>TOTAL - Wai'alea-Iwaihilo Kai Subareas</strong></td>
<td></td>
<td>4</td>
<td></td>
<td>4.752</td>
<td>1.100</td>
<td></td>
<td>2.562</td>
<td>401.50</td>
<td>1.100</td>
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</tbody>
</table>

---

B9
WATER USE PERMIT NO. 027

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

Permit Information

<table>
<thead>
<tr>
<th>Permit Information</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water User:</td>
<td>United States Army APVG-GWC-T, Building #113 Wheeler Army Airfield Schofield Barracks, HI 96858</td>
</tr>
<tr>
<td>Landowner of Source:</td>
<td>United States Army APVG-GWC-T, Building #113 Wheeler Army Airfield Schofield Barracks, HI 96858</td>
</tr>
<tr>
<td>Permitted Withdrawal Rate:</td>
<td>1.035 mgd (Based upon a 12-month moving average)</td>
</tr>
<tr>
<td>Water Management Area:</td>
<td>Moanaloa</td>
</tr>
<tr>
<td>Island:</td>
<td>Oahu</td>
</tr>
<tr>
<td>Aquifer Sector/System:</td>
<td>Honolulu/Moanaloa</td>
</tr>
<tr>
<td>System Sustainable Yield:</td>
<td>18 mgd</td>
</tr>
<tr>
<td>Water Type:</td>
<td>Fresh, Potable</td>
</tr>
<tr>
<td>Original CWRM Date:</td>
<td>September 11th, 1981</td>
</tr>
<tr>
<td>Standard Conditions:</td>
<td>1-11, 13-22</td>
</tr>
<tr>
<td>Special Conditions:</td>
<td>None</td>
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Water Source

<table>
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<tr>
<th>Water Source</th>
<th>Details</th>
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</thead>
<tbody>
<tr>
<td>State Well Number(s):</td>
<td>2053-11, 2053-13</td>
</tr>
<tr>
<td>Well Name:</td>
<td>Fort Shafter</td>
</tr>
<tr>
<td>Water Source TMK Number(s):</td>
<td>1st Division, 1-1-008:005</td>
</tr>
<tr>
<td>State Land Use Classification(s):</td>
<td>Urban/Conservation</td>
</tr>
<tr>
<td>County Zoning Classification(s):</td>
<td>F-1/P-1</td>
</tr>
<tr>
<td>Geographical Coordinates:</td>
<td></td>
</tr>
<tr>
<td>Well No. 2053-11 (Well 1):</td>
<td>Latitude 21° 20' 34.0&quot; North Longitude 157° 53' 05.0&quot; West</td>
</tr>
<tr>
<td>Well No. 2053-13 (Well 2):</td>
<td>Latitude 21° 20' 34.5&quot; North Longitude 157° 53' 05.2&quot; West</td>
</tr>
</tbody>
</table>
End Use

End Use TMK Number(s): 1st Division, Various
State Land Use Classification(s): Various
County Zoning Classification(s): Various
Beneficial Use Explanation: Domestic water use for Fort Shafter Army installation

Background Information

Water Use Permit 027 originally governed State Well Nos. 2053-10 and 0253-11 beginning in the early 1980's. On March 1st, 1995, approval was granted to cap State Well No. 2053-10 and institute use of State Well 2053-13. At this time, Water Use Permit 027 was modified accordingly to reflect the change made.

Consistent water use reporting records are available up until March of 2006, when reporting was abruptly halted. The permittee's 12-month moving average had not exceeded the permitted amount of 1.035 mgd during that time. Salinity records are not currently being reported. Reference the permit file for additional information on reporting history.

Water Use Permit 027 was approved during the September 11th, 1981 Commission on Water Resource Management meeting. This water source has been in use for at least 25 years by the United States Army. Standard conditions 1-11 & 13-22 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: Wayde Nakai
Site Address: Fort Shafter, Building 509
Fort Shafter, HI 96858

Brown and Caldwell conducted a field investigation on February 12th, 2008 from 10:45 a.m. until 11:15 a.m. with Mr. Wayde Nakai. During this time, type of water usage was verified, GPS coordinates of well head(s) were recorded, 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 at the Fort Shafter Military installation. 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. 027

State Well Nos. 2053-11 and 2053-13 are located on TMK parcel 1-1-008:005 at 21° 20' 34.0" N, 157° 53' 05.0" W (±14 ft), and 21° 20' 34.5" N, 157° 53' 05.2" W (±15 ft), respectively. Water is drawn from this well battery, treated with chlorine, and metered at the well site. It is then pumped up to two main storage tanks on Fort Shafter that feed the domestic water system. Because water from this well is used on private residences and primarily indoors, end use inspection was not conducted on this field investigation. Reference the Appendix for photographs of the previously described system components. Note that photographs at this site were limited due to the confidentiality concerns expressed by the United States Army.

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.

Since no monthly water use or salinity levels are being reported on a consistent basis, the permittee is found to be in violation of Standard Condition (10).

Based upon visual inspection of the system, all components appear to be in full working order. The permittee demonstrated functionality of an installed flowmeter and provided access to the site grounds where no wasting of water or water loss was observed.

Recommendations

- Address the following discrepancies between the Commission’s electronic database and actual field investigation findings:
  - Permittee and landowner addresses
  - Water source TMK parcel information
- Address issue of violation of Standard Condition (10) regarding non-reporting of water use and salinity levels.
20-Year Water Use Permit Review
Water Use Permit No. 027

APPENDIX

Field Investigation Photographs
Figure 1 – State Well No. 2053-11

Figure 2 – State Well No. 2053-13
Figure 3 – Control system for well pumps

Figure 4 – Functional system flowmeter
**Water Use Permit Survey**

(Please complete one survey form for each WUP)

<table>
<thead>
<tr>
<th>WUP Number:</th>
<th>827</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well Number(s):</td>
<td>2053-11, 2053-13</td>
</tr>
</tbody>
</table>

**Contact Information (of the person who will be present at site visit):**

- **Name:** Karl Santa, Wayde Nakae
- **Phone (for phone interview):** (808) 1-1-11 1-12 123-4567 656-8200
- **Email:** Karl.Santa@us.army.mil
- **Best time to reach for phone interview:** M-F 0730-1530

**Property Information (of the water use/well location):**

- **Address:** Fort Shafter Building 589
- **City:** Honolulu
- **Well Location TMK (list all if multiple wells present):** 1-1-8-5
- **Water Use TMK (list all if used on multiple lots):**

**Water Use/Well Information:**

- **Is the water source currently in use?** Yes [x] No [ ]
- **If no, please explain:**

What are you currently using the water for? (example: “Use for 45 acres of diversified agriculture and 3 residences”):

- **Domestic water use for Fort Shafter Army installation**

- **Is a flow meter installed and working properly?** Yes [x] No [ ]
- **If no, please explain:**

Do you submit monthly water use reports to the State? Yes [x] No [ ]
- **If no, please explain:** We have been submitting reports periodically.

**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.

<table>
<thead>
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<th><strong>Date</strong> (M-F):</th>
<th><strong>Time:</strong> 9:00 am</th>
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<th><strong>Time:</strong> 3:00 pm</th>
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<td></td>
<td><strong>Fr</strong></td>
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<tr>
<td><strong>Date</strong></td>
<td><strong>M-F</strong></td>
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<tr>
<td><strong>Fr</strong></td>
<td>12:00 pm</td>
<td>3:00 pm</td>
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<td></td>
</tr>
<tr>
<td><strong>Date</strong></td>
<td><strong>M-F</strong></td>
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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 Alakea Street, Suite #2400
Honolulu, HI 96813
Tel: (808) 203-2661
Fax: (808) 533-0226
mcsmith@brwncaid.com

*For Official Use Only*

**Received:** 12/12/07  **Information Updated:** 12/12/07  **Phone Interview Complete:** 2/1/08

**Notes/Comments:**
Phone Interview

WUP Number: 027  Well Number(s): 2053-11, 2053-13

Contact Name: Karl Santa  Phone Number: 666-1410 (x1122)

Attempt #1: Date/Time: 2/7/08 (10:30 am)  Result: Reached
Attempt #2: Date/Time: N/A  Result: N/A

Well Location TMK(s):

Water Use TMK(s):

Water Source Address: Fort Shafter Building 509
City: Honolulu  Zip Code: 96856

Currently using water source? Yes ☒ No ☐

Notes/Comments: Use for domestic purposes on Fort Shafter

How often is the water source being used? Daily ☒ Weekly ☐ Monthly ☐

Notes/Comments:

How long have you been using this water source?: N/A

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: 2/12/08 @ 10:00 am

Notes (Special directions, site conditions, potential hazards, general notes, etc.):
See directions from WUP 4641; Meeting w/ Wayde Nakai for several sites on this day.
Contact still Joni Morigato

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: M.S.  Date: 2/7/08  Time: 10:30 am
Field Investigation Checklist

WUP Number: 027
Well Number(s): 2053-11, 2053-13

Water Source

Well Location TMK(s): 1-1-026-005
Well Head GPS Coordinates: Latitude: Below Longitude: Below
Well Type: Well Pump
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:
__________________________________________________________
Water Use

Water Use TMK(s): Various
What is the water being used for? Fort Shafter Military Installation
   Water tank adjacent to golf course — Pump station to higher elevation tank.
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:
__________________________________________________________
Are the permit conditions being complied with? Yes ☑ No ☐
If no, explain:
__________________________________________________________
   However, no reports on record since March, 2006

Other

Photographs of: Water Source ☑ Water Meter ☐ Usage Area ☑ Pump/Motor ☑
General Notes/Comments:
2053-11: 21° 40' 34.0" N, 157° 53' 05.0" W (±14 ft)
2053-13: 21° 40' 34.5" N, 157° 53' 06.2" W (±18 ft)
   Chlorination/treatment at well site.

Investigated By: M.S. Date: 2/12/06 Time: 10:30 a.m.
**Standard Conditions List**

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

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

3. The water use must at all times meet the requirements set forth in HRS § 174C-49(a), which means that it:
   a. Can be accommodated with the available water source;
   b. Is a reasonable-beneficial use as defined in HRS § 174C-3;
   c. Will not interfere with any existing legal use of water;
   d. Is consistent with the public interest;
   e. Is consistent with State and County general plans and land use designations;
   f. Is consistent with County land use plans and policies; and
   g. Will not interfere with the rights of the Department of Hawaiian Home Lands as provided in Section 221 of the Hawaiian Homes Commission Act and HRS § 174C-101(a).

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

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

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

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

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

**Variations of Standard Condition (8) are as follows:**

i. Modification of any permit condition shall be approved by the Commission. Modification of any permit condition without notification may result in the revocation of the water use permit.
9. This permit may be modified by the Commission and the amount of water initially
granted to the permittee may be reduced if the Commission determines it is
necessary to:
   a. Protect the water sources (quantity or quality);
   b. Meet other legal obligations including other correlative rights;
   c. Insure adequate conservation measures;
   d. Require efficiency of water uses;
   e. Reserve water for future uses, provided that all legal existing uses of water as
      of June, 1987 shall be protected;
   f. Meet legal obligations to the Department of Hawaiian Home Lands, if
      applicable; or
   g. Carry out such other necessary and proper exercise of the State’s and the
      Commission’s police powers under law as may be required.

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

10. An approved flowmeter(s) must be installed to measure monthly withdrawals and a
monthly record of withdrawals, salinity, temperature, and pumping times must be
kept and reported to the Commission on Water Resource Management on forms
provided by the Commission on a monthly basis (attached).

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Variations of Standard Condition (20) are as follows:

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

21. This permit may not be transferred or the use rights granted by this permit sold or in any other way alienated. Pursuant to HRS § 174C-59 and the requirements of Chapter 174C, the Commission on Water Resource Management has the authority to allow the transfer of the permit and the use rights granted by this permit in a manner consistent with HRS § 174C-59. Any such transfer shall only occur with the Commission’s prior express written approval. Any sale, assignment, lease, alienation, or other transfer of any interest in this permit shall be void.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

20. Standard Condition 16 is waived for saltwater wells.

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

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

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

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

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

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

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

28. The applicant shall follow the agreed monitoring plan.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

53. The use authorized by the permit must not interfere 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 emergency water use occurs, the permittee shall notify the Commission in writing within one (1) day of pumping, to inform the Commission as to the nature of the emergency and the expected duration of the emergency. A water
use report shall also be filed pursuant to Standard Condition 10 and Administrative Rule 13-168-7.

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

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

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

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

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

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

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

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

67. Standard Condition 17 is waived.

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

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

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

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

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

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

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

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

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

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

78. Standard Condition 9 is waived.

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

80. Standard Condition 10 is waived.

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

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

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

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

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

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

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

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

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

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

92. Standard Condition 7 shall not apply.

93. Standard Condition 22 shall not apply.

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

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

96. HECO 1 mgd for industrial use

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

98. BWS 1 mgd for municipal use.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

119. Standard Conditions 10 & 18 shall not apply.

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

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

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

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

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

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

Applicant/Water User: DPW, USAG-HI
Address: ATTN: APVG-GWC-T,
SCHOFIELD BARRACKS, HI 96857

Landowner of Source: DEPARTMENT OF ARMY
Address: ATTN: APVG-GWC-T,
SCHOFIELD BARRACKS, HI 96857

PERMITTED SOURCE INFORMATION

Island: OAHU
Water Management Area: MOANALUA
Aquifer Sector: HONOLULU
Aquifer System: MOANALUA
System Sustainable Yield: 18 mgd
Well Name: FORT SHAFTER
State Well Nos.: 2053-11 & 13

PERMITTED USE INFORMATION

Reasonable beneficial use: MILITARY
Withdrawal (12 month moving ave.): 1.035 mgd
% of Sustainable Yield: 6%
Location of water use
TMK #: 1-1-8:14
Address: WALKER DR., FORT SHAFTER
State land use classification: URBAN
County zoning classification: MILITARY

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 groundwater 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, used for the reasonable beneficial use described, and 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 groundwater 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 groundwater use here must not interfere with surface or other groundwater rights or reservations.

5. The groundwater 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 March 1, 1995 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.

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 groundwater 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 MOANALUA 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 Moanalua 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 Moanalua Groundwater 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.
GROUND WATER USE PERMIT
DPW, USAG-HI, Well No. 2053-13

22. The issuance of this permit was approved by the Commission on Water Resource Management at its meeting on March 1, 1995.

MICHAEL D. WILSON, Chairperson
Commission on Water Resource Management

Date of Permit Issuance: MAY 4 1995

APPROVED AS TO FORM:

William Mancuso 4/30/95
Deputy Attorney General

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: 11 May 95

Printed Name: DENNIS J. FONTANA

Firm or Title: COL. EN. Director of Public Works

PLEASE SIGN AND RETURN ONE COPY OF THIS PERMIT TO THE COMMISSION AND RETAIN A COPY FOR YOUR RECORD.
GROUND WATER USE PERMIT
DPW, USAG-HI, Well No. 2053-13

EXHIBIT A

Water Use Permit
Groundwater

SPECIAL CONDITIONS

A. (NO SPECIAL CONDITIONS)
PRELIMINARY ENGINEERING REPORT FOR NEW POTABLE WATER SOURCE

WELL NO. 2053-13

FORT SHAFTER, HONOLULU, OAHU, HAWAII

TAX MAP KEY: 1-1-8:14

Prepared for:

DEPARTMENT OF THE ARMY
DIRECTORATE OF PUBLIC WORKS
UNITED STATES ARMY GARRISON HAWAII

Prepared by:

R. M. Towill Corporation
Engineering & Planning

Mink & Yuen, Inc.
Hydrology

PRE-FINAL

12/12/95
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1. General

This preliminary engineering report is being prepared per Title 11, Chapter 20, Department of Health Administrative Rules and Regulations, Section 11-20-29.

2. General Information

a. Project Description

Well No. 2053-13 is being developed as part of the water supply system for Fort Shafter in the area of the Moanalua, Oahu, Hawaii, see Figure 1. The well is specifically being constructed to replace one of two existing wells located near Building 509. The well had to be replaced due to problems with its alignment. The well is located at Fort Shafter under Tax Map Key (TMK): 1-1-08:14. The water developed from this well, approximately 1,100 gallons per minute (gpm) with an allowable withdrawal of 1.035 million gallons per day (mgd) will replace the water from well No. 2053-10. Well No. 205-10 will be converted to a monitoring well.

The new well, designated as Well No. 2053-13 by the Department of Land and Natural Resources (DLNR), has been constructed to provide water to help meet the demands of Fort Shafter, including military personnel stationed at the installation and civilian employees. The Fort Shafter Water System consists of three pressure service zones: Lower - 200-foot service zone; Middle - 400-foot service zone; and Upper - 500-foot service zone. The lower service zone stretches from Shafter Flats to the Fort Shafter Golf Course, servicing up to elevation 104 feet mean sea level (msl). This zone has a connection to the Honolulu Board of Water Supply (BWS) System at Patch Gate. This connection is normally closed. The middle and upper service zones are located above Wisser Road and requires booster pump stations, pressure reducing valves and check valves to separate each system. The middle service zone serves from elevation 100 to 330 feet msl while the upper service zone serves from elevation 300 to 450 feet msl.

b. Owner and Authorized Representatives

The project site and adjacent land are owned by the Department of the Army. Following the completion of the well construction and the installation of a pump and associated facilities, the well will be a part of the Fort Shafter water system operated by the United States Army Garrison Hawaii (USAG-HI) Directorate of Public Works.

c. Site Plan

See Figure 2.
3. Physical and Hydrological Characteristics of the Area

a. Location

The well site is located approximately 600 feet mauka of Moanalua Highway and about 3,200 feet north west of Middle Street. The well is located at an elevation of 19.6 feet msl. The site was selected next to the well it is replacing, next to the other supply wells. The location and design of the well were approved by DPW in 1994.

b. Climate

The climate of the project area is described as a mild subtropical climate. The average annual mean temperature is 73 degrees F. The annual precipitation is 42 inches.

c. Topography

Fort Shafter lies across an abrupt change in slope between Shafter Flats at an elevation of less than 20 feet msl and the eroded slopes of the old shield volcano, known as the Koolaus. The Main Post has an undulating terrain with a mean elevation of 100 feet msl. The ground rises sharply after the built-up areas north of the post.

The topographic map of the area is presented in Figure 1.

d. Geology and Foundation Conditions

The Koolau Basalts, which form the basement rock for all of eastern Oahu, show exceptional uniformity where exposed above the 100 foot elevation. The main volcanic vent for the Koolau formation lay to the northeast of Fort Shafter. Thin pahoehoe lavas are most common in the upper valley. The thick, massive aa lavas are also evident. The interface between the flows are irregular and loose blocks, lava tubes, and contraction joints allows for high water permeability, making the unweathered basalts good aquifers.

The rolling surface upon which rests most of the Fort Shafter facilities is a part of the Honolulu Plain. Above the basaltic bedrock, terraced by wave action, lies a deposit of poorly permeable weathered alluvium which has been overlain by marine sediments containing calcareous shell deposited when the sea level was at least 95 feet above its present level. Interbedded with these are clays, and towards the top of the formation tuffs from post-erosional eruptions occur. The earliest is believed to be derived from the Aliamanu Crater and laid in water. Following the recession of the sea to its present level, later eruptions from Salt Lake and Makalapa vents deposited more tuff over the land. Moanalua Stream was deflected to the east by the volcanic deposits to join Kahauiki Stream before entering the sea. Alluvial fans were built over the tuffs by the streams issuing from the uplands to form Shafter Terrace, a slightly elevated surface between the post-erosional craters and mountains. Streams have slightly incised their courses into the soft sediments creating a gently
undulating surface. Water infiltrated in the high rainfall areas in the mountains is inhibited from seeping into the ocean by a caprock of low permeability sediment. These may be several hundred feet thick at the coast but get progressively thinner towards the landward edge of the plain.

There is a considerable diversity in the soil types within the Military Reservation. Fort Shafter crosses the steep slopes and sharp ridges of the upper drainage basins where surface erosion and soil slips are common. Here the rainfall is greater than 60 inches per year and the ground is frequently moist. The soil occurs as a thin mantle 1 to 10 inches deep. Rock outcappings are common and the soft weathered bedrocks is fairly permeable. Further down the valley the slopes are still steep but the rainfall is less, going as low as 25 inches per year. There is less lush vegetation and rocks cover most of the surface. Soils tend to be sticky and plastic having a high shrink swell potential. When saturated the soil is subject to sliding.

The dissected uplands (Manana Series) on the lower slopes above the Main Post soil layers have developed on slopes less than 40%. This soil is subject to erosion, especially when the vegetal cover is disturbed.

The stream courses and floodplains (Kawaihapai and Hanalei Series) are developed in the alluvium deposited by stream actions. In the middle valley floor where the slopes are moderate, the soils are well drained. Lower down the stream course, the soil can be muck or peat, and may be acidic and poorly drained. Erosion is less of a problem due to the gentler slopes.

The upper alluvial fans (Makiki and Kaena Series) are developed in the course sediments deposited higher up the alluvial fans. The Makiki soils formed from stream deposits over volcanic ash and cinders.

The lower alluvial fans (Honouliuli Series) consist of the finer sediments from the streams. These soils are clay and have low permeability and low erosion potential.

The types of soils range from stony silt volcanic clays in the hills to medium structure grayish brown and reddish brown clays with good loam texture. The ravines and sloping valley areas have adobe clay. The Shafter Flats area generally consists of coral limestone and silt-sand-gravel materials that were dredged from the Keehi Lagoon seaplane channel and used to backfill the Weli Pond during the 1940-1944 period. This area is not suitable for heavy buildings. Light frame structures would be satisfactory. In the Main Post at higher elevations, the soils are generally porous and well drained with boulders.

e. Earthquake Considerations and Design Parameters

According to the 1994 Uniform Building Code, the island of Oahu is designated as Seismic Zone 2A. All facilities will be designed accordingly.
f. Groundwater Conditions

Groundwater within the area is anticipated to be a high quality basal water. The sustainable yield of the Moanalua aquifer system is 18 mgd and since this is a well replacement project, the aquifer sustainable yield will be adequate for the replacement well.

g. Flood Problems Including Tsunami Inundation Zones

According to the U.S. Federal Emergency Management Agency Flood Insurance Rate Map (FIRM), the project site is close to or within Zone A, or areas determined to have a flood hazard by approximate means. The area has been studied by the U.S. Corps of Engineers and has a potential for flooding during the 100-year storm. The well will be protected from flooding so no flood water intrusion is expected. Since the well site is located relatively far from the ocean, tsunamis would not have a significant impact at the well site.

h. Conformance with Local Land Use Planning and Zoning Regulations

According to the City and County of Honolulu Development Plan the well site and its surrounding area have been designated as M, or Military. The State land use classification is U, or urban. Wells are a permitted use for this district.

i. Water Rights and Future Uses by Others

The Army is the owner of the land and has coordinated its well sites with the appropriate State and County agencies. The permit to construct the well was obtained from the DLNR Commission on Water Resource Management. The well will be connected to existing storage and transmission facilities, also owned by the Army and the water produced will be part of the Fort Shafter water supply system.

4. Extent of Waterworks System

a. Description of Existing Area to be Served

The existing area water supply, transmission and distribution system is owned and operated by the USAG-HI. The infrastructure is existing and was constructed by the Directorate of Public Works of USAG-HI and the Army Criteria Technical Manual TM-5-813-1, Water Supply Sources and General Considerations, June 4, 1987; MIL-HDBK-1008A, Military Handbook Fire Protection for Facilities Engineering, Design, and Construction, March 31, 1988; TM 5-813-4, Water Supply, Water Storage, November 1985; TM 5-813-5, Water Supply, Water Distribution, November 1986; were followed for the design of the water system facilities. The project area is located within the lower service zone, the 200-foot zone.
In the Fort Shafter water system, the Army has established three service pressure zones:

<table>
<thead>
<tr>
<th>Pressure Zone</th>
<th>Service Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>500 foot</td>
<td>300 to 450 feet msl</td>
</tr>
<tr>
<td>400 foot</td>
<td>100 to 330 feet msl</td>
</tr>
<tr>
<td>200 foot</td>
<td>5 to 140 feet msl</td>
</tr>
</tbody>
</table>

1) Water Supply Sources

The area is currently served by two existing supply wells at Building S-509. The wells can supply up to 1.8 million gallons per day (mgd). The usual demand is closer to 0.935 mgd. One well is out of plumb and will be replaced by this new well. The remaining well will be converted into a monitoring well.

2) Water Storage and Transmission

Within the 500-foot pressure zone or upper system, there is one 0.15 million gallon (mg) reservoir. Water is transmitted to this reservoir from the middle zone by a booster pump. The 400 foot pressure zone or middle system has a 0.5 mg reservoir also fed by a booster pump, from the 200 foot pressure zone or lower system. The lower system has two reservoirs, a 0.7 mg and 0.3 mg reservoir located at the same site. See Exhibit 1.

Water storage could be a problem in the middle and upper service zone during a fire. Additional water can be supplied by the booster pump from the lower system to the upper systems. Opening the existing connection to the BWS system at Patch Gate can solve some of the problems of water storage during a fire for the middle and upper systems.

3) Water Distribution

The water distribution system is existing and adequate to deliver water to the users at Fort Shafter. The system consists of 4, 6, 8, 10, and 12-inch water lines and booster pump stations, see Exhibit 1. Pressure reducing valves help to separate the upper system from the middle system and the middle system from the lower system.

A connection to the BWS system at Patch Road to the lower system is also available should emergency water supply be required for any reason. The connection is metered by the BWS.

b. Description of Water Demands, Land Use, and Population

The water system analyses were completed based on the existing land use as identified by the Army. The maximum daily demand for the lower service zone is 1.705 mgd. The maximum daily demand for the middle service zone is 0.939 plus 0.450 for the golf course. The maximum daily demand for the upper service zone is 0.102 mgd.
Fort Shafter consists of 591.0 acres of land located on the island of Oahu, about 3.0 miles northwest of the Central District of Honolulu. The installation is divided into two areas, Shafter Flats (184.1 acres) and the Main Post. The two areas are divided by the H-1 Interchange and Moanalua Highway. Originally known as Kahauiki Military Reservation, Fort Shafter was established in 1905 on approximately 1359 acres of land in the foothills of the Koolau Range above Honolulu Harbor. This had been public domain and government land but had reverted to the U.S. Government when the Hawaiian Islands were annexed in 1899. In 1907, the new post was named in honor of Major General William R. Shafter a veteran of the Civil War and the Spanish American War, and the Commanding General of the Superior Headquarters for Hawaii, the Department of California, until his retirement in 1901. Fort Shafter is the oldest active Army Installation in Hawaii, and continues in use as the headquarters for the U.S. Army in Hawaii.

The Palm Circle area was the first battalion cantonment area constructed and was completed in 1907. The post hospital was completed in 1909 at the site of the current H-1 Interchange, and although enlarged in 1926 following the land exchange with a local landowner, the hospital remain at the same location until 1948. The hospital was relocated to its current location at Tripler Army Medical Center.

The Fort has floor space to occupy 9,800 people including civilian employees. The Required Facilities tabulation, August 1984 estimates the resident and employee population at 7,953 people.

c. Appraisal of Future Requirements

The future area water supply requirements are not expected to increase at this time.

d. Provision for Extending Water Works System

No extensions to the water system are expected at this time.

e. Fire Protection and Pressure Requirements

The existing water transmission system is adequate for fire protection with adequate residual pressures. Water storage facilities in the middle and upper systems cannot meet the fire demand and must be supplemented by the lower system. No changes to the system are expected at this time.

f. Alternate Solutions

The alternative considered was no action and to utilize the existing well in its present state and accept the operational problems associated with operating a well that is out of plumb. This is not an acceptable mode of operation. A new well constructed at the existing site was selected because of enhanced operations and maintenance.
g. Environmental and Economic Impact

The proposed development of the well will not include substantial improvements and additions to the existing potable water system. The well is a replacement well and no new buildings and developments are planned to be served by this well.

5. Potential Sources of Contamination

a. Description of well site:

1) Coordinates. The site is located at approximately 21°20'48" latitude and 157°53'16" longitude.

2) Elevation. The elevation of the well is about 19.6 feet MSL, as indicated in Figure 2.

3) Catchment Area. The estimated catchment area is 800 acres, with an average ground slope of about 12 percent.

4) Summary of Soil and Substrata. Material encountered during the course of drilling was:

<table>
<thead>
<tr>
<th>Material</th>
<th>Depth Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Dirt</td>
<td>0 to 4 feet</td>
</tr>
<tr>
<td>Red Clay</td>
<td>4 to 12 feet</td>
</tr>
<tr>
<td>Brown Clay &amp; Boulders</td>
<td>12 to 30 feet</td>
</tr>
<tr>
<td>River Gravel &amp; Boulders</td>
<td>30 to 35 feet</td>
</tr>
<tr>
<td>Grey Clay &amp; Boulders</td>
<td>35 to 45 feet</td>
</tr>
<tr>
<td>Brown Clay</td>
<td>45 to 113 feet</td>
</tr>
<tr>
<td>Volcanic Rock, Solid</td>
<td>113 to 127 feet</td>
</tr>
<tr>
<td>Brown Clay</td>
<td>127 to 140 feet</td>
</tr>
<tr>
<td>Volcanic Rock, Solid</td>
<td>140 to 146 feet</td>
</tr>
<tr>
<td>Volcanic Rock w/ Clay Stringers</td>
<td>146 to 150 feet</td>
</tr>
<tr>
<td>Clay &amp; Boulders</td>
<td>150 to 155 feet</td>
</tr>
<tr>
<td>Volcanic Rock, Weathered</td>
<td>155 to 166 feet</td>
</tr>
<tr>
<td>Volcanic Rock, Solid</td>
<td>166 to 180 feet</td>
</tr>
<tr>
<td>Volcanic Rock, Part. Fractured</td>
<td>180 to 185 feet</td>
</tr>
<tr>
<td>Volcanic Rock, Firm</td>
<td>185 to 260 feet</td>
</tr>
<tr>
<td>Volcanic Rock, Water &amp; Cinders</td>
<td>260 to 265 feet</td>
</tr>
<tr>
<td>Volcanic Rock, Firm</td>
<td>265 to 270 feet</td>
</tr>
<tr>
<td>Volcanic Rock, Fractured</td>
<td>270 to 280 feet</td>
</tr>
<tr>
<td>Volcanic Rock, Firm</td>
<td>280 to 290 feet</td>
</tr>
</tbody>
</table>

For further details about material encountered during drilling, refer to the Well Drilling Log found in Appendix A.
5) Well Depth. The drilled well depth is 290 feet. The free water table of the groundwater is approximately at the ground surface. The as built conditions of the well are shown in Figure 3.

b. Design Well Draft. The capacity of the new well, Well No. 2053-13, is approximately 1,100 gpm with an allowable withdrawal of 1.035 mgd.

c. Water Quality Data

In general, the water pumped from wells of this depth is of very high quality. All contaminants for which tests were conducted are below the maximum contaminant levels (MCLs) or detection limits. The water quality from this well is fit for human consumption. The summary of the water quality test data is presented in Table 1 and in Appendix B.

d. Land Use Classification for the Surrounding Area. Refer to Section 3h on page 4.

e. Sources of Contamination

1) Extent of recharge area. The capture zone for the well has a maximum width of 1650 feet at 1 mgd. The stagnation point is only about 260 feet down gradient from the well. See Figure 4. The catchment area is 800 acres for 1 mgd and is a portion of the capture zone. The exact limits of the catchment area cannot be defined. Virtually all recharge will occur in the wet Koolau mountains inland of the conservation zone boundary. The recharge area for the Moanalua Aquifer Sector extends from the H-1 interchange and Moanalua Highway between the west end of Honolulu International Airport and Keehi Lagoon to the ridge peak of the Koolau Mountains. The Fort Shafter well is located in Kahauiki Valley which is a portion of the Mo analua Aquifer Sector and also extends to the ridge of the Koolaus.

2) Type of Contaminants

According to the area land use the most probable potential manmade source of contamination is from Military activities above the well site. The Military controls much of the land and has responsibility to control sources of pollution within its area of control. While there is potential of contamination based on the land ownership, regulated use of hazardous materials is the responsibility of the Directorate of Public Works, Army.

There will be sources of contamination such as fuel storage tanks, refuse handling facilities, hazardous waste handling facilities, motor vehicle maintenance facilities, other maintenance facilities, helipads, fuel dispensing areas and a golf course. These facilities are all under an environmental compliance system program developed by the Department of the Army. This system is set up to ensure compliance with Federal, State, Local, Department of Defense, and Army environmental regulations. Fort Shafter was assessed under this program and will comply with its findings. The assessment was done for seventeen environmental categories. These are:
**TABLE 1**

**AECOS**

970 N. Kalaheo Avenue, Suite C300 • Kailua, Hawaii 96734
Telephone: (808) 254-5884

CLIENT: Roscoe Moss
91-2594 Olai St.
Kapolei, HI 96707

ATTENTION: Tracy Runnels

| FILE No.: | 604 |
| REPORT DATE: | 06/15/95 |
| PAGE: | 1 of 3 |

**REPORT OF ANALYTICAL RESULTS**

SAMPLE TYPE: potable water
AECOS LOG No.: 8515

DATE SAMPLED: 05/04/95
DATE RECEIVED: 05/04/95

<table>
<thead>
<tr>
<th>ANALYTE</th>
<th>Units</th>
<th>Det. Limit</th>
<th>MCL</th>
<th>Method</th>
<th>Ft. Shafter Well #1</th>
<th>Anal Date/ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Coliform</td>
<td>col/100 ml</td>
<td>Absence</td>
<td>SM 9222 A,B</td>
<td>&lt; 1&lt;sup&gt;†&lt;/sup&gt;</td>
<td>05/04/95</td>
<td></td>
</tr>
<tr>
<td>Fecal Coliform</td>
<td>col/100 ml</td>
<td>Absence</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
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<tr>
<td>Turbidity</td>
<td>NTU</td>
<td>0.1</td>
<td>0.5/1</td>
<td>EPA 180.1</td>
<td>0.30</td>
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<tr>
<td>Chloride</td>
<td>mg/L</td>
<td>1</td>
<td>3</td>
<td>EPA 325.3</td>
<td>115</td>
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<td>pH</td>
<td>---</td>
<td>0.01</td>
<td>6.5-8.5</td>
<td>EPA 150.2</td>
<td>7.96</td>
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<tr>
<td>Conductivity</td>
<td>μmhos/cm</td>
<td>1</td>
<td>---</td>
<td>EPA 120.1</td>
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<tr>
<td>Temperature</td>
<td>°C</td>
<td>---</td>
<td>---</td>
<td>EPA 170.1</td>
<td>22.5</td>
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<tr>
<td>Fluoride</td>
<td>mg/L</td>
<td>0.20</td>
<td>4</td>
<td>EPA 340.2</td>
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<tr>
<td>Nitrate</td>
<td>mg N/L</td>
<td>0.001</td>
<td>10</td>
<td>EPA 353.2</td>
<td>0.463</td>
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<tr>
<td>Nitrite</td>
<td>mg N/L</td>
<td>0.001</td>
<td>1</td>
<td>EPA 353.2</td>
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<tr>
<td>Alkalinity</td>
<td>mg/L</td>
<td>4</td>
<td>250</td>
<td>EPA 310.1</td>
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<tr>
<td>Calcium</td>
<td>mg/L</td>
<td>0.15</td>
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<td>EPA 215</td>
<td>34.0</td>
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<tr>
<td>Arsenic</td>
<td>mg/L</td>
<td>0.003</td>
<td>0.05</td>
<td>EPA 206.2</td>
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<tr>
<td>Barium</td>
<td>mg/L</td>
<td>0.002</td>
<td>2</td>
<td>EPA 208.2</td>
<td>0.021</td>
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<tr>
<td>Cadmium</td>
<td>mg/L</td>
<td>0.0001</td>
<td>0.005</td>
<td>EPA 213.2</td>
<td>&lt; 0.0001</td>
<td></td>
</tr>
</tbody>
</table>

MCL = Maximum Contaminant Level
ND = Not Detected at or above detection limit.
† with moderate (43) non-coliform.

---

J. Mello, Laboratory Director
<table>
<thead>
<tr>
<th>ANALYTE</th>
<th>Units</th>
<th>Det. Limit</th>
<th>MCL</th>
<th>Method</th>
<th>Ft. Shafter Well #1</th>
<th>Anal Date/ ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chromium</td>
<td>mg/L</td>
<td>0.001</td>
<td>0.1</td>
<td>EPA 218.2</td>
<td>0.003</td>
<td>05/11/95</td>
</tr>
<tr>
<td>Copper</td>
<td>mg/L</td>
<td>0.001</td>
<td>1.3 *</td>
<td>EPA 220.2</td>
<td>0.034</td>
<td>05/05/95</td>
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<tr>
<td>Lead</td>
<td>mg/L</td>
<td>0.001</td>
<td>0.015*</td>
<td>EPA239.2</td>
<td>&lt;0.001</td>
<td>05/16/95</td>
</tr>
<tr>
<td>Mercury</td>
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<td>0.0005</td>
<td>0.002</td>
<td>EPA 245.1</td>
<td>&lt;0.0005</td>
<td>05/26/95</td>
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<td>Selenium</td>
<td>mg/L</td>
<td>0.002</td>
<td>0.05</td>
<td>EPA 270.2</td>
<td>&lt; 0.002</td>
<td>05/16/95</td>
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<td>EPA Method 504</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DBCP (Dibromo-chloropropane)</td>
<td>mg/L</td>
<td>0.00001</td>
<td>0.0004</td>
<td>EPA 504</td>
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<td>05/17/95</td>
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<tr>
<td>EDB (Ethylene Dibromide)</td>
<td>mg/L</td>
<td>0.00002</td>
<td>0.0004</td>
<td>EPA 504</td>
<td>&lt; 0.00002</td>
<td>05/17/95</td>
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<tr>
<td>EPA Method 507</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Atrazine</td>
<td>mg/L</td>
<td>0.001</td>
<td>0.003</td>
<td>EPA 507</td>
<td>&lt; 0.0001</td>
<td>05/30/95</td>
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<tr>
<td>Alachlor</td>
<td>mg/L</td>
<td>0.0001</td>
<td>0.002</td>
<td>EPA 507</td>
<td>&lt; 0.001</td>
<td>05/30/95</td>
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<tr>
<td>EPA Method 508/525.2</td>
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<td></td>
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<tr>
<td>Chlordane</td>
<td>mg/L</td>
<td>0.00001</td>
<td>0.002</td>
<td>EPA 508</td>
<td>&lt; 0.0001</td>
<td>05/13/95</td>
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<tr>
<td>Endrin</td>
<td>mg/L</td>
<td>0.0001</td>
<td>0.002</td>
<td>EPA 525.2</td>
<td>&lt; 0.0001</td>
<td>05/13/95</td>
</tr>
<tr>
<td>Heptachlor</td>
<td>mg/L</td>
<td>0.000001</td>
<td>0.0004</td>
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<tr>
<td>Heptachlor</td>
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<td>0.000001</td>
<td>0.0002</td>
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<tr>
<td>Epoxide</td>
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<td>0.00002</td>
<td>0.0002</td>
<td>EPA 525.2</td>
<td>&lt; 0.0002</td>
<td>05/13/95</td>
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<tr>
<td>Lindane</td>
<td>mg/L</td>
<td>0.010</td>
<td>0.04</td>
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<td>&lt; 0.010</td>
<td>05/13/95</td>
</tr>
<tr>
<td>Methoxychlor</td>
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<td>0.0005</td>
<td>EPA 508</td>
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<tr>
<td>PCB's</td>
<td>mg/L</td>
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<td>0.003</td>
<td>EPA 508</td>
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<td>05/13/95</td>
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<tr>
<td>Toxaphene</td>
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<td>0.001</td>
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<td>&lt; 0.0008</td>
<td>05/14/95</td>
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<td>EPA Method 515.1</td>
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<tr>
<td>2,4-D</td>
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<td>0.07</td>
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<td>05/14/95</td>
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<td>Pentachlorophenol</td>
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<td>0.001</td>
<td>EPA 515.1</td>
<td>&lt; 0.0008</td>
<td>05/14/95</td>
</tr>
</tbody>
</table>

MCL = Maximum Contaminant Level
ND = Not Detected at or above detection limit.
* = Action Level
### TABLE 1 (CONTINUE)

**CLIENT:** Roscoe Moss  
91-2594 Olai St.  
Kapolei, HI 96707  

**ATTENTION:** Tracy Runnels

<table>
<thead>
<tr>
<th>ANALYTE &amp; PACE</th>
<th>Units</th>
<th>Det. Limit</th>
<th>MCL</th>
<th>Method</th>
<th>Ft. Shafter Well #1</th>
<th>Anal Date/ID</th>
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<tbody>
<tr>
<td>2,4,5-TP</td>
<td>mg/L</td>
<td>0.001</td>
<td>0.05</td>
<td>EPA 515.1</td>
<td></td>
<td>05/14/95</td>
</tr>
<tr>
<td>EPA Method 524.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benzene</td>
<td>mg/L</td>
<td>0.0005</td>
<td>0.005</td>
<td>EPA 524.2</td>
<td>&lt; 0.0005</td>
<td>05/08/95</td>
</tr>
<tr>
<td>Carbon</td>
<td>mg/L</td>
<td>0.0005</td>
<td>0.005</td>
<td>EPA 524.2</td>
<td>&lt; 0.0005</td>
<td>05/08/95</td>
</tr>
<tr>
<td>Tetrachloride</td>
<td>mg/L</td>
<td>0.0005</td>
<td>0.1</td>
<td>EPA 524.2</td>
<td>&lt; 0.0005</td>
<td>05/08/95</td>
</tr>
<tr>
<td>Chlorobenzene</td>
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<td>0.0005</td>
<td>0.6</td>
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<td>&lt; 0.0005</td>
<td>05/08/95</td>
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<tr>
<td>ortho-Dichlorobenzene</td>
<td>mg/L</td>
<td>0.0005</td>
<td>0.075</td>
<td>EPA 524.2</td>
<td>&lt; 0.0005</td>
<td>05/08/95</td>
</tr>
<tr>
<td>para-Dichlorobenzene</td>
<td>mg/L</td>
<td>0.0005</td>
<td>0.005</td>
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<td>&lt; 0.0005</td>
<td>05/08/95</td>
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<tr>
<td>1,2-Dichloroethane</td>
<td>mg/L</td>
<td>0.0005</td>
<td>0.007</td>
<td>EPA 524.2</td>
<td>&lt; 0.0005</td>
<td>05/08/95</td>
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<tr>
<td>1,1-Dichloroethene</td>
<td>mg/L</td>
<td>0.0005</td>
<td>0.07</td>
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<tr>
<td>cis,1,2-Dichloroethylene</td>
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<td>0.0005</td>
<td>0.1</td>
<td>EPA 524.2</td>
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<td>05/08/95</td>
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<tr>
<td>trans,1,2-Dichloroethylene</td>
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<td>0.005</td>
<td>EPA 524.2</td>
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<td>05/08/95</td>
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<tr>
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<td>Styrene</td>
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<td>0.1</td>
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<td>05/08/95</td>
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<tr>
<td>Tetracloroethene</td>
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<td>0.005</td>
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<td>1,1,1-Trichloroethane</td>
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<td>05/08/95</td>
</tr>
<tr>
<td>Trichloroethylene</td>
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<td>0.005</td>
<td>EPA 524.2</td>
<td>&lt; 0.0005</td>
<td>05/08/95</td>
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<tr>
<td>TCP (1,2,3-Trichloropropane)</td>
<td>mg/L</td>
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<td>0.0008</td>
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<td>05/08/95</td>
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<tr>
<td>Vinyl Chloride</td>
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<td>0.002</td>
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<td>Xylenes (Total)</td>
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<td>PACE</td>
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<td>Carbofuran</td>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td>ML</td>
</tr>
</tbody>
</table>
FIGURE 3
AS BUILT CONDITIONS
FOR NEW WELL
NOT TO SCALE
There is a potential for wastewater contamination from a wastewater pump station located at "I" Place near the well that may have overflowed in the past. This potential overflow would have discharged into Kahauiki Stream and away from the well site. This would be an infrequent occurrence during heavy rains and will be investigated by the Directorate of Public Works, Army. Because this is suspected to happen during heavy rains there is little potential for percolation into the ground to affect the area groundwater. The State Department of Health, Chapter 62, Wastewater System Regulations, prohibit cesspool or septic tank construction upgradient of the well site.

There is also a potential for contamination by underground storage tanks (USTs) which are located throughout the Fort Shafter area. According to the assessment done for the environmental compliance system program, the USTs located at Buildings 108, 508, 525, 710 and 720 (see Exhibit 1 for building locations) did not comply with Federal, State, County, and/or Department of Defense requirements.

The environmental assessment also states that hazardous materials are not being stored properly at Buildings 322 and 504 (see Exhibit 1 for building locations). Currently efforts are being made to correct the violations described in the environmental assessment.

A layer of low permeability caprock in the Fort Shafter area should prevent potential contaminants at or just below the surface from percolating into the groundwater aquifer below.

The well is located in a flood plain, contamination from natural sources will be controlled by the proper well construction, preventing flood waters from entering the well or appurtenant
piping.

3) Distance to Well. The potential sources of contamination are immediately adjacent to the well site and extend mauka approximately 4,000 feet up the valley.

4) Method of Disposal. The disposal of the sources of contamination is to authorized disposal sites on Oahu or off island. The Directorate of Public Works, Army practices for waste and contaminant disposal complies with the findings of the environmental compliance system program for the criteria described above.

5) Depth from Source to Groundwater Table. The aquifer is confined by 113 feet of caprock. The free water table is at the ground surface.

f. Groundwater Contours. The well area is located in Kahauiki Valley at elevation 19.6 feet msl and the piezometric head is at 19.8 feet msl so an artisan condition exists. Groundwater flows along under the caprock, which may extend up to elevation 40 feet msl in the valley floor, to the ocean. The well withdraws groundwater from below the caprock.

6. Sources of Water Supply

a. Nature of Soil. The aquifer consists of Koolau basalt.

b. Probability of Surface Drainage or Underground Water Contamination. None. The well is grouted to a depth of 180 feet.

c. Depth to Groundwater Table. The depth to the confined aquifer is 113 feet. The unconfined water table is at 19.8 feet. The groundwater in the main volcanic rock aquifer is confined by a caprock of low permeability sediments. Groundwater from the volcanic aquifer seeps upwards into the sediments at a very low rate but does not reach the ground surface.

d. Slope of Groundwater Table. 1/5000

e. Potential Flooding and Earthquake Risk

As mentioned previously, the area has been determined to have a flooding potential. The Corps of Engineers has set the 500-year water surface elevation at 22.8 feet msl and the 100-year water surface elevation at 20.5 feet msl. The well area will be inundated but the well casing will extend to elevation 26 feet msl, well above the 500-year flood elevation. According to the 1994 Uniform Building Code, the island of Oahu is designated as Seismic Zone 2A, where the seismic zone factor, Z, is 0.15. Areas designated as Zone 2A have a probability of seismic risk and are susceptible to earthquake damage. Any new structures such as reservoirs and control center will be designed accordingly.
f. Data Relating Quantity and Quality to Stress Periods. The water yielded by the Shafter wells have been consistently good, even during time of drought.

g. Factors in Potential Contamination. In the near vicinity of the well the groundwater is protected from contamination by caprock.

h. Contaminate Control Procedures. The Directorate of Public Works, Army determined the potential for contamination in relation to the seventeen regulations. Within Fort Shafter, most facilities that could be sources of contamination required updated written procedures for the handling of hazardous materials. The one area to be investigated was the sewage pump station at "I" Place.

i. Assurances Against Contamination. The well is grouted to a depth of 180 feet, which extends through the caprock into the confined aquifer. Between the inland margin of the caprock and the edge of the conservation area, a potential for contamination exists. The measures taken by the Directorate of Public Works, Army through their environmental compliance system program should prevent contamination of the aquifer. To date, there is no record that contamination has occurred.

7. Proposed Treatment Works

a. Process. Section 11-20-46 of the State of Hawaii Department of Health Rules and Regulations establishes criteria under which filtration and disinfection are required for water from a surface water source or from a groundwater source under the direct influence of surface water (GWI). The source is not under the influence of surface water so no interim disinfection systems are planned to be installed before filtration systems. Sampling and monitoring will be done according to Section 11-20-46.

b. Site. No treatment facility is planned to be constructed at this time.

c. Plant Modifications. There is no existing treatment plant serving the water supply facilities in the area. As such, no plant modifications will be required as a result of the project.

d. Basis of Design

1) Design Period. No treatment facility is planned to be constructed at this time.

2) Design Population and Flow. No treatment facility is planned to be constructed at this time.

3) Flow Characteristics. No treatment facility is planned to be constructed at this time.

4) Design Flow. No treatment facility is planned to be constructed at this time.
5) Reserve Capacity. No treatment facility is planned to be constructed at this time.

6) Treatment System Description. No treatment facility is planned to be constructed at this time.

7) Staging. No treatment facility is planned to be constructed at this time.

e. Waste Disposal. No waste will be generated.

f. Operation and Maintenance. No treatment facility is planned to be constructed at this time.

8. Pumping Facilities

a. Purpose

The purpose of the pump is to lift water from the water table into the 0.7 mg and 0.3 mg reservoirs.

b. Pumping Layout and Size of Force Main

The well will be outfitted with a vertical turbine pump similar to the pump in the existing well to be replaced. The pumped water will then be delivered to the 0.7 mg and 0.3 mg reservoirs through a 12" diameter pipeline. The layout of the pipeline will follow along the roads in Fort Shafter.

c. Design Flow Requirements and Effects of Storage

From the expected 1.5 mgd production capacity of the well, the pump is designed to pump 1,100 gpm at 250 feet of total dynamic head (tdh). Storage level in the 0.7 mg and 0.3 mg reservoirs will be controlled by a float sensor.

d. Liquid Characteristics

Potable water, with characteristics as indicated in the water analyses included in Table 1 and Appendix B. The concentration of contaminants listed are below the maximum contaminant level (MCLs) or detection limits.

e. Electric Power Available

The existing Hawaii Electric Company (HECo) system within Fort Shafter utilized for the existing well will continue to provide electrical power to the site and the new well.
f. Pumping Arrangement

The line shaft vertical turbine pump and motor will be started and stopped automatically by a level sensor in the 0.7 mg and 0.3 mg reservoirs.

g. Pump Selection

The pump will be selected according to the following parameters:
Capacity = 1,100 gpm  250 tdh  Rotation speed = 1,760 rpm

h. Proposed Buildings and Other Structural Improvements

A control center will be in the same building used to house the existing pump motor control system in accordance with the Army Standards.

i. Water Hammer Consideration

Pressure reducing station are not required to control water hammer and other high pressure problems at this time.

j. Essential Features of Construction and Operation

The well pump will be controlled automatically by a water level sensor in the 0.7 mg and 0.3 mg reservoirs. Flow, vibrations and heat sensors will provide safeguards for the pump and motor in the event of malfunction.

k. Electrical System

The existing HECo system on Fort Shafter will continue to provide electrical power to the site and to the well.

9. Finished Water Storage

The water storage facilities are discussed above within the waterworks system.

10. Water Distribution Systems

a. General Layout of System

The transmission line from the new replacement well to the 200-foot elevation reservoirs will be the existing Fort Shafter lower water system. This is a system of 4, 6, 8, and 12-inch lines that connect to the existing facilities within the Military Reservation.
The schematic layout of the water system is presented in Exhibit 1. The water system is as described above within the waterworks discussion.

b. Materials, Valves, Hydrants, Meters, etc.

Materials, valves, hydrants, meters and other appurtenances will be specified, designed, and located according to Army Technical Manuals.

c. Proximity of Other Utilities

The closest utilities are the HECo’s electrical lines and the Fort Shafter water and sewer lines that service the buildings in the area of Building 560.

d. Effects of Incremental Construction

The pumps, reservoirs and buildings have been installed over the course of many years. Future buildings and improvements to the water system will be done as needed.

e. Other Information

The pipeline profiles and sections have been designed according to Army Technical Manuals.

11. Financing

Costs for the construction will be borne by the Army with the facilities operated and maintained by Army personnel after acceptance.
REFERENCES

Analysis of Existing Facilities Environmental Assessment Report, Master Plan Basic Information Maps, Fort Shafter, City and County of Honolulu, Hawaii, U.S. Army Engineer Division - Pacific Ocean Corps of Engineers, Honolulu, Hawaii, August 1979


APPENDIX A
APPENDIX A
# DRILLING LOG

## Drilling Log Details

- **Date**: 3/20/95
- **Job No.**: 196R
- **Hole No.**: 1
- **Elevation**: ft.
- **Customer**: J & N Zers
- **Driller**: Rodney Caudill (8 hrs)
- **Rig**:
- **Helper**: James Coleman (8 hrs)
- **Gas**: Oil
- **Arv. Job**: Lv. Job
- **Hrs.**: Repairs
- **Or. No.**:
- **Bit Size**: 20
- **Type**: STAR
- **Casing Size**: 20 in., Length in hole: 30 ft.
- **In., Amt. Perforated**: ft., in.
- **Depth Start**: ft., Depth Stop**: ft., Feet Drilled**:
- **Water Levels**: M ft., Time: M ft., Time:

## Depth Log

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Powdered Rock</td>
<td>Sandstone + Strong Clay</td>
</tr>
<tr>
<td>4</td>
<td>Red soil</td>
<td>Started drilling</td>
</tr>
<tr>
<td>9</td>
<td>Red Clay</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Clay &amp; Boulder</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Remarks

- Safety Meeting, Rigger + Hoisting Casing

## Signed

- **Signed**: Rodney Caudill
- **Date**: 3/20/95
## DRILLING LOG

**Roscoe Moss Hawaii, Inc.**

**Date:** 3-21 1995  
**Job No.:** 1954  
**Hole No.:** 1  
**Elevation:** ft.

### Customer

Driller:  
Helper:  
Arv. Job:  
Lv. Job:  

### Rig, Gas, Oil, Repairs

#### Bit-Size

- **Size:** 20
- **Type:** STAR

#### Casing-Size

- **Diameter:** 20 in.
- **Length in hole:** 30 ft.
- **In., Amt. Perforated:**
- **ft., Day Ped Drilled:**

### Water Levels, Time

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>Top</th>
</tr>
</thead>
<tbody>
<tr>
<td>17</td>
<td>Brown Clay</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Brown Clay &amp; Sand</td>
<td></td>
<td></td>
</tr>
<tr>
<td>26</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Measurements

- **A**
- **B**

**Remarks:**  
- Safety Meeting  
- Keeping location clear  
- Hose, cable  
- Roper picked up  
- Work area safe and easy to work in

**Signed:** Godfrey Cook  
**Date:** 3-21 1995
## Drilling Log

**Roscoe Moss Hawaii, Inc.**

Date: 3-22 1975  
Job No.: 195R  
Hole No.: 3  
Elevation:  

### Customer

Location:  

### Driller

Roscoe Couch  
Hrs.: 8  
Type: STAR  

### Helper

James Cathness  
Hrs.: 8  

### Helper

Hrs.:  

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

### Bit-Size

20  

### Casing-Size

20 in.  
Length in hole: 35 ft.  

### Depth Start

ft.  
Depth Stop:  
ft.  
Feet Drilled:  

### Water Levels, Time

M  
ft., Time:  
M  
ft.  

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>River gravel &amp; small boulders</td>
<td>Pipe going crooked</td>
</tr>
<tr>
<td>65</td>
<td></td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>Gray Clay &amp; boulders had to pull back</td>
<td></td>
</tr>
<tr>
<td>69</td>
<td>Gray Clay</td>
<td></td>
</tr>
<tr>
<td>115</td>
<td>Brown Clay</td>
<td></td>
</tr>
<tr>
<td>130</td>
<td></td>
<td></td>
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</table>

### Remarks:

Silty Drilling  
Powdered Sakai  
Hard & slow  
Eyes protected  

### Signed

Roscoe Couch  
Date: 3-22 1975
# Drilling Log

**Roscoe Moss Hawaii, Inc.**

**81-256A Olai Street - Ewa Beach, Hawaii 96707**

**Telephone (808) 682-5855 - 682-5854 - Fax (808) 682-5856**

---

**Date:** 3-23 19 85  
**Job No.:** 185A  
**Hole No.:** 1  
**Elevation:** ft.  
**Location:**  

### Driller

**Name:** Rodney Caudel  
**Hrs.:** 8  
**Rig:**  
**Gas:**  
**Oil:**  
**Repairs:**  

### Helper

**Name:** James Cottrell  
**Hrs.:** 8  
**Gas:**  
**Oil:**  
**Repairs:**  

### Arrv. Job

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

### Bit-Size

**Type:** STAR  
**Casing-Size:** 20 in., Length in hole 35 ft.  
**In., Amt. Perforated:** ft., in.  
**Depth Start:** ft., Depth Stop:** ft., Feet Drilled  
**Water Levels, Time:** M ft., Time:** M ft.  

### Measurements

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<tbody>
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</tr>
<tr>
<td>85</td>
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<td></td>
<td></td>
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</table>

### Remarks:

"Safety Meeting, Eyes & Ears & Hard Protection"

---

**Signed:** Rodney Caudel  
**Date:** 3-23 19 85
### Drilling Log

**Roscoe Moss Hawaii, Inc.**

**Date:** 3-24 1955  
**Job No.:** 1358  
**Hole No.:** 7  
**Elevation:** ft.

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<table>
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<th>8 Hrs.</th>
<th>Rig</th>
<th>24-2</th>
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<tbody>
<tr>
<td>James Cowan</td>
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<table>
<thead>
<tr>
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<th>Gas</th>
<th>Oil</th>
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<tbody>
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<table>
<thead>
<tr>
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<th>Repairs</th>
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<table>
<thead>
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<tbody>
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<td>Star</td>
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<table>
<thead>
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<th>in., Length in hole</th>
<th>ft.</th>
<th>in., Amt. Perforated</th>
<th>ft.</th>
<th>in.</th>
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<table>
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<th>ft., Depth Stop</th>
<th>ft., Feet Drilled</th>
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<tbody>
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<table>
<thead>
<tr>
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<th>M</th>
<th>ft., Time</th>
<th>M</th>
<th>ft.</th>
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#### Measurements

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<th>Formation</th>
<th>Remarks</th>
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</tr>
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</tr>
<tr>
<td>113</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Remarks:**
- Safety meeting, handling, unloading, setting back position.

**Signed:** Roscoe Couch  
**Date:** 3-24 1955
<table>
<thead>
<tr>
<th>Date</th>
<th>3-27</th>
<th>Job No.</th>
<th>195R</th>
<th>Hole No.</th>
<th>1</th>
<th>Elevation</th>
<th>ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer</td>
<td></td>
<td></td>
<td></td>
<td>Location</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Driller</td>
<td>Roddy Couch</td>
<td>9.0 Hrs.</td>
<td>Rig</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Helper</td>
<td>James Hohman</td>
<td>9.0 Hrs.</td>
<td>Gas</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Helper</td>
<td></td>
<td></td>
<td></td>
<td>Repairs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arv. Job</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lv. Job</td>
<td></td>
<td></td>
<td></td>
<td>Or. No.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bit-Size</td>
<td>20</td>
<td>Type</td>
<td>STAR</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depth Start</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depth Stop</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water Levels, Time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Measurements**

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>Top</th>
</tr>
</thead>
<tbody>
<tr>
<td>113</td>
<td>well caved in</td>
<td>drilled out to 699</td>
<td></td>
</tr>
</tbody>
</table>

**Remarks:**

SAFETY MEETING, open floor's cutting, with pasture & welling

Signed: Roddy Couch  Date: 3-27 95
**DRILLING LOG**

**Roscoe Moss Hawaii, Inc.**

91-229 ALEI STREET, EWA BEACH, HAWAII 96707

TELEPHONE (808) 682-5866  FAX (808) 682-5866

**Date:** 3-28-95  **Job No.:** 155R  **Hole No.:** 1  **Elevation: **

**Customer:**  

**Location:**  

<table>
<thead>
<tr>
<th>Driller</th>
<th>Rodney Cook</th>
<th>6 Hrs.</th>
<th>Rig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Helper</td>
<td>James Cohen</td>
<td>7 Hrs.</td>
<td>Gas</td>
</tr>
<tr>
<td>Helper</td>
<td></td>
<td></td>
<td></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>
<tr>
<td>Hrs. Repairs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Or. No.</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>Casing-Size</td>
<td>Length in hole</td>
</tr>
<tr>
<td>Depth Start</td>
<td>ft.</td>
</tr>
<tr>
<td>Water Levels, Time</td>
<td>m</td>
</tr>
</tbody>
</table>

**Remarks:**

- Well collapsed to 60' Tried to drill out
- Need casing went to yard & picked up 46' 20" casing
- Pulled casing from well cut off bottom where bit has searched it

**Signed:** Rodney Cook  **Date:** 3-28-95
**DRILLING LOG**

---

**Roscoe Moss Hawaii, Inc.**

91-259A Olai Street, Ewa Beach, HI 96707

Telephone: (808) 682-5856 • (808) 682-5866 • Fax: (808) 682-5866

---

**Date:** 3-29 '95  
**Job No.:** 195R  
**Hole No.:** 1  
**Elevation:** ________ ft.

**Customer:** ____________________  
**Location:** ____________________

**Driller:** Rodney Couel  
**Hrs.:** ________  
**Rig:** ____________________

**Helper:** James Callister  
**Hrs.:** ________  
**Gas:** ________  
**Oil:** ________

**Helper:** ____________________  
**Hrs.:** ________  
**Repairs:** ________

**Arv. Job:** ________  
**Lv. Job:** ________  
**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.

---

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>Top</th>
</tr>
</thead>
<tbody>
<tr>
<td>59'20&quot;</td>
<td>Welded in 59'20&quot; Casing, Cleared well</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Measurements:**

---

**Remarks:** Safety meeting, working around overhead wires

---

**Signed:** Rodney Couel  
**Date:** 3-29 '95
DRILLING LOG

Roscoe Moss Hawaii, Inc.
91-2284 Olai Street * Ewa Beach, Hawaii 96707
Telephone: (808) 682-5866 * 682-5864 * Fax: (808) 682-5866

Date 3-30 95  Job No. 1956  Hole No. 1  Elevation 10 ft.
Customer Location
Driller Roscoe Coach 5 Hrs. Rig Oil
Helper James Esther 9 Hrs. Gas
Helper Ave. Job 8 Hrs. Repairs
Lv. Job
Or. No.

Bit-Size 20 Type STAR
Casing-Size 80 in. Length in hole 73 ft. Amt. Perforated ft. in.
Depth Start ft. Depth Stop ft. Feet Drilled
Water Levels, Time M ft., Time M ft.

Remarks: Safety Meeting, heading of fuel, gasoline compression.

Signed Roscoe Coach  Date 3-30 95
## DRILLING LOG

**Roscoe Moss Hawaii, Inc.**

**Date:** 3-31  1995  
**Job No.:** 175  
**Hole No.:** 1  
**Elevation:** ft.  
**Location:** SHAPEA

<table>
<thead>
<tr>
<th>Role</th>
<th>Name</th>
<th>Hours</th>
<th>Rig</th>
<th>Gas</th>
<th>Oil</th>
<th>Repairs</th>
<th>Or. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Driller</td>
<td>Rodney Goode</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Helper</td>
<td>James Cook</td>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bit-Size</th>
<th>20</th>
<th>Type</th>
<th>STAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Casing-Size</td>
<td>20 in.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Length in hole</td>
<td>23 ft.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>In. Amt. Perforated</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depth Start</td>
<td>113 ft.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depth Stop</td>
<td>120 ft.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feet Drilled</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water Levels, Time</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>7:00PM 9'5.5 ft.</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>113</td>
<td>gray clay hard</td>
<td></td>
<td></td>
</tr>
<tr>
<td>120</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Remarks:</th>
<th>Safety Bootwear</th>
<th>Hard Tools</th>
<th>grounds</th>
<th>drills</th>
<th>spade</th>
</tr>
</thead>
</table>

**Signed:** Rodney Cook  
**Date:** 3-31  1995
**DRILLING LOG**

**Roscoe Moss Hawaii, Inc.**

91-289A Olai Street, Ewa Beach, Hawaii 808707
Telephone (808) 682-5866 • Fax (808) 682-5864

Date: 4-3 '95  Job No.: 195A  Hole No.: 2  Elevation: __________ ft.

Customer: ______________________ Location: Shaft

Driller: Rodney Cook  Hrs.: __________ Rig: __________

Helper: James Cotton  Hrs.: __________ Gas: __________

Hrs.: __________ Oil: __________

Arv. Job: __________ Lv. Job: __________ Or. No.: __________

Bit-Size: 20  Type: SP2R


Depth Start: 18C ft., Depth Stop: 125 ft., Feet Drilled: __________

Water Levels, Time: 2:00 PM 5:16 ft., Time: 2:50 PM 5:10 ft.

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>120</td>
<td>gray lava flow</td>
<td></td>
</tr>
<tr>
<td>125</td>
<td></td>
<td>__________</td>
</tr>
</tbody>
</table>

*Feet shifted to shop*

*picked up handtools at corner*

Remarks: Safety meeting, walking on sheet surfaced

Signed: Rodney Cook  Date: 4-3 '95
**Drilling Log**

**Roscoe Moss Hawaii, Inc.**

- **Date:** 4-4 1995
- **Job No.:** 1958
- **Hole No.:** 1
- **Elevation:** ft.
- **Location:** Shelter

<table>
<thead>
<tr>
<th>Driller</th>
<th>Hrs.</th>
<th>Rig</th>
<th>Helper</th>
<th>Hrs.</th>
<th>Gas</th>
<th>Helper</th>
<th>Hrs.</th>
<th>Repairs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rodney Coval</td>
<td></td>
<td></td>
<td>Jack Cummings</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Arr. Job:** __________  **Lv. Job:** __________  **Or. No.:** __________

**Bit Size:** 20  **Type:** STAR

**Casing Size:** 20  **In. Length in hole:** 53  **ft.**  **In., Amt. Perforated:** 7  **ft.**

**Depth Start:** 125  **ft.**  **Depth Stop:** 140  **ft.**  **Feet Drilled:** 15

**Water Levels, Time:**
- 8:05 a.m. 7' 4"  ft., Time: 7:40 a.m. 7' 4"  ft.

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>Top</th>
</tr>
</thead>
<tbody>
<tr>
<td>125</td>
<td>Gley Face Soft</td>
<td></td>
<td></td>
</tr>
<tr>
<td>120</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>127</td>
<td>Brown Clay Sticky</td>
<td></td>
<td></td>
</tr>
<tr>
<td>140</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Remark:**

- SFPL Meeting working hard open gears & moving parts

**Signed:** Rodney Coval  **Date:** 4-4 1995
**DRILLING LOG**

**Roscoe Moss Hawaii, Inc.**

**Date:** 4-5 1995  
**Job No.:** 105C  
**Hole No.:** 7  
**Elevation:** ft.

**Customer:**  
**Location:** Shelter

<table>
<thead>
<tr>
<th>Driller</th>
<th>Hours</th>
<th>Rig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rodney Cook</td>
<td>8</td>
<td>087</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Helper</th>
<th>Hours</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>James Collard</td>
<td>8</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<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>20</td>
<td>STCL</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>20</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>140</td>
<td>150</td>
<td></td>
</tr>
</tbody>
</table>

**Water Levels, Time:**

- **8:00 A.M. 7' ft.**  
- **8:30 P.M. 6' ft.**

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
</tr>
</thead>
<tbody>
<tr>
<td>140</td>
<td>Gray lava solid</td>
</tr>
<tr>
<td>146</td>
<td></td>
</tr>
<tr>
<td>150</td>
<td>Lava with clay stringers</td>
</tr>
</tbody>
</table>

**Remarks:**  
Safety meeting, hard hats, steel toes, safety glasses

**Signed:** Rodney Cook  
**Date:** 4-5 1995
DRILLING LOG

Roscoe Moss Hawaii, Inc.

91-289A Olai Street • Ewa Beach, Hawaii 96707
Telephone (808) 682-8895 • 682-8884 • Fax (808) 682-5866

Date: W-C 19 85 Job No: 1551 Hole No: 2 Elevation ft.
Customer: Location:

Driller: Rayco Coach Hrs. Rig
Helper: James Costello Hrs. Gas
Helper: Hrs. Oil
Arv. Job Lv. Job

Av. Hr. Or. No.

Bit Size: 20 Type: Star

Casing Size: 80 in. Length in hole: 23 ft. in. Amt. Perforated ft. in.

Depth Start: 150 ft. Depth Stop: 122 ft. Feet Drilled


<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>Top</th>
</tr>
</thead>
<tbody>
<tr>
<td>150</td>
<td>clay &amp; boulders</td>
<td></td>
<td></td>
</tr>
<tr>
<td>155</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>155</td>
<td>gray lave fractured</td>
<td></td>
<td></td>
</tr>
<tr>
<td>174</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>192</td>
<td>gray lave solid</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Remarks: Safety meeting, Rappel lifting with proper placement of steel and their caution.

Signed: Rayco Coach Date: W-C 19 85
Date: 4-10 1975  | Job No.: 155A  | Hole No.: 1  | Elevation:  
Customer:   | Location:  
Driller:  | Rig:  
Helper:  | Gas:  | Oil:  
Helper:  | Repairs:  

Bit-Size:  | Type:  
Casing-Size:  | in., Length in hole:  
Depth Start:  | ft., Depth Stop:  
Water Levels, Time:  | in., Amt. Perforated:  

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>122</td>
<td>Gray clay</td>
<td>Solid</td>
</tr>
<tr>
<td>180</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Remarks: Safety meeting, general maintenance on all equipment.

Signed: Rodney Couch  | Date: 4-10 1975
### DRILLING LOG

**Roscoe Moss Hawaii, Inc.**

91-259A OLAI STREET • EWABEACH, HAWAII 96707

TELEPHONE (808) 682-5556 • 682-5544 • FAX (808) 682-5666

---

<table>
<thead>
<tr>
<th>Date</th>
<th>4-11 19 95</th>
<th>Job No.</th>
<th>19SR</th>
<th>Hole No.</th>
<th>1</th>
<th>Elevation</th>
<th>ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer</td>
<td></td>
<td>Location</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Driller:** Roscoe Moss 8 Hrs. Rig

**Helper:** Jacob Moss 8 Hrs. Gas

**Helper:** Oil

**Arv. Job:**

**Lv. Job:**

**Hrs. Repairs:**

---

<table>
<thead>
<tr>
<th>Bit-Size</th>
<th>Type</th>
<th>Star</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<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>

<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>900 ft., Time</th>
<th>M ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**Measurements**

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

- Picked up 180' 16' from Shut
- Pulled & 20' casing back to 50'
- Secured header from well set casing back down to 23' cleared well to bottom
- Set 180' of 16' casing put 4 bags cement stuck up with bit

---

**Remarks:**

- Safety Meeting
- Handling Heavy over head objects & proper Rigging

---

Signed: Roscoe Moss Date: 4-11 19 95
Date: 4/12/1975  
Job No.: 175-R  
Hole No.: 1  
Elevation: __________ ft.

Customer: __________________  
Location: Shepherd

Driller: Rodney Cook  8 Hrs.  
Rig: __________

Helper: James Caffrey  8 Hrs.  
Gas: __________  
Oil: __________

Helper: Tony & Travis  16 Hrs.  
Repairs: __________

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

Bit-Size: 6  
Type: STA

Casing-Size: 16 in.  
Length in hole: 180 ft.  
Amt. Perforated: __________ ft. __________ in.

Depth Start: __________ ft.  
Depth Stop: __________ ft.  
Feet Drilled: __________

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>
<td></td>
<td>picked up 4 pallets cement</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ripped up to cement</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cemented 120 bags cement brought level to 75'</td>
<td></td>
</tr>
</tbody>
</table>

Remarks:  Safety meeting  Working around cement dust  
using respiratory equipment

Signed: Rodney Cook  
Date: 4-12-1975
**DRILLING LOG**

**Roscoe Moss Hawaii, Inc.**

1812 OMA STREET, EWA BEACH, HAWAII 96707
TELEPHONE (808) 682-5856 • FAX (808) 682-5686

<table>
<thead>
<tr>
<th>Date</th>
<th>4-13-95</th>
<th>Job No.</th>
<th>195R</th>
<th>Hole No.</th>
<th>1</th>
<th>Elevation</th>
<th>ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer</td>
<td></td>
<td>Location</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Driller   | Rodney Cov  | 8 Hrs. | Rig     |          |   |           |     |
| Helper    | James Cottman | 8 Hrs. | Gas     | Oil      |   |           |     |
| Helper    | Jerry Dancer  | 8 Hrs. | Repairs |          |   |           |     |

| Bit-Size  | 1/4          | Type    | STAR   |          |   |           |     |
| Casing-Size | 1/4 in., Length in hole | 180 ft. in., Amt. Perforated | ft. in. |          |   |           |     |
| Depth Start | ft. | Depth Stop | ft. | Feet Drilled |          |   |           |     |
| 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>
<td>Compressed</td>
<td>7 pallets Compress</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Brought Compress to ground level</td>
<td></td>
</tr>
</tbody>
</table>

| Remarks: | Safety Meeting, back shade & proper lifting |

Signed: **Rodney Cov** Date: **4-13-95**
**DRILLING LOG**

**Roscoe Moss Hawaii, Inc.**

91-259A OLAI STREET • EWA BEACH, HAWAII 96707

TELEPHONE (808) 682-5856 • 682-5554 • FAX (808) 682-5866

**Date** 4-15-75  **Job No.** 1384  **Hole No.** 1  **Elevation** ft.

<table>
<thead>
<tr>
<th>Customer</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Shelter</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Driller</th>
<th>8 Hrs.</th>
<th>Rig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rodney Cook</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Helper</th>
<th>8 Hrs.</th>
<th>Gas</th>
<th>Oil</th>
</tr>
</thead>
<tbody>
<tr>
<td>James Coffman</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Helper</th>
<th>Hrs.</th>
<th>Repairs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<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>10</td>
<td>Star</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Casing-Size</th>
<th>16</th>
<th>Length in hole</th>
<th>180</th>
<th>Amt. Perforated</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<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>
<th>Measurements</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>A</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>
</tr>
</thead>
<tbody>
<tr>
<td>179</td>
<td>gray lava Series</td>
<td></td>
</tr>
<tr>
<td>182</td>
<td></td>
<td></td>
</tr>
<tr>
<td>182</td>
<td>gray lava breccia</td>
<td></td>
</tr>
<tr>
<td>185</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Remarks:**

- Loaded cement equipment on crane and loaded bits casing + define head etc. took crane to widen for daily.
- Started drilling.

**Remarks:**

- Safety meeting using grinders, with proper hand eye face protection.

**Signed** Rodney Cook  **Date** 4-15-75
Date: 4-17-95  
Job No.: 195K  
Hole No.: 2  
Elevation:  

**Customer:**  
Location:  

**Driller:**  
**Helper:**  
**Arv. Job:**  
**Lv. Job:**  
**Arv. Job:**  
**L. Job:**  

**Hrs.**  
**Hrs.**  
**Hrs.**  
**Hrs.**  

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

**Bit Size:** 12  
**Type:**  

**Casing Size:**  
**Length in hole:**  
**Bt. in., Lnt. in hole:**  ft.  
**Amt. Perforated:**  

**Depth Start:** 185 ft.  
**Depth Stop:** 205 ft.  
**Feet Drilled:**  

**Water Levels:**  
**Time:** 7:00 AM  
**Time:**  

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>Top A</th>
<th>Top B</th>
</tr>
</thead>
<tbody>
<tr>
<td>185</td>
<td>Gray Lava</td>
<td></td>
<td>56,10</td>
<td></td>
</tr>
<tr>
<td>200</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Remarks:**  
Safety Meeting  
Keeping work area clean  
Hoses, wiring, heads, chairs, or steps picked up  

**Signed:**  
**Date:** 4-17-95
## DRILLING LOG

<table>
<thead>
<tr>
<th>Date</th>
<th>2-19-95</th>
<th>Job No.</th>
<th>175R</th>
<th>Hole No.</th>
<th>2</th>
<th>Elevation</th>
<th>ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer</td>
<td></td>
<td>Location</td>
<td>Shafter</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Driller</td>
<td>Rodney</td>
<td>8 Hrs.</td>
<td>Rig</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Helper</td>
<td>James</td>
<td>8 Hrs.</td>
<td>Gas</td>
<td>Oil</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arv. Job</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lv. Job</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hrs.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Or. No.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bit-Size</td>
<td>16</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>ST A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Casing-Size</td>
<td>16</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>in., Length in hole</td>
<td>180 ft.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>in., Amt. Perforated</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ft.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depth Start</td>
<td>200 ft.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depth Stop</td>
<td>230 ft.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feet Drilled</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water Levels, Time</td>
<td>8:00 AM</td>
<td>5:55 ft., Time</td>
<td>M</td>
<td></td>
<td>ft.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Depth

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>Top</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>gray lava fine</td>
<td></td>
<td></td>
</tr>
<tr>
<td>235</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Measurements

- A
- B

### Remarks:

- Safety meeting
- Climbing on deck
- Uscing safety belt

Signed: Rodney Cook
Date: 2-18-95
**DRILLING LOG**

**Roscoe Moss Hawaii, Inc.**

Date: 4-14 1995  
Job No.: 195R  
Hole No.: 2  
Elevation:  
Location: Ship

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Rodney Cook</td>
<td>James Olden</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Rig | Gas | Oil | Repairs |

<table>
<thead>
<tr>
<th></th>
<th>5 Hrs.</th>
<th>8 Hrs.</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th></th>
<th>5 Hrs.</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</table>

<p>| | |</p>
<table>
<thead>
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</tbody>
</table>

<p>| | |</p>
<table>
<thead>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Bit-Size:** 10  
**Type:** 5'ur

<table>
<thead>
<tr>
<th>Casing-Size</th>
<th>Length in hole</th>
<th>Amt. Perforated</th>
</tr>
</thead>
<tbody>
<tr>
<td>16 in.</td>
<td>180 ft.</td>
<td></td>
</tr>
</tbody>
</table>

**Depth:** 230 ft.  
**Depth Stop:** 250 ft.  
**Feet Drilled:**

**Water Levels:** 800 ft.  
**Time:** M 22 ft.  
**Time:** M ft.

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>Top</th>
</tr>
</thead>
<tbody>
<tr>
<td>230</td>
<td>Gray sand</td>
<td>firm</td>
<td></td>
</tr>
<tr>
<td>250</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Remarks:**

Signed: Rodney Cook  
Date: 4-19 1995
## DRILLING LOG

**Roscoe Moss Hawaii, Inc.**

91-259A Olai Street, Ewa Beach, Hawaii 96707

Telephone (808) 682-5856 • (808) 5554 • Fax (808) 682-5866

---

**Date**: 4-2-1975  
**Job No.**: 1952  
**Hole No.**: 1

**Location**: Shelter

---

**Driller**: Rodney Cool  
**Hrs.**:  
**Rig**:  
**Gas**:  
**Oil**:  
**Repairs**:  
**Arv. Job**:  
**Lv. Job**:  
**Hrs.**:  
**Or. No.**:  

---

**Bit-Size**: 10  
**Type**: SP-DR

---

**Casing-Size**: 10 in., Length in hole 180 ft.  
**Amt. Perforated**:  

---

**Depth Start**: 250 ft.  
**Depth Stop**: 290 ft.  
**Feet Drilled**:  

---

**Water Levels, Time**:

- 8:00 AM  
- 5' ft., Time  
- M  
- ft.

---

### Depth

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
</tr>
</thead>
<tbody>
<tr>
<td>250</td>
<td>Grey Lava Lime</td>
</tr>
<tr>
<td>260</td>
<td>Broken Lava Water &amp; Circlers</td>
</tr>
<tr>
<td>265</td>
<td>Grey Lava Lime</td>
</tr>
<tr>
<td>290</td>
<td></td>
</tr>
</tbody>
</table>

---

**Remarks**:  

---

**Signed**: Rodney Cool  
**Date**: 4-20-1975
Date: 4-21 1979  
Job No.: 128A  
Hole No.: 1  
Elevation: ___ ft.

Customer:  
Location: Shafter

Driller:  
Hrs.: 8  
Rig:  

Helper:  
Hrs.: 8  
Gas:  
Oil:  
Repairs:  

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

Bit-Size: #4  
Type: SDRC

Casing-Size: 10 in., Length in hole: 150 ft.  
in.


Water Levels, Time: 8:00 AM + 2 ft., Time: ___ M ft.

Remarks:  

Depth  
Formation  
Remarks  
Top

270  
Forty Lava  
getting no cuttings  
hole filling in

280  


Signed: Roscoe Couch  
Date: 4-21 1979
## DRILLING LOG

**Roscoe Moss Hawaii, Inc.**

**91-259A OLAI STREET • EWA BEACH, HAWAII 96707**

**TELEPHONE (808) 682-5556 • 682-5554 • FAX (808) 682-5866**

---

**Date:** 4-26-95  
**Job No.:** 155A  
**Hole No.:** 1  
**Elevation:** ft.  
**Location:** Shaft

**Customer:**  
**Driller:** Rodney Counal  
**9 Hrs.** Rig.  
**Helper:** James Cattell  
**9 Hrs.** Gas  
**Oil**

**Helper:**  
**Hrs.** Repairs

**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 ft., Time ft.

---

**Depth** | **Formation** | **Remarks** | **Top** | **Measurements**
--- | --- | --- | --- | ---

- Picked up finger truck from Shop  
  Took to Shop, started setting pump
- Pump set a 90' Airline at 40'  
  Air pressure 1710 lbs, pumped 1100 gpm  
  with 1'' Air hose

**Remarks:** Safety Meeting working with overhead objects

**Signed:** Rodney Counal  
**Date:** 4-26-95
DRILLING LOG

Date 1-27-19 55  Job No. 1956  Hole No. 1  Elevation ft.
Customer  Location  Shafter
Driller Rodney Crouch  8 Hrs.  Rig
Helper James Coffman  8 Hrs.  Gas  Oil
Helper  Hrs.  Repairs

Bit-Size  Type

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

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

Water Levels, Time 7:30 M + 2" 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>Pumped well HT 500 ft. 750 ft. 1000 ft.</td>
<td>checked other wells for dirty sand with Electric Scanners</td>
<td></td>
</tr>
<tr>
<td></td>
<td>water level dropped 146</td>
<td>started pulling pump to drill floor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>get different orders reset pump &amp; hipped up</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Remarks:

Signed  Date 1-27-19 55
**DRILLING LOG**

Roscoe Moss Hawaii, Inc.

91-259A Olai Street • Ewa Beach, Hawaii 96707

Telephone (808) 682-5856 • 682-5554 • Fax (808) 682-5866

Date: 4-28-1975  Job No.: 1958  Hole No.: 1  Elevation: ______ ft.

Customer:  

Location: Shaft  

Driller: Rodney Couch  9 Hrs.  Rig:  

Helper: James Lathem  7 Hrs.  Gas:  

Helper:  1 Hrs.  Oil:  

Arv. Job:  

Job Lv. Job:  

Lg. Job Or. No:  

Bit-Size:  

Type:  


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>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SAT up to</td>
<td>Stop test</td>
</tr>
<tr>
<td></td>
<td>Started @ 8:45</td>
<td>pumping late 1200 2 VN with 1/16&quot; air lock</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>900</td>
</tr>
<tr>
<td></td>
<td></td>
<td>700</td>
</tr>
<tr>
<td></td>
<td>Air line at 20' from surface of ground</td>
<td></td>
</tr>
<tr>
<td></td>
<td>bowl's sat at 49'</td>
<td></td>
</tr>
</tbody>
</table>

Remarks:  

Signed: Rodney Couch  

Date: 4-28-1975
**DRILLING LOG**

---

**Date:** 5-2 1975  **Job No.:** 1958  **Hole No.:** 1  **Elevation:** ft.

**Customer:**  
**Location:** Shafter

**Driller:** Rodney Conk  **12 Hrs.**  **Rig:**  
**Helper:** James Curran  **12 Hrs.**  **Gas:**  
**Helper:**  **Hrs.**  **Oil:**  
**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>Started pump test</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>pumping at 100 gpm with 231 ft. draw down</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>bowls set at 49' from Top of casing</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Air line at 20'</td>
<td></td>
</tr>
</tbody>
</table>

**Remarks:**

---

**Signed:** Rodney Conk  **Date:** 5-2 1975
<table>
<thead>
<tr>
<th>Date</th>
<th>5-3 1975</th>
<th>Job No.</th>
<th>Hole No.</th>
<th>Elevation (ft)</th>
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<tbody>
<tr>
<td>Customer</td>
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<tr>
<td>Driller</td>
<td>Rodney Cook</td>
<td>8 Hrs.</td>
<td>Rig</td>
<td></td>
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<tr>
<td>Helper</td>
<td>James Cuthman</td>
<td>8 Hrs.</td>
<td>Gas</td>
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<tr>
<td>Arv. Job</td>
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<tr>
<td>Lv. Job</td>
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<tr>
<td>Or. No.</td>
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<tr>
<td>Bit-Size</td>
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<tr>
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<td>Depth Start</td>
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<tr>
<td>Depth Stop</td>
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<tr>
<td>Feet Drilled</td>
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<tr>
<td>Water Levels Time</td>
<td>M</td>
<td>ft.</td>
<td>Time</td>
<td>M</td>
</tr>
</tbody>
</table>

**Test pumping 110 gpm**

**Remarks:**

Signed: Rodney Cook  Date: 5-3 1975
APPENDIX B
REPORT OF ANALYTICAL RESULTS

SAMPLE TYPE: potable water
DATE SAMPLED: 05/04/95
AECOS LOG No.: 8515
DATE RECEIVED: 05/04/95

<table>
<thead>
<tr>
<th>ANALYTE</th>
<th>Units</th>
<th>Det. Limit</th>
<th>MCL</th>
<th>Method</th>
<th>Ft. Shafter Well #1</th>
<th>Anal Date/ID</th>
</tr>
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<tbody>
<tr>
<td>Total Coliform</td>
<td>col/100 ml</td>
<td>---</td>
<td>Absence</td>
<td>SM 9222 A,B</td>
<td>&lt; 1†</td>
<td>05/04/95 BEL</td>
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<tr>
<td>Fecal Coliform</td>
<td>col/100 ml</td>
<td>---</td>
<td>Absence</td>
<td>---</td>
<td>---</td>
<td>---</td>
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<tr>
<td>Turbidity</td>
<td>NTU</td>
<td>0.1</td>
<td>0.5/1</td>
<td>EPA 180.1</td>
<td>0.30</td>
<td>05/04/95 me</td>
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<tr>
<td>Chloride</td>
<td>mg/L</td>
<td>1</td>
<td>3</td>
<td>EPA 325.3</td>
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<td>pH</td>
<td>---</td>
<td>0.01</td>
<td>6.5-8.5</td>
<td>EPA 150.2</td>
<td>7.96</td>
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<td>Conductivity</td>
<td>( \mu )hos/cm</td>
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<td>---</td>
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<td>Temperature</td>
<td>°C</td>
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<td>22.5</td>
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<td>Nitrate</td>
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<tr>
<td>Nitrite</td>
<td>mg N/L</td>
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<td>1</td>
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<td>Alkalinity</td>
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<td>250</td>
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<td>Calcium</td>
<td>mg/L</td>
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<td>EPA 215</td>
<td>34.0</td>
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<td>Arsenic</td>
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<td>0.05</td>
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<td>Barium</td>
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<td>2</td>
<td>EPA 208.2</td>
<td>0.021</td>
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<td>Cadmium</td>
<td>mg/L</td>
<td>0.0001</td>
<td>0.005</td>
<td>EPA 213.2</td>
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<td>05/10/95 dh</td>
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</tbody>
</table>

MCL = Maximum Contaminant Level
ND = Not Detected at or above detection limit.
† with moderate (43) non-coliform.
<table>
<thead>
<tr>
<th>ANALYTE</th>
<th>Units</th>
<th>Det. Limit</th>
<th>MCL</th>
<th>Method</th>
<th>Ft. Shafter Well #1</th>
<th>Anal Date/ID</th>
</tr>
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<tbody>
<tr>
<td>Chromium</td>
<td>mg/L</td>
<td>0.001</td>
<td>0.1</td>
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<td>Copper</td>
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<td>0.001</td>
<td>1.3</td>
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<td>Lead</td>
<td>mg/L</td>
<td>0.001</td>
<td>0.015</td>
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<td>Mercury</td>
<td>mg/L</td>
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<td>0.002</td>
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<td>Selenium</td>
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<td>05/16/95</td>
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<td>EPA Method 504</td>
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<tr>
<td>DBCP (Dibromo-chloropropane)</td>
<td>mg/L</td>
<td>0.00001</td>
<td>0.00004</td>
<td>EPA 504</td>
<td>&lt;0.00001</td>
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<tr>
<td>EDB (Ethylene Dibromide)</td>
<td>mg/L</td>
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<td>0.00004</td>
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<td>EPA Method 507</td>
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<tr>
<td>Atrazine</td>
<td>mg/L</td>
<td>0.001</td>
<td>0.003</td>
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<td>0.0001</td>
<td>0.002</td>
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<td>05/30/95</td>
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<tr>
<td>Chlordane</td>
<td>mg/L</td>
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<td>0.002</td>
<td>EPA 508</td>
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<tr>
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<td>0.0002</td>
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<td>0.0004</td>
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<td>05/13/95</td>
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<tr>
<td>Heptachlor</td>
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<td>Epoxide</td>
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<td>PCB's</td>
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<td>0.0005</td>
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<td>0.003</td>
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<tr>
<td>2,4-D</td>
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MCL = Maximum Contaminant Level  
ND = Not Detected at or above detection limit.  
* = Action Level
<table>
<thead>
<tr>
<th>ANALYTE</th>
<th>Units</th>
<th>Det. Limit</th>
<th>MCL</th>
<th>Method</th>
<th>Ft. Shafter Well #1</th>
<th>Anal Date/ ID</th>
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<tbody>
<tr>
<td>2,4,5-TP</td>
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<td>05/08/95</td>
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<td>Dichloroethylene</td>
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<td>0.005</td>
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<td>05/08/95</td>
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<td>05/08/95</td>
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<td>1,1,1-</td>
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<td>0.2</td>
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<tr>
<td>Trichloroethane</td>
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<td>0.005</td>
<td>EPA 524.2</td>
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<td>05/08/95</td>
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<tr>
<td>Trichloroethylene</td>
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<td>TCP (1,2,3-</td>
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<td>Trichloropropane</td>
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<td>Vinyl Chloride</td>
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<td>0.002</td>
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<tr>
<td>Xylenes (Total)</td>
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</table>
HECO CHEMISTRY LABORATORY
ENVIRONMENTAL DEPARTMENT
Analysis Report

Report Date: May 26, 1995

Client: AECOS
970 N. Kalaeo Avenue, Suite C-300
Kailua, HI 96734

Sample: Drinking Water

Sample Date: See Below

<table>
<thead>
<tr>
<th>Sample I.D.</th>
<th>Sample Site</th>
<th>Sample Date</th>
<th>Fluoride mg/L</th>
<th>Mercury mg/L</th>
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</thead>
<tbody>
<tr>
<td>8513</td>
<td>Waiawa 595 Well</td>
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<td>05/04/95</td>
<td>&lt;0.20</td>
<td>&lt;0.0005</td>
</tr>
</tbody>
</table>

Analyzed by: G. Kisuwa/B. Quidez

Approved by: Charles Kishimoto
Lab Supervisor
LABORATORY ANALYSIS REPORT

CLIENT: AECOS, INC.
970 N. KALAHEO AVE
KAILUA, HI 96734

PROJECT NAME: ROSCOE MOSS
LOG #: 8515

Date/Time Sampled: 05/04/95 @ 0845
Date/Time Received: 05/04/95 @ 1622
TEMPERATURE CONTROL: 2°C

Analysis Date/Time: 05/04/95 @ 1630

ANALYSIS       RESULT       UNIT       METHOD NUMBER

TOTAL COLIFORM <1         col/100     SM 9222A,B
W/ MODERATE (43) non-coliforms

05/05/95 @ 1550 hrs - called Snookie with final report.

PAGE 1 OF 1

Approved by: [Signature]
REPORT OF ANALYTICAL RESULTS

SAMPLE TYPE: drinking water
DATE SAMPLED: 06/28/95
AECOS LOG No.: 8640
DATE RECEIVED: 06/28/95

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J. Mello, Laboratory Director
Laboratory Report

for

PACE, Inc.
4765 Calle Quetzal

Camarillo, CA 93010

Attention: Client Services

Report#: 21339
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Report #: 21339
Sample #: 950703059  Sample ID: CL-3198-FORT SHAFFER  Project: SUBCONTRACT

SDWA Pesticides  (ML/EPA 508 )
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Sample #: 950701053     Sample ID: CL-5198-PORT SHAFFER     Project: SUBCONTRACT

SDWA Pesticides

Quality Control

(ML/EPA 508 )
Sample #: 250703059  Sample ID CL-3198-PORT SHAFFER  Project: SUBCONTRACT

## SDWA Pesticides (ML/EPA 508)

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Report #: 21339
Laboratory Report

for

PACE, Inc.
4765 Calle Quetzal
Camarillo, CA 93010

Attention: Client Services

MONTGOMERY LABORATORIES
Submitted on
MAY 17 1995

Report#: 20198
Subcontractor: Paia Pace

Requested By: Snookie
Date: 5/4/95

Results Requested By: 2 weeks

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Notes/Special Instructions:

QTY = 3 1l glass
10 vials
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Notes/Special Instructions:
### Sample Information
- **Sample ID:** CL2211-1(S55), WAIANA 595 WELL
- **Sample Type:** Water
- **Sampled:** 01-May-1995
- **Received:** 09-May-1995
- **Reported:** 17-May-1995

### Aldicarb (ML/EPA 531.1)

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<th>Conc.</th>
<th>% Rec</th>
<th>Dilution</th>
<th>Det. Limit</th>
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<th>By</th>
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Policy and Procedures

Sample ID: 95030148  Sample ID CLA213-108519 WATER 595 FIELD Project SUBCONTRACT
Sample Type Water Sampled 03-May-1999 Received 09-May-1999 Reported 17-May-1999

### Aldicarbs Surrogate Summary (ML/EPA 531.1)

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<tr>
<th>Parameter</th>
<th>Percent Recovery</th>
<th>Acceptable Range</th>
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Report No: 20198
### Aldicarbs Quality Control

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<th>Parameter</th>
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Report #: 20198
# Laboratory Report

**Sample Type:** Water  
**Sampled:** 01-May-1995  
**Received:** 02-May-1995  
**Reported:** 17-May-1995

## Aldicarb (ML/EPA 531.1)

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<th>Conc.</th>
<th>Rec</th>
<th>Det. Limit</th>
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<th>By</th>
<th>Analyzed</th>
<th>By</th>
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<td>Yke</td>
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<td>Yke</td>
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*Report #: 20198*
**Aldicarbs**

**Surrogate Summary**

(ML/EPA 531.1)

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Report #: 20198

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Sample #: 950591449  Sample ID: CL211-219515, PT SHAFTER WELLI  Project: SUBCONTRACT

Sample Type: Water  Sampled: 02-may-1995  Received: 02-may-1995  Reported: 17-may-1995

---

**Laboratory Report**

PACK, Inc.
4765 Calla Quezal
Camarillo, CA 93010
ATTN: Client Services
**Laboratory Report**

PACE, Inc.  
4765 Calle Quetzal  
Camarillo, CA 93010  
ATTN: Client Services

Sample #: 96009143  
Sample ID: C2212-2 (8125 FT SHAPER WELL)  
Project: SUBCONTRACT  
Sample Type: Water  
Sampled: 03-May-1995  
Received: 09-May-1995  
Reported: 17-May-1995

### Aldicarbs Quality Control

<table>
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<tr>
<th>Control</th>
<th>Parameter</th>
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<th>Actual</th>
<th>Found</th>
<th>%Recv</th>
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<td>ND</td>
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<tr>
<td>MBLK</td>
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<td>ug/l</td>
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<td>MBLK</td>
<td>Oxamyl (Vydac)</td>
<td>ug/l</td>
<td>ND</td>
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<td>3-Hydroxyacarbosuran</td>
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REPORT OF LABORATORY ANALYSIS

Southern California Laboratory
4765 Calle Quetzal, Camarillo, California 93012
(805) 389-1353
FAX (805) 389-1438

CLIENT: Snookie Mello
ABCO, Incorporated
970 N. Kalaheo Ave Suite C300
Kailua-Cahu, HI 96734

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION
8513, Waiawa 595 Well

MATRIX
Drinking Water

SAMPLED BY
Client

SAMPLED RECEIVED
05/03/95 1100 05/05/95

CONSTITUENT
NITROGEN AND PHOSPHORUS CONTAINING PESTICIDES
Alachlor (15972608) 1. ND
Atrazine (1912249) 0.1 ND
Nitrolyxylene (Percent Surrogate) . 91.

RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit):
(1) Sample Preparation on 05/08/95 by PK

Lab Certifications: CAELAP #1598; UTELAP #E-142; AZELAP #AZ0162; A2LA #0136-01; L.A.Co.CS #10187

06/06/95
GC4/R414915
SJG/sjgcmo (dw)
950-0-050895

An Equal Opportunity Employer
REPORT OF LABORATORY ANALYSIS

Southern California Laboratory
4765 Calle Quetzal, Camarillo, California 93012

(805) 389-1353
FAX (805) 389-1438

CLIENT: Snookie Mello
AECOS, Incorporated
970 N. Kalaheo Ave Suite C300
Kailua-Oahu, HI 96734

Lab Number : CL-2213-2
Project : 8513/8515
Analyzed : 05/30/95
Analyzed by: RA
Method : EPA 507

REPORT OF ANALYTICAL RESULTS

REPORTED BY: RAE

SAMPLE DESCRIPTION | MATRIX | SAMPLED BY | SAMPLED | RECEIVED
---|---|---|---|---
8515, Fort Shafter Well #1 | Drinking Water | Client | 05/04/95 | 05/05/95

CONSTITUENT | (CAS RN) | *PQL | RESULT | NOTE
---|---|---|---|---
NITROGEN AND PHOSPHORUS CONTAINING PESTICIDES
Alachlor | 15972608 | 1 | ND | 
Atrazine | 1912249 | 0.1 | ND | 
Nitrometaxylene (Percent Surrogate) | | | 73 | 

Lab Certifications: CAELAP #1598; UTELAP #E-142; AZELAP #AZ0162; A2LA #0136-01; L.A.Co.CSD #10187

*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

(1) Sample Preparation on 05/08/95 by PK

06/06/95
GC4/R414916
SJG/sjgamo (dw)
507-0-050895
REPORT OF LABORATORY ANALYSIS

Southern California Laboratory
4765 Calle Quetzal, Camarillo, California 93012
(805) 389-1353
FAX (805) 389-1438

CLIENT: PACE, Incorporated

QC Batch ID: 507-0-050895

Analyzed : 05/30/95
Analyzed by: RA
Method : EPA 507

METHOD BLANK

REPORT OF ANALYTICAL RESULTS

Page 1 of 1

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<td>Atrazine</td>
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<td>Fenamiphos</td>
<td>(22224926)</td>
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*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

(1) Sample Preparation on 05/08/95 by PK

06/02/95
GC4/R414912
SJG/sjgamo(dw)

Lab Certifications: CAELAP #1598; UTELAP #E-142; AZELAP #AZ0162; AZELAP #AZ0162; L.A. Co. CSD #10187

An Equal Opportunity Employer
## REPORT OF LABORATORY ANALYSIS

Southern California Laboratory  
4765 Calle Quetzal, Camarillo, California 93012  
FAX (805) 389-1353

lient: PACE, Incorporated

QC Batch ID: 507-0-050895

Reported: 05/30/95  
Analysed by: RA

Method: EPA 507

QC SPIKE

REPORT OF ANALYTICAL RESULTS

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<th>SPIKE</th>
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<tr>
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<td>µg/L</td>
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<td>Cycloate</td>
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Lab Certifications: CAELAP #1598; UTELAP #E-142; AZELAP #AZ0162; A2LA #0136-01; L.A.Co.CSD #10137

*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit: (1) Sample Preparation on 05/08/95 by PK

06/02/95

GC4/R414913

SJG/sjgamo (dw)
REPORT OF LABORATORY ANALYSIS

Southern California Laboratory
4765 Calle Quetzal, Camarillo, California 93012

(805) 389-1353
FAX (805) 389-1438

QC Batch ID: 507-0-050895

CLIENT: PACE, Incorporated

Sample Description

QC SPIKE
REPORT OF ANALYTICAL RESULTS

Page 1 of 1

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Lab Certifications: CAELAP #1598; UTELAP #E-142; AZELAP #AZ0162; AZLA #0136-01; L.A.Co.CSD #10187

*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit

(1) Sample Preparation on 05/08/95 by PK

06/02/95
GC4/R1214914
SJG/sjgamo (dw)
**REPORT OF LABORATORY ANALYSIS**

Southern California Laboratory  
4765 Calle Quetzal, Camarillo, California 93012  
(805) 389-1353  
FAX (805) 389-1438

CLIENT: Snookie Mello  
AECOS, Incorporated  
970 N. Kalaehe Ave Suite C300  
Kailua-Oahu, HI 96734

Lab Number : CL-2213-1  
Project : 8513/8515

**REPORT OF ANALYTICAL RESULTS**

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**CONSTITUENT**  
<table>
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<th>(CAS RN)</th>
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<th>RESULT</th>
<th>NOTE</th>
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**EDB/DBCP**  
| Ethylene Dibromide | (106934) | 0.02 | ND   |
| Dibromochloropropane | (96128)  | 0.01 | ND   |
| Percent Surrogate Recovery | | 103. | |

Lab Certifications: CAELAP #1598; UTELAP #E-142; AZELAP #AZ0162; A2LA #0136-01; L.A.Co.CSD #1018

*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)*

(1) Sample Preparation on 05/17/95 by RA using EPA 504

(2) All positive results are confirmed by a second column.
**REPORT OF LABORATORY ANALYSIS**

Southern California Laboratory  
4765 Calle Quetzal, Camarillo, California 93012  
(805) 389-1353  
FAX (805) 389-1438

CLIENT: Snookie Mello  
AECOS, Incorporated  
970 N. Kalaheo Ave Suite C300  
Kailua-Oahu, HI 96734

Lab Number: CL-2213-2  
Project: 8513/8515  
Analyzed: 05/17/95  
Analyzed by: RA  
Method: EPA 504

---

### REPORT OF ANALYTICAL RESULTS

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<tr>
<td>Ethylene Dibromide</td>
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<td>Dibromochloropropane</td>
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<td>Percent Surrogate Recovery</td>
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**LAB CERTIFICATIONS:** CAELAP #1598; UTELAP #E-142; AZELAP #AZ0162; A2LA #0136-01; L.A.Co.CSD #1013

*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit):*

(1) Sample Preparation on 05/17/95 by RFA using EPA 504
(2) All positive results are confirmed by a second column.

---

06/02/95  
GC12/R1213714  
SJG/sjgcmo(dw)/gps  
504-12-051795
REPORT OF LABORATORY ANALYSIS

Southern California Laboratory
4765 Calle Quetzal, Camarillo, California 93012
(805) 389-1353
FAX (805) 389-1438

CLIENT: PACE, Incorporated

QC Batch ID: 504-12-051795

Analyzed: 05/17/95
Analyzed by: RA
Method: EPA 504

METHOD BLANK
REPORT OF ANALYTICAL RESULTS

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<tr>
<td>Ethylene Dibromide</td>
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<td>0.02</td>
<td>ND</td>
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<tr>
<td>Dibromochloropropane</td>
<td>(96128)</td>
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<td>Percent Surrogate Recovery</td>
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Lab Certifications: CAELAP #1598; UTELAP #E-142; AZELAP #AZ0162; A2LA #0136-01; L.A.Co.CSD #10187

*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit): (1) Sample Preparation on 05/17/95 by RFA using EPA 504 (2) All positive results are confirmed by a second column.

06/02/95
GC12/R1213710
SJG/sjgcomo(dw)/gps
REPORT OF LABORATORY ANALYSIS

CLIENT: PACE, Incorporated

QC Batch ID: 504-12-051795

Analyzed: 05/17/95
Analyzed by: RA
Method: EPA 504

QC SPIKE

REPORT OF ANALYTICAL RESULTS

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Lab Certifications: CAELAP #1598; UTELAP #E-142; AZELAP #AZ0162; AZELAP #AZ0162; L.A.Co.CSD #10187

*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit).

(1) Sample Preparation on 05/17/95 by RFA using EPA 504
(2) All positive results are confirmed by a second column.

06/02/95
GC12/R1213711
SJG/sjgmo(dw)/gps
# REPORT OF LABORATORY ANALYSIS

Southern California Laboratory  
4765 Calle Quetzal, Camarillo, California 93012  
(805) 389-1353  
FAX (805) 389-1438

QC Batch ID: 504-12-051795

CLIENT: PACE, Incorporated

**SAMPLE DESCRIPTION**

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<td>0.43</td>
<td>100</td>
<td>0</td>
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<tr>
<td>Dibromochloropropane</td>
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<td>4.9</td>
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Lab Certifications: CAELAP #1598; UTELAP #E-142; AZELAP #AZ0162; AZLA #0136-01; L.A.Co.CSD #10187

*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit).*

(1) Sample Preparation on 05/17/95 by RFA using EPA 504

(2) All positive results are confirmed by a second column.
**REPORT OF LABORATORY ANALYSIS**

Southern California Laboratory  
4765 Calle Quetzal, Camarillo, California 93012  
(805) 389-1353  
FAX (805) 389-1438

CLIENT: Snookie Mello  
AECOS, Incorporated  
970 N. Kalaheo Ave Suite C300  
Kailua-Oahu, HI 96734

Lab Number: CL-2213-1  
Project: 8513/8515  
Analyzed: 05/10/95  
Analyzed by: KL  
Method: EPA 508

**REPORT OF ANALYTICAL RESULTS**

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**CONSTITUENT**

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<td>µg/L</td>
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Lab Certifications: CAELAP #1598; UTELAP #E-142; AZELAP #AZ0162; A2IA #0136-01; L.A.Co.CSD #10187

*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit).*

(1) Sample Preparation on 05/10/95 by PK
(2) All positive results are confirmed by a second column.

06/02/95
GC10/KL133A25
SJG/sjgada/cmo(dw)/kjl
508-0-051095A

4765 Calle Quetzal  
Camarillo, CA 93012  
TEL: 805-389-1353  
FAX: 805-389-9614

An Equal Opportunity Employer
REPORT OF LABORATORY ANALYSIS

Southern California Laboratory
4765 Calle Quetzal, Camarillo, California 93012
(805) 389-1353
FAX (805) 389-1438

CLIENT: Snookie Mello
AECOS, Incorporated
970 N. Kalaheo Ave Suite C300
Kailua-Oahu, HI 96734

Lab Number: CL-2213-2
Project: 8513/8515

REPORT OF ANALYTICAL RESULTS

<table>
<thead>
<tr>
<th>SAMPLE DESCRIPTION</th>
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<td>Client</td>
<td>05/04/95</td>
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<th>*PQL</th>
<th>RESULT</th>
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<td>Heptachlor epoxide</td>
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<tr>
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Lab Certifications: CAELAP #1598; UTELAP #E-142; AZELAP #AZ1062; AZLA #0136-01; L.A.Co.CSD #10187

*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

(1) Sample Preparation on 05/10/95 by PK
(2) All positive results are confirmed by a second column.
REPORT OF LABORATORY ANALYSIS

Southern California Laboratory
4765 Calle Quetzal, Camarillo, California 93012

QC Batch ID: 508-0-05109SA

CLIENT: PACE, Incorporated

Analyzed: 05/10/95
Analyzed by: KL
Method: EPA 508

METHOD BLANK
REPORT OF ANALYTICAL RESULTS

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<td>Heptachlor</td>
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<td>Heptachlor epoxide</td>
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<tr>
<td>Toxaphene</td>
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Lab Certifications: CAELAP #1598; UTELAP #E-142; AZELAP #AZ0162; AZLA #0136-01; L.A.Co.CSD #10187

*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit).
(1) Sample Preparation on 05/10/95 by PK
(2) All positive results are confirmed by a second column.

06/02/95
GC10/KL133A22
SJG/sjgada/cmo(dw)/kjl
REPORT OF LABORATORY ANALYSIS

Southern California Laboratory
4765 Calle Quetzal, Camarillo, California 93012

(805) 389-1353
FAX (805) 389-1438

CLIENT: PACE, Incorporated

QC Batch ID: 508-0-051095A

Analyzed : 05/10/95
Analyzed by: KL
Method : EPA 508

QC SPIKE
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION  MATRIX  SAMPLED BY  SAMPLED DATE RECEIVED

QC SPIKE  Drinking Water

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<th>CONSTITUENT</th>
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Lab Certifications: CAELAP #1598; UTELAP #E-142; AZELAP #AZ0162; AZELAP #10187; LA Co. CSD #0136-01; L.A. Co. CSD #0187

*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

(1) Sample Preparation on 05/10/95 by PK
(2) All positive results are confirmed by a second column.

06/02/95
GC10/KL133A23
SJG/sjgada/cmo(dw)/kj1
REPORT OF LABORATORY ANALYSIS

Southern California Laboratory
4765 Calle Quetzal, Camarillo, California 93012

QC Batch ID: 508-0-051095A

CLIENT: PACE, Incorporated

Analyzed: 05/10/95
Analyzed by: KL
Method: EPA 508

QC SPIKE
REPORT OF ANALYTICAL RESULTS

Page 1 of 1

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Lab Certifications: CAELAP #1598; UTELAP #E-142; AZELAP #AZ0162; A2LA #0136-01; L.A. Co. CSD #10187
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)
(1) Sample Preparation on 05/10/95 by PK
(2) All positive results are confirmed by a second column.

06/02/95
GC10/KL133A24
SJG/sjgada/cmo(dw)/kr1
REPORT OF LABORATORY ANALYSIS

Southern California Laboratory  
4765 Calle Quetzal, Camarillo, California 93012  
(805) 389-1353  
FAX (805) 389-1438

CLIENT: Snookie Mello  
ASCOS, Incorporated  
970 N. Kalaheo Ave Suite C300  
Kailua-Cahu, HI 96734  
Lab Number: CL-2213-1  
Project: 8513/8515  
Analyzed: 05/14/95  
Analyzed by: RA  
Method: EPA 515.1

REPORT OF ANALYTICAL RESULTS

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<th>RECEIVED</th>
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<th>RESULT</th>
<th>NOTE</th>
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<td>µg/L</td>
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<tr>
<td>2,4-D</td>
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<td>1,2,3</td>
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<tr>
<td>2,4,5-TP (Silvex)</td>
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<td>3.6</td>
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<tr>
<td>Dichloroprop (2,4-DP)</td>
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<td>2,4,5-T</td>
<td>(93765)</td>
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<td>Pentachlorophenol</td>
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<td>ND</td>
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<td>Dinoseb</td>
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<td>Bentazon</td>
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<tr>
<td>2,4-DB</td>
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<td>Dicamba</td>
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<td>Percent Surrogate Recovery</td>
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Lab Certifications: CAELAP #1598; UTELAP #E-142; AZELAP #A20162; A2LA #0136-01; L.A.Co.CSD #10187

*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

(1) Sample Preparation on 05/09/95 by GG using EPA 515.1
(2) High concentration of some non-target analytes caused the sample to be run diluted resulting in raised Practical Quantitation Limits (PQL's) for analytes. Refer to the blank for undiluted PQL's.
(3) All positive results are confirmed by a second column.

06/02/95
GC12/PAL213313
SJG/sjgmps (dw)
5150050995
REPORT OF ANALYTICAL RESULTS

<table>
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<th>SAMPLE DESCRIPTION</th>
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<th>RECEIVED</th>
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<tr>
<td>2,4-D</td>
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<tr>
<td>2,4,5-TP (Silvex)</td>
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Percent Surrogate Recovery

1, 2, 3

Lab Certifications: CAELAP #1598; UTELAP #E-142; AZELAP #AZ0162; AZLIA #0136-01; L.A.Co.CSD #10187

*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit).

(1) Sample Preparation by GG using EPA 515.1
(2) High concentration of some non-target analytes caused the sample to be run diluted resulting in raised Practical Quantitation Limits (PQL's) for analytes. Refer to the blank for undiluted PQL's.
(3) All positive results are confirmed by a second column.
REPORT OF LABORATORY ANALYSIS

Southern California Laboratory
4765 Calle Quetzal, Camarillo, California 93012

QC Batch ID: 5150050995

CLIENT: PACE, Incorporated

Sample Description: Drinking Water

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<tr>
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<td>ND</td>
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<tr>
<td>2,4,5-TP (Silvex)</td>
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<tr>
<td>Dichlorprop (2,4-DP)</td>
<td>(120365)</td>
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<tr>
<td>2,4,5-T</td>
<td>(93765)</td>
<td>0.2</td>
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<td>Pentachlorophenol</td>
<td>(87865)</td>
<td>0.08</td>
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<tr>
<td>Dinoseb</td>
<td>(88857)</td>
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<td>Bentazon</td>
<td>(25057890)</td>
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<td>2,4-DB</td>
<td>(94826)</td>
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<td>Picloram</td>
<td>(1918021)</td>
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<td>Dalapon</td>
<td>(75990)</td>
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<td>Dicamba</td>
<td>(1918009)</td>
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<td>Percent Surrogate Recovery</td>
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Lab Certifications: CAELAP #1598; UTELAP #E-142; AZELAP #AZ0162; A2LA #0136-01; L.A. Co. CSD #10187

*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit).

(1) Sample Preparation by GG using EPA 515.1

06/02/95
GC12/RA1213315
SJG/sjggps (dw)
CLIENT: PACE, Incorporated

QC Batch ID: 5150050995

Analyzed: 05/14/95
Analyzed by: RA
Method: EPA 515.1

QC SPIKE
REPORT OF ANALYTICAL RESULTS
Page 1 of 1

<table>
<thead>
<tr>
<th>SAMPLE DESCRIPTION</th>
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<th>SAMPLED BY</th>
<th>SAMPLED DATE RECEIVED</th>
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<td>Drinking Water</td>
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<table>
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<tr>
<th>CONSTITUENT</th>
<th>*PQL µg/L</th>
<th>SPIKE AMOUNT µg/L</th>
<th>RESULT µg/L</th>
<th>%REC</th>
<th>NOTES</th>
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<tbody>
<tr>
<td>Chlorinated Herbicides</td>
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<tr>
<td>2,4-D</td>
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<td>2.50</td>
<td>2.30</td>
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<td>2,4,5-TP (Silvex)</td>
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<td>0.19</td>
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<td>2,4,5-T</td>
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<td>0.20</td>
<td>80%</td>
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Lab Certifications: CAELAP #1598; UTELAP #E-142; AZELAP #A0162; AZLA #0136-01; L.A.Co.CSD #10187
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit) (1)
Sample Preparation on 05/09/95 by GG using EPA 515.1

06/02/95
R1213310
SJG/sjggps (dw)
REPORT OF LABORATORY ANALYSIS

Southern California Laboratory
4765 Calle Quetzal, Camarillo, California 93012

(805) 389-1353
FAX (805) 389-1438

CLIENT: PACE, Incorporated

QC SPIKE
REPORT OF ANALYTICAL RESULTS

QC SPIKE DUPLICATE
Drinking Water

SAMPLE DESCRIPTION | MATRIX | SAMPLED BY | SAMPLED DATE RECEIVED
--- | --- | --- | ---
QC SPIKE DUPLICATE | Drinking Water | | |

<table>
<thead>
<tr>
<th>CONSTITUENT</th>
<th>*PQL (µg/L)</th>
<th>SPIKE AMOUNT</th>
<th>RESULT µg/L</th>
<th>%REC</th>
<th>RPD</th>
<th>NOTE</th>
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<tr>
<td>2,4-D</td>
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<tr>
<td>2,4,5-TP (Silvex)</td>
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Lab Certifications: CAELAP #1598; UTELAP #E-142; AZELAP #AZ0162; A2LA #0136-01; L.A.Co.CSD #1013~

*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit).

(1) Sample Preparation on 05/09/95 by GG using EPA 515.1

06/02/95
GC12\R1213313
SJG/sjggps (dw)
REPORT OF LABORATORY ANALYSIS

Southern California Laboratory
4765 Calle Quetzal, Camarillo, California 93012

CLIENT: Snookie Mello
AECOS, Incorporated
970 N. Kalaeo Ave Suite C300
Kailua-Oahu, HI 96734

Lab Number: CL-2213-1
Project: 8513/8515

REPORT OF ANALYTICAL RESULTS

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<td>8513, Waiawa 595 Well</td>
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<td>Client</td>
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<td>1100 05/05/95</td>
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<table>
<thead>
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<th>CONSTITUENT</th>
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<tr>
<td>Volatile Organics by GC/MS</td>
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<tr>
<td>Benzene</td>
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<tr>
<td>Bromobenzene</td>
<td>(108861)</td>
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<td>ND</td>
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<tr>
<td>Bromochloromethane</td>
<td>(74975)</td>
<td>0.5</td>
<td>ND</td>
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</tr>
<tr>
<td>Bromodichloromethane</td>
<td>(75274)</td>
<td>0.5</td>
<td>ND</td>
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<tr>
<td>Bromoform</td>
<td>(75252)</td>
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<td>ND</td>
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<td>Bromomethane (Methyl bromide)</td>
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<td>ND</td>
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<tr>
<td>n-Butylbenzene</td>
<td>(104518)</td>
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<tr>
<td>sec-Butylbenzene</td>
<td>(135988)</td>
<td>0.5</td>
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<td>tert-Butylbenzene</td>
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<td>ND</td>
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<td>Carbon tetrachloride</td>
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<td>Chlorobenzene</td>
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<td>Chloroethane (Ethyl chloride)</td>
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<tr>
<td>Chloroform</td>
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<tr>
<td>Chloromethane (Methyl chloride)</td>
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<td>4-Chlorotoluene</td>
<td>(106434)</td>
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<tr>
<td>Dibromochloromethane</td>
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<td>Dibromochloropropane</td>
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<td>1,2-Dibromoethane (EDB)</td>
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Lab Certifications: CAELAP #1598; UTELAP #E-142; ASEQAP #AZ0162; A2LA #0136-01; L.A.Co.CSD #10187

*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limi*

06/02/95
DVI/08MAY06
DI/jgymo(dw)/css
DVI-524-050895-A
REPORT OF LABORATORY ANALYSIS

Southern California Laboratory
4765 Calle Quetzal, Camarillo, California 93012

CLIENT: Snookie Mello
AECOS, Incorporated
970 N. Kalaheo Ave Suite C300
Kailua-Cahu, HI 96734

Lab Number: CL-2213-1
Project: 8513/8515
Analyzed: 05/08/95
Analyzed by: CS
Method: EPA 524.2

REPORT OF ANALYTICAL RESULTS

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<tbody>
<tr>
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<td>Drinking Water</td>
<td>Client</td>
<td>05/03/95</td>
<td>05/05/95</td>
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<table>
<thead>
<tr>
<th>CONSTITUENT</th>
<th>(CAS RN)</th>
<th>*PQL</th>
<th>RESULT µg/L</th>
<th>NOTE</th>
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</thead>
<tbody>
<tr>
<td>Dibromomethane</td>
<td>(74953)</td>
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<td>1,2-Dichlorobenzene</td>
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<td>1,3-Dichlorobenzene</td>
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<td>1,4-Dichlorobenzene</td>
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<td>Dichlorodifluoromethane (Freon 12)</td>
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<tr>
<td>1,3-Dichloropropene</td>
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<td>2,2-Dichloropropene</td>
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<td>1,1-Dichloropropene</td>
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<td>Ethylbenzene</td>
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<td>Hexachlorobutadiene</td>
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<td>Isopropylbenzene</td>
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<td>4-Isopropyltoluene</td>
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<td>Methylene chloride</td>
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<td>Naphthalene</td>
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Lab Certifications: CAELAP #1598; UTELAP #E-142; ASELAP #AZ0162; A2LA #0136-01; L.A. Co. CSD #10187
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit

06/02/95
DV1/08MAY06
DI/jgymo (dw) /cxw
DV1-524-050895-A

An Equal Opportunity Employer
REPORT OF LABORATORY ANALYSIS

Southern California Laboratory
4765 Calle Quetzal, Camarillo, California 93012
(805) 389-1353
FAX (805) 389-1438

CLIENT: Snookie Mello
AECOS, Incorporated
970 N. Kalaheo Ave Suite C300
Kailua-Oahu, HI 96734

Lab Number: CL-2213-1
Project: 8513/8515

Analyzed: 05/08/95
Analyzed by: CS
Method: EPA 524.2

REPORT OF ANALYTICAL RESULTS

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<td>Client</td>
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<th>RESULT</th>
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<td>n-Propylbenzene</td>
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<td>Styrene</td>
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<td>Toluene</td>
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<td>1,2,3-Trichlorobenzene</td>
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<td>1,2,4-Trichlorobenzene</td>
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<td>Trichloroethene (TCE)</td>
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<td>Trichlorofluoromethane (Freon 11)</td>
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<td>1,2,3-Trichloropropene</td>
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Lab Certifications: CAELAP #1598; UTELAP #E-142; AZELAP #AZ0162; A2LA #0136-01; L.A.Co.CSD #1018
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit):

06/02/95
DV1/08MAY06
DI/jgycom (dw)/cxs
DV1-524-050895-A
REPORT OF LABORATORY ANALYSIS

Southern California Laboratory
4765 Calle Quetzal, Camarillo, California 93012

(805) 389-1353
FAX (805) 389-1438

CLIENT: Snookie Mello
AECOS, Incorporated
970 N. Kalaheo Ave Suite C300
Kailua-Cahu, HI 96734

Lab Number: CL-2213-1
Project: 8513/8515

REPORT OF ANALYTICAL RESULTS

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<tr>
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<th>(CAS RN)</th>
<th>*PQL</th>
<th>RESULT</th>
<th>NOTE</th>
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<tbody>
<tr>
<td>1,2-Dichlorobenzene-d4 spike level</td>
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<td>1,2-Dichlorobenzene-d4 (Surrogate Percent Recovery)</td>
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<td>4.5</td>
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Lab Certifications: CAELAP #1598; UTELAP #E-142; AZELAP #AZ0162; A2LA #0136-01; L.A.Co.CSD #1018

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06/02/95
DV1/08MAY06
DI/jgyno (dw)/cxs
DV1-524-050895-A
REPORT OF LABORATORY ANALYSIS

Southern California Laboratory
4765 Calle Quetzal, Camarillo, California 93012
(805) 389-1353
FAX (805) 389-1438

CLIENT: Snookie Mello
AECOS, Incorporated
970 N. Kalaheo Ave Suite C300
Kailua-Cahu, HI 96734

Lab Number: CL-2213-2
Project: 8513/8515
Analyzed: 05/08/95
Analyzed by: CS
Method: EPA 524.2

REPORT OF ANALYTICAL RESULTS

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<td>ND</td>
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<tr>
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<td>Bromoform</td>
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06/02/95
DVI/08MAY07
DI/jgcdmo (dw)/cxs
DVI-524-050895-A
REPORT OF LABORATORY ANALYSIS

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4765 Calle Quetzal, Camarillo, California 93012

Lab Number: CL-2213-2
Project: 8513/8515

CLIENT: Snookie Mello
AECOS, Incorporated
970 N. Kalahea Ave Suite C300
Kailua-Oahu, HI 96734

Analyzed: 05/08/95
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REPORT OF ANALYTICAL RESULTS

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06/02/95
DV1/08MAY07
DI/jgymo(dw)/cx
DV1-524-050895-A
**REPORT OF LABORATORY ANALYSIS**

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FAX (805) 389-1438

CLIENT: Snookie Mello  
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970 N. Kalaeo Ave Suite C300  
Kailua-Oahu, HI 96734

Lab Number : CL-2213-2  
Project : 8513/8515  
Analyzed : 05/08/95  
Analyzed by: CS  
Method : EPA 524.2

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**REPORT OF ANALYTICAL RESULTS**

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8515, Fort Shafter Well #1  
Drinking Water  
Client  
05/04/95 0845 05/05/95

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<th>CONSTITUENT</th>
<th>(CAS RN)</th>
<th>*PQL µg/L</th>
<th>RESULT µg/L</th>
<th>NOTE</th>
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06/02/95  
DV1/08MAY07  
DI/jgymo(dw)/cxs  
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An Equal Opportunity Employer
### REPORT OF ANALYTICAL RESULTS

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**CLIENT:** Snookie Mello  
AECOS, Incorporated  
970 N. Kalaeo Ave Suite C300  
Kailua-Cahu, HI 96734

Lab Number: CL-2213-3  
Project: 8513/8515  
Analyzed: 05/08/95  
Analyzed by: CS  
Method: EPA 524.2

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**Volatile Organics by GC/MS**

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<tr>
<td>1,3-Dichlorobenzene</td>
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<td>1,4-Dichlorobenzene</td>
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<td>Dichlorodifluoromethane (Freon 12)</td>
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<td>Hexachlorobutadiene</td>
<td>(87683)</td>
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<td>Isopropylbenzene</td>
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<td>4-Isopropyltoluene</td>
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<td>Methylene chloride</td>
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<td>Naphthalene</td>
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Lab Certifications: CAELAP #1598; UTELAP #E-142; ATELAP #AZ0162; AZLA #0136-01; L.A.Co.CSD #10187

*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

06/02/95
DVL/08MAY08
DI/gycmo (dw)/cxs
DVL-524-050895-A

An Equal Opportunity Employer
REPORT OF LABORATORY ANALYSIS

Southern California Laboratory
4765 Calle Quetzal, Camarillo, California 93012

Lab Number: CL-2213-3
Project: 8513/8515

CLIENT: Snookie Mello
AECOS, Incorporated
970 N. Kalaeao Ave Suite C300
Kailua-Oahu, HI 96734

Report of Analytical Results

SAMPLE DESCRIPTION MATRIX SAMPLED BY SAMPLED RECEIVED
Trip Blank for 8513 Aqueous Client 05/05/95

<table>
<thead>
<tr>
<th>CONSTITUENT</th>
<th>(CAS RN)</th>
<th>*PQL µg/L</th>
<th>RESULT µg/L</th>
<th>NOTE</th>
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</thead>
<tbody>
<tr>
<td>n-Propylbenzene</td>
<td>(103651)</td>
<td>0.5</td>
<td>ND</td>
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</tr>
<tr>
<td>Styrene</td>
<td>(100425)</td>
<td>0.5</td>
<td>ND</td>
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<tr>
<td>1,1,1,2-Tetrachloroethane</td>
<td>(630206)</td>
<td>0.5</td>
<td>ND</td>
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<tr>
<td>1,1,2,2-Tetrachloroethane</td>
<td>(79345)</td>
<td>0.5</td>
<td>ND</td>
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<tr>
<td>Tetrachloroethene (PCE)</td>
<td>(127184)</td>
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<td>ND</td>
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<td>Toluene</td>
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<td>1,2,3-Trichlorobenzene</td>
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<td>1,2,4-Trichlorobenzene</td>
<td>(120821)</td>
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<td>Trichloroethene (TCE)</td>
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<td>Trichlorofluoromethane (Freon 11)</td>
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<td>1,2,3-Trichloropropene</td>
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Lab Certifications: CAELAP #1598; UTELAP #E-142; AZELAP #AZ0162; A2LA #0136-01; L.A.Cs.F.S. #10187

*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

06/02/95
DV1/08MAY08
DI/jgycomo(dw)/cxs
DV1-524-050895-A

4765 Calle Quetzal
Camarillo, CA 93012
TEL: (805)389-1353
FAX: (805)389-1438

An Equal Opportunity Employer
REPORT OF LABORATORY ANALYSIS

CLIENT: Snookie Mello
AECOS, Incorporated
970 N. Kalaheo Ave Suite C300
Kailua-Cahu, HI 96734

Analyzed by: CS
Method: EPA 524.2

REPORT OF ANALYTICAL RESULTS

<table>
<thead>
<tr>
<th>SAMPLE DESCRIPTION</th>
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<th>SAMPLED BY</th>
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<tr>
<td>Trip Blank for 8513</td>
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<td>Client</td>
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REPORT OF LABORATORY ANALYSIS

Southern California Laboratory
4765 Calle Quetzal, Camarillo, California 93012
Lab Number: CL-2213-4
(805) 389-1353
Project: 8513/8515
FAX (805) 389-1438

CLIENT: Snookie Mello
AECOS, Incorporated
970 N. Kalahoe Ave Suite C300
Kailua-Oahu, HI 96734

Analyzed: 05/08/95
Analyzed by: CS
Method: EPA 524.2

REPORT OF ANALYTICAL RESULTS

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RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit).

06/02/95
DV1/08MAY09
D1/jgycmo(dw)/cxs
DV1-524-050895-A

Lab Certifications: CAELAP #1598; UTELAP #E-142; AZELAP #AZ0162; A2LA #0136-01; L.A.Co.CSD #10187
### REPORT OF LABORATORY ANALYSIS

**Southern California Laboratory**
4765 Calle Quetzal, Camarillo, California 93012

**Lab Number:** CL-2211-4  
**Project:** 8513/8515  
**Client:** Snookie Mello  
**AECOS, Incorporated**  
970 N. Kalaheo Ave Suite C300  
Kailua-Oahu, HI 96734

**Sample Description:** Trip Blank for 8515  
**Matrix:** Aqueous  
**Sampled by:** Client  
**Sampled:** 05/05/95

### REPORT OF ANALYTICAL RESULTS

**Constituent**  
**CAS RN**  
**PQL**  
**Result**  
**Note**

<table>
<thead>
<tr>
<th>Constituent</th>
<th>(CAS RN)</th>
<th><em>PQL</em></th>
<th><strong>Result</strong></th>
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<td>1,3-Dichlorobenzene</td>
<td>(541731)</td>
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<td>1,4-Dichlorobenzene</td>
<td>(106467)</td>
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Lab Certifications: CAELAP #1598; UTELAP #E-142; AZELAP #AZ0162; A2LA #0136-01; L.A.Co.CSD #1018

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06/02/95  
**DV1/08MAY09**  
**DI/jgycmo (dw)/cxs**  
**DV1-524-050895-A**
REPORT OF LABORATORY ANALYSIS

Southern California Laboratory
4765 Calle Quetzal, Camarillo, California 93012

Lab Number: CL-2213-4
Project: 8513/8515

CLIENT: Snookie Mello
AECOS, Incorporated
970 N. Kalaheo Ave Suite C300
Kailua-Oahu, HI 96734

Reported by: CS
Method: EPA 524.2

REPORT OF ANALYTICAL RESULTS

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<td>1,2,3-Trichloropropene</td>
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<td>1,3,5-Trimethylbenzene</td>
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<td>Vinyl chloride</td>
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<td>Xylenes</td>
<td>(1330207)</td>
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<tr>
<td>cis-1,3-Dichloropropene</td>
<td>(10061015)</td>
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<tr>
<td>trans-1,3-Dichloropropene</td>
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Lab Certifications: CAELAP #1598; UTELAP #E-142; AZELAP #AZ0162; A2LA #0136-01; L.A.Co.CSD #10187

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06/02/95
DVL/08MAY09
DI/gycmo(dw)/cx0
DVL-524-050895-A

An Equal Opportunity Employer
REPORT OF LABORATORY ANALYSIS

Southern California Laboratory
4765 Calle Quetzal, Camarillo, California 93012

CLIENT: Snookie Mello
AECOS, Incorporated
970 N. Kalaeo Ave Suite C300
Kailua-Oahu, HI 96734

REPORT OF ANALYTICAL RESULTS

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Lab Certifications: CAELAP #1598; UTELAP #E-142; AZELAP #AZ0162; A2LA #0136-01; L.A.Co.CSD #1018

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REPORT OF LABORATORY ANALYSIS

Southern California Laboratory
4765 Calle Quetzal, Camarillo, California 93012
(805) 389-1353
FAX (805) 389-1438

QC Batch ID: DVI-524-050895-A

CLIENT: PACE, Incorporated

Analyzed : 05/08/95
Analyzed by: CS
Method : EPA 524.2

METHOD BLANK
REPORT OF ANALYTICAL RESULTS

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<td>Bromodichloromethane</td>
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<td>Bromoform</td>
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<td>Bromomethane (Methyl bromide)</td>
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<td>4-Chlorotoluene</td>
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Lab Certifications: CAEILAP #1598; UTEILAP #E-142; AZEILAP #AZ0162; AZLA #0136-01; L.A.Co.CSD #10187

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06/02/95
DVI/08MAY05
DI/jgycom (dw)/cos

An Equal Opportunity Employer
REPORT OF LABORATORY ANALYSIS

CLIENT: PACE, Incorporated

Sample Description

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<tr>
<th>Constituent</th>
<th>CAS RN</th>
<th>PQQL mg/L</th>
<th>Result mg/L</th>
<th>Note</th>
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Lab Certifications: CAAELAP #1598; UTEELAP #E-142; AXXELAP #AZ0162; AZLAP #0136-01; L.A Co., CSD #10187

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06/02/95
DV1/08MAY05
DI/ggyco (dw)/cox
**REPORT OF LABORATORY ANALYSIS**

Southern California Laboratory
4765 Calle Quetzal, Camarillo, California 93012

(805) 389-1353
FAX (805) 389-1438

CLIENT: PACE, Incorporated

QC Batch ID: DVI-524-050895-A

Analyzed: 05/08/95
Analyzed by: CS
Method: EPA 524.2

**METHOD BLANK**

**REPORT OF ANALYTICAL RESULTS**

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<th>RESULT µg/L</th>
<th>NOTE</th>
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<td>1,2,3-Trichloropropene</td>
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<td>1,3,5-Trimethylbenzene</td>
<td>(108678)</td>
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<td>Vinyl chloride</td>
<td>(75014)</td>
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<td>(1330207)</td>
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<td>cis-1,3-Dichloropropene</td>
<td>(10061015)</td>
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<td>trans-1,3-Dichloropropene</td>
<td>(10061026)</td>
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Lab Certifications: CAELAP #1598; UTELAP #E-142; AZELAP #AZ0162; A2LA #0136-01; L.A.Co.CSD #10187

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06/02/95
DVI/08MAY05
DI/jgycmc(dw)/cxs
REPORT OF LABORATORY ANALYSIS

Southern California Laboratory
4765 Calle Quetzal, Camarillo, California 93012
(805) 389-1353
FAX (805) 389-1438

CLIENT: PACE, Incorporated

QC Batch ID: DVI-524-050895-A

Analyzed: 05/08/95
Analyzed by: CS
Method: EPA 524.2

QC SPIKE
REPORT OF ANALYTICAL RESULTS

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<th>RESULT</th>
<th>%REC</th>
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Lab Certifications: CAELAP #1598; UTELAP #E-142; AZELAP #AZ0162; A2LA #0136-01; L.A.Co.CSD #10187

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06/02/95
DVI/08MAY02
DI/jgymo (dw) /cws

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REPORT OF LABORATORY ANALYSIS

Southern California Laboratory
4765 Calle Quetzal, Camarillo, California 93012

QC Batch ID: DV1-524-050895-A

CLIENT: PACE, Incorporated

Analyzed: 05/08/95
Analyzed by: CS
Method: EPA 524.2

REPORT OF ANALYTICAL RESULTS

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<th>SPIKE AMOUNT</th>
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</table>

Lab Certifications: CAELAP #1598; UTELAP #S-142; AZELAP #AZ0162; AZLA #0136-01; L.A.CS #01187

*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit.

06/02/95
DV1/08MAY93
DI/jgycomp(dw)/cxs
DECLARATION OF EXISTING WATER WITHDRAWAL AND USE
Honolulu and Wai'aluas Ground Water Control Areas

Instructions: This form must be properly completed, signed, and submitted for each individual well or connected battery of wells on or before June 4, 1981, in accordance with Regulation 9 of the Department. Submit the form with any attachments to Department of Land and Natural Resources, P.O. Box 373, Honolulu, Hawaii 96809.

1. WATER USER: Name: ___________________________ Phone: ___________________________
   Directorate of Engineering and Housing
   Mailing address: US Army Support Command, Honolulu, Hawaii, Ft Shafter, HI 96858

2. WATER USER’S WELL(s) CONNECTED BATTERY OF WELLS: User’s Well Name and Location: Fort Shafter Wells
   Pump or natural flow capacity (gpm): 1250
   Year pump inst./modified: 1980
   Tax Map Key: 1-1-08-5

3. BENEFICIALLY USED WATER:
   (a) Major Use: ☐ Municipal ☐ Agriculture ☐ Military ☐ Industrial
       ☐ Domestic ☐ Other (specify) (specify)
   (b) Minor Uses: (specify)
   (c) For Agriculture Use: list crop(s) (specify), total acreage irrigated, and attach map showing acreage irrigated by the well source.

4. BENEFICIALLY USED WATER WITHDRAWALS:
   (a) All figures given in (b) are records of: ☐ Metered flow ☐ Nameplate pump capacity
       ☐ Flowmeter ☐ Orifice ☐ Weir ☐ Other (specify)
   (b) Records available (in million gallons per day, three decimal places):

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>May</td>
<td>33.750</td>
<td>35.025</td>
<td>26.400</td>
<td>29.625</td>
<td>30.000</td>
<td>25.800</td>
<td>30.100</td>
</tr>
<tr>
<td>June</td>
<td>56.625</td>
<td>38.700</td>
<td>29.400</td>
<td>31.725</td>
<td>26.100</td>
<td>25.725</td>
<td>34.712</td>
</tr>
<tr>
<td>July</td>
<td>51.300</td>
<td>48.600</td>
<td>39.750</td>
<td>37.500</td>
<td>32.175</td>
<td>26.475</td>
<td>39.300</td>
</tr>
<tr>
<td>Aug.</td>
<td>55.725</td>
<td>31.750</td>
<td>47.400</td>
<td>40.800</td>
<td>40.650</td>
<td>32.700</td>
<td>41.504</td>
</tr>
<tr>
<td>Sep.</td>
<td>50.325</td>
<td>46.875</td>
<td>27.975</td>
<td>35.625</td>
<td>37.200</td>
<td>43.225</td>
<td>40.204</td>
</tr>
<tr>
<td>Oct.</td>
<td>39.975</td>
<td>39.375</td>
<td>34.875</td>
<td>37.200</td>
<td>32.850</td>
<td>33.000</td>
<td>36.312</td>
</tr>
<tr>
<td>Nov.</td>
<td>32.625</td>
<td>34.800</td>
<td>28.275</td>
<td>28.125</td>
<td>27.975</td>
<td>31.050</td>
<td>30.475</td>
</tr>
<tr>
<td>Dec.</td>
<td>27.675</td>
<td>38.550</td>
<td>26.700</td>
<td>22.800</td>
<td>29.325</td>
<td>30.075</td>
<td>29.187</td>
</tr>
<tr>
<td>Yr. total</td>
<td>847.000</td>
<td>125.725</td>
<td>379.720</td>
<td>350.260</td>
<td>348.450</td>
<td>348.000</td>
<td></td>
</tr>
<tr>
<td>Mo. Ave</td>
<td>37.250</td>
<td>35.477</td>
<td>31.600</td>
<td>32.438</td>
<td>30.038</td>
<td>29.000</td>
<td></td>
</tr>
<tr>
<td>5-year average</td>
<td>34.990/kgm, highest day use 2.4 mgd on Jun 18/19, 1975.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(c) For Agriculture Use only: description of withdrawal schedule (include times of day and days of week):

5. WELL DESCRIPTION:
   On the attached sheet, make corrections or additions thereon in red pencil as necessary and return with Declaration form. If information is readily available in another form, you may submit it in lieu of the corrected sheet.

Declaration: Under penalties provided in Regulation 9 of the Department of Land and Natural Resources, the undersigned declare and certify that this declaration has been examined, including accompanying statements, and to the best of our knowledge and belief, it is true, correct, and complete.

ADOLPH A. HIGHT, COL, EN
Dir of Engineering & Housing

Landowner of Well Site: ___________________________ Date: ___________________________

For Official Use: Last day to certify: ___________________________ Amount certified: ___________________________ Date certified: ___________________________ WELL(S) No. ___________
**WELL INFORMATION SHEET**

Instructions: The following information is currently on file at the Department of Land and Natural Resources, Division of Water and Land Development. If there are any changes, please make the necessary corrections and return to the Department of Land and Natural Resources, P.O. Box 373, Honolulu, Hawaii 96809.

<table>
<thead>
<tr>
<th>Field</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well Number</td>
<td>2083-11</td>
</tr>
<tr>
<td>Name or Location</td>
<td>Ft. Shafter</td>
</tr>
<tr>
<td>Owner or User</td>
<td>U.S. Army</td>
</tr>
<tr>
<td>Year Drilled</td>
<td>1960</td>
</tr>
<tr>
<td>Driller</td>
<td>Nat Whiton</td>
</tr>
<tr>
<td>Ground Surface Elevation</td>
<td>21</td>
</tr>
<tr>
<td>Casing Diameter</td>
<td>12</td>
</tr>
<tr>
<td>Total depth of well</td>
<td>330</td>
</tr>
<tr>
<td>Casing depth</td>
<td>175</td>
</tr>
<tr>
<td>Major Use</td>
<td>Domestic</td>
</tr>
<tr>
<td>Static Water Level</td>
<td>23.8</td>
</tr>
<tr>
<td>Chloride content</td>
<td>64-110</td>
</tr>
<tr>
<td>Installed pump capacity</td>
<td></td>
</tr>
<tr>
<td>Average annual draft</td>
<td></td>
</tr>
</tbody>
</table>

---
WELL INFORMATION SHEET

Instructions: The following information is currently on file at the Department of Land and Natural Resources, Division of Water and Land Development. If there are any changes, please make the necessary corrections and return to the Department of Land and Natural Resources, P.O. Box 373, Honolulu, Hawaii 96809.

Well Number: 2053-10

Name or Location: Ft. Shafter

Owner or User: U.S. Army

Year drilled: 1914

Driller: McCandless

Ground Surface Elevation in feet referenced to mean sea level: 20

Casing Diameter in inches: 12

Total depth of well in feet: 279

Casing depth in feet: 169

Major Use: ✓ Domestic  □ Disposal

□ Municipal  □ Unused  □ Lost

□ Irrigation  □ Sealed  □ Recharge

□ Industrial  □ Observation  □ Other (specify)

Static Water Level in feet: 23.8

Chloride content of water in milligrams/liter: 69-161

Installed pump capacity in million gallons per day: 

Average annual draft in million gallons per day: 1.2
State of Hawaii
Department of Land and Natural Resources

DECLARATION OF EXISTING WATER WITHDRAWAL AND USE
Honolulu and Waialua Ground Water Control Areas

Instructions: This form must be properly completed, signed, and submitted for each individual well or connected battery of wells on or before June 4, 1981, in accordance with Regulation 9 of the Department. Submit the form with any attachments to Department of Land and Natural Resources, P.O. Box 373, Honolulu, Hawaii 96809.

1. WATER USER: Name: Director of Engineering and Housing
Mailing address: US Army Support Command, Hawaii, Fort Shafter HI 96858
Phone: 

2. WATER USER'S WELL # CONNECTED BATTERY OF WELLS:
User's Well Name and Location: Tripler Wells
Tax Map Key: 1-1-12-20
User's Well No. (s) Pump or natural flow capacity (gpm) Capacity determined by flowmeter, nameplate, orifice, etc. (specify) Year pump inst./modified

<table>
<thead>
<tr>
<th>No.</th>
<th>Capacity</th>
<th>Method</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>540</td>
<td>On Flowmeter</td>
<td>1945/1979</td>
</tr>
<tr>
<td>2</td>
<td>540</td>
<td>On Flowmeter</td>
<td>1945/1979</td>
</tr>
</tbody>
</table>

3. BENEFICIAL USE OF WATER:
(a) Major Use:
- [ ] Municipal
- [ ] Agriculture
- [ ] Military
- [ ] Industrial
- [ ] Domestic
- [ ] Other (specify)
(b) Minor Uses:
- [ ] (specify)
(c) For Agriculture Use list crop(s), total acreage irrigated, and attach map showing acreage irrigated by the well source.

4. BENEFICIALLY USED WATER WITHDRAWALS:
(a) All figures given in (b) are records of:
- [ ] Metered flow
- [ ] Nameplate pump capacity
- [ ] Orifice
- [ ] Weir
- [ ] Other (specify)
(b) Records available (in million gallons per day, three decimal places):

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
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<th></th>
<th></th>
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<tbody>
<tr>
<td>Nov.</td>
<td>16.660</td>
<td>20.046</td>
<td>27.378</td>
<td>22.004</td>
<td>11.622</td>
<td>15.210</td>
<td>18.820</td>
</tr>
<tr>
<td>Yr. total</td>
<td>214.741</td>
<td>217.520</td>
<td>321.126</td>
<td>271.266</td>
<td>172.716</td>
<td>172.145</td>
<td>214.458</td>
</tr>
</tbody>
</table>

5-year average: 0.669 mgd, highest day use 1.56 mgd on 10 Apr. 1978.

5. WELL DESCRIPTION:
On the attached sheet, make corrections or additions thereon in red pencil as necessary and return with Declaration form. If information is readily available in another form, you may submit it in lieu of the corrected sheet.

Declaration: Under penalties provided in Regulation 9 of the Department of Land and Natural Resources, the undersigned declare and certify that this declaration has been examined, including accompanying statements, and to the best of our knowledge and belief, it is true, correct, and complete.

Water User: ADOLPH A. HIGHT, COL, EN
Dir of Engineering & Housing

Landowner of Well Site:

Date: 2 Jan 81

For Official Use: Last day to certify
Amount certified

WELL(S) No. 2153-07-08
**WELL INFORMATION SHEET**

Instructions: The following information is currently on file at the Department of Land and Natural Resources, Division of Water and Land Development. If there are any changes, please make the necessary corrections and return to the Department of Land and Natural Resources, P.O. Box 373, Honolulu, Hawaii 96809.

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Well Number</td>
<td>2153-08</td>
</tr>
<tr>
<td>Name or Location</td>
<td>Moanalua</td>
</tr>
<tr>
<td>Owner or User</td>
<td>U.S. Army</td>
</tr>
<tr>
<td>Year drilled</td>
<td>1945</td>
</tr>
<tr>
<td>Driller</td>
<td>U.S. Army</td>
</tr>
<tr>
<td>Ground Surface Elevation</td>
<td>28</td>
</tr>
<tr>
<td>Casing Diameter</td>
<td>16</td>
</tr>
<tr>
<td>Total depth of well</td>
<td>306</td>
</tr>
<tr>
<td>Casing depth</td>
<td>97</td>
</tr>
<tr>
<td>Major Use</td>
<td>Military (specify)</td>
</tr>
<tr>
<td>Static Water Level in feet</td>
<td>23.8</td>
</tr>
<tr>
<td>Chloride content in mg/liter</td>
<td>68-69</td>
</tr>
<tr>
<td>Installed pump capacity</td>
<td></td>
</tr>
<tr>
<td>Average annual draft</td>
<td></td>
</tr>
</tbody>
</table>
WELL INFORMATION SHEET

Instructions: The following information is currently on file at the Department of Land and Natural Resources, Division of Water and Land Development. If there are any changes, please make the necessary corrections and return to the Department of Land and Natural Resources, P.O. Box 373, Honolulu, Hawaii 96809.

Well Number: 2193-07

Name or Location: Moanalua

Owner or User: U.S. Army

Year drilled: 1945

Driller: U.S. Army

Ground Surface Elevation in feet referenced to mean sea level: 28

Casing Diameter in inches: 16

Total depth of well in feet: 302

Casing depth in feet: 52

Major Use: ☑ Domestic ☐ Disposal

☐ Municipal ☐ Unused ☐ Lost

☐ Irrigation ☐ Sealed ☐ Recharge

☐ Industrial ☐ Observation ☐ Other (specify)

Static Water Level in feet: 20.0

Chloride content of water in milligrams/liter: 62-76

Installed pump capacity in million gallons per day: 

Average annual draft in million gallons per day: 0.6
March 16, 1981

Col. Adolph A. Hight
Director of Engineering & Housing
Department of the Army
Headquarters U.S. Army Support Command
Ft. Shafter, Hawaii 96858

On February 27, 1981, the Board of Land and Natural Resources designated the Honolulu and Waialua Districts as the Honolulu Ground Water Control Area and the Waialua Ground Water Control Area. By this action, the Department of Land and Natural Resources is now responsible for regulating all uses of ground water in these areas.

If you are currently using ground water from any well or spring source, you are required to declare such water use to the Department of Land and Natural Resources if you wish to continue your present use. Specifically, you must fill out, sign, and return the enclosed Declaration of Existing Water Withdrawal and Use form to the Department by June 4, 1981, in accordance with Regulation 9 of the Department of Land and Natural Resources.

According to our records, you have 6 well(s) located on your property (Tax Map Key ____________). Please complete the enclosed form and return it as soon as possible to: Department of Land and Natural Resources, P.O. Box 373, Honolulu, Hawaii 96809.

If you have any questions or need help in filling out the form, please call the Division of Water and Land Development at 548-7619. Thank you for your cooperation.

Very truly yours,

SUSUMU ONO
Chairman of the Board

Enc.
## WELL INFORMATION SHEET

Instructions: The following information is currently on file at the Department of Land and Natural Resources, Division of Water and Land Development. If there are any changes, please make the necessary corrections and return to the Department of Land and Natural Resources, P.O. Box 373, Honolulu, Hawaii 96809.

<table>
<thead>
<tr>
<th>Well Number</th>
<th>2093-11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name or Location</td>
<td>Ft. Shafter</td>
</tr>
<tr>
<td>Owner or User</td>
<td>U.S. Army</td>
</tr>
<tr>
<td>Year drilled</td>
<td>1960</td>
</tr>
<tr>
<td>Driller</td>
<td>Nat Whiton</td>
</tr>
<tr>
<td>Ground Surface Elevation in feet referenced to mean sea level</td>
<td>21</td>
</tr>
<tr>
<td>Casing Diameter in inches</td>
<td>12</td>
</tr>
<tr>
<td>Total depth of well in feet</td>
<td>330</td>
</tr>
<tr>
<td>Casing depth in feet</td>
<td>175</td>
</tr>
</tbody>
</table>

- **Major Use:**
  - ☑ Domestic
  - ☐ Municipal
  - ☐ Irrigation
  - ☐ Industrial
  - ☐ Observation
  - ☐ Other (specify)

- **Static Water Level in feet:** 22.8
- **Chloride content of water in milligrams/liter:** 64-110
- **Installed pump capacity in million gallons per day:**
- **Average annual draft in million gallons per day:**
The following additional information is forwarded for your possible use:

US ARMY HAWAI'I WATER SOURCES

ISLAND OF OAHU

1) Ft Shafter Mil Res:
   a) Active well - drilled 1914 - No. 146 (next to the pump house)
   b) Active well - drilled 1960 - No. 146-2 (located south of well 146 near the pump house)
   c) Inactive well - drilled 1945 - No. 146-1 (located in tunnel)

2) Tripler Army Hospital:
   a) Active well - drilled Jan 1945 - No. 154-1A
   b) Inactive well - drilled Apr 1945 - No. 154-1B (Well put out of service until well casing is repaired)

3) Aliamanu Mil Res:
   a) Active well - drilled 1941 - No. 160 (2155-04.

4) Schofield Barracks Mil Res:
   a) Four (4) active wells in one shaft - shaft No. 4

5) Other Installations: Water is purchased from the C&C of Hon - EWS; Oahu Sugar Co; Mokuleia Ranch & Land Co; Kahuku Sugar Co.

COPY RECEIVED BY DEPT. OF THE ARMY, HEADQUARTERS UNITED STATES ARMY, HAWAII, (Marked May 19, 1967)
# Pump Replacement for Well No. 2053-11

1. **Pump Tests Check** Kevin Gooding (initial)

   - Current Well Transmissivity in database? Yes No
   - Current Well Specific Capacity in database?
   - ft\(^2\)/day
   - gpm/ft of drawdown

   **Step-Drawdown Test:**
   - followed WCPI Stds
   - analysis attached
   - proposed pump cap o.k.

   **Aquifer Pump Test:**
   - followed WCPI Stds
   - T & S analysis attached

   **Well Interference:**
   - estimated Steady-State drawdown at 1-mile radius is ft.
   - analysis attached

   **Stream Surface Water Impacted:**
   - If yes, identify most probable stream

   **Geology Code for Well Index:**

2. **Pump Installation Check** Mitch Ohye (initial)

   - data complete
   - followed Special Cond & Elev.
   - well database updated

3. **Charley/Lenore/Ryan** (initial) take action based on above analysis

   **ATTACHMENTS FOR ACCEPTANCE:**
   - 1WCR2 ACCEPTANCE LETTER
   - 2PUMP INST. COMPLETION CERTIFICATE
   - 3METER INSTALL. REPORT (if necessary)
   - 4WUR FORM (if necessary)
   - 5USGS MAP UPDATED
   - 6PARCEL CHECK
   - 7WELL DATABASE INPUT CHECK
   - 8GLEN'S PUMP TEST WORKSHEET
   - 9PUMP As-Built CHECK PRINT

   - To be sent to driller
   - To be sent to landowner/operator

   **Staff internal checks**

4. Roy (initial) check (Entered PICC accept date into database)

5. Susan (initial) finalize

6. Charley/Lenore/Ryan File
February 26, 2007

Mr. Dwight Ho  
Beylik Drilling & Pump Service, Inc.  
91-259A Olai St.  
Kapolei, HI 96707

Dear Mr. Ho:

Well Completion Report Part II for Well No. 2053-11

Thank you for submitting the additional information to complete the subject report, which we received on November 30, 2006. We have accepted the subject report as complete as of that date.

If you have any questions, please contact Lenore Nakama of the Commission staff at 587-0218.

Sincerely,

W. ROY HARDY  
Hydrologic Program Manager

LN:ss

c: U.S. Army Directorate of Public Works, (APVG-GWE-D)
February 26, 2007

U.S. Army Directorate of Public Works
(APVG-GWE-D)
Bldg. 113 Wheeler Army Airfield
Schofield Barracks, HI 96857
Attn: Mr. Jon Morisato

Dear Mr. Morisato:

Certificate of Pump Installation Completion for Well No. 2053-11

We are pleased to inform you that the pump replacement work for the Fort Shafter Well No. 2 Well (Well No. 2053-11) is complete and acceptable.

To protect Hawaii’s natural ground water resources for the benefit of all, the following requirements apply to the use of your well:

1. If the well is not in use it must be properly capped.

2. If the well is to be abandoned then the landowner must cause a licensed contractor to apply for a well abandonment permit in accordance with §13-168-12(f) prior to any well sealing or plugging work.

3. In the event that the well operator and/or landowner changes, the Commission shall be notified of the change prior to the change, and all forms shall be transferred to the new owner.

4. In the event the benchmark in the concrete base of the well is altered in any way, an updated elevation survey (page 5 of the Well Completion Report Part I) shall be submitted to the Commission. The Well Completion Report Part I can be obtained by contacting staff or at www.hawaii.gov/dlnr/cwrmlforms.htm.

5. Your approved pump has a capacity of 1,100 gpm at a head of 220 ft. In the future, pump replacements of equal or lesser capacity will not require an additional permit from the Commission, but will require the submission of a Well Completion Report Part II by the licensed pump installer. If the pump replacement is greater than the existing pump, you will need to apply for a new pump installation permit.
6. The landowner shall cause the well operator to maintain the installed meter or other appropriate means for measuring and reporting withdrawals and water levels, and appropriate devices or means for measuring chlorides and temperature. These data shall be measured monthly and reported to the Commission on a monthly basis, on forms provided by the Chairperson (attached), in accordance with §13-168-7, HAR.

7. The proposed use shall not adversely affect existing or future legal uses of water in the area, including any surface water or established instream flow standards. The authorization to drill a well and/or install a pump shall not constitute a determination of correlative water rights. The landowner and well operator are notified that the quantity of water taken from the well and/or the pump capacity could be reduced by the Commission in the future.

8. In the event that your installed pump is less than 70 gallons per minute, and no elevation survey has been completed, you may be required to do one in the future.

Because groundwater in Hawaii is a public trust, and adverse effects at one well may affect other water resources, any violation of the above conditions, or any other provision of the Hawaii Administrative Rules, may be subject to fines of up to $5,000/day. The Commission needs your help and asks that you do your part in utilizing this shared resource. We prefer to work with you in meeting the goal of protecting our ground water resources together.

If you have any questions, please contact Lenore Nakama of the Commission staff at 587-0218.

Sincerely,

W. ROY HARDY
Hydrologic Program Manager

LN:ss
Encl: Water Use Report Forms

c: Honolulu Board of Water Supply
Dwight Ho, Beylik Drilling and Pump Service, Inc.
TO

COMMISSION ON WATER RESOURCE MANAGEMENT

PO BOX 621

HONOLULU, HI 96809

WE ARE Sending YOU ☑ Attached ☐ Under separate cover via __________________ the following items:

- Shop drawings
- Copy of letter
- Change order
- Prints
- Plans
- Change order
- Samples
- Specifications
- Flowmeter Information

<table>
<thead>
<tr>
<th>COPIES</th>
<th>DATE</th>
<th>NO.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>11/29/06</td>
<td></td>
<td>FLOWMETER INFORMATION</td>
</tr>
</tbody>
</table>

THESE ARE TRANSMITTED as checked below:

☐ For approval ☐ Approved as submitted ☐ Resubmit ______ copies for approval

☐ For your use ☐ Approved as noted ☐ Submit ______ copies for distribution

☐ As requested ☐ Returned for corrections ☐ Return ______ corrected prints

☐ FOR BIDS DUE _____________________________ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS_________________________________________________________

COPY TO_ 1450T / C FILE_________________________________________

SIGNED: _____________________________

If enclosures are not as noted, kindly notify us at once. FOR: TONI GONZALEZ
November 13, 2006

Mr. Dwight Ho  
Beylik Drilling & Pump Service, Inc.  
91-259A Olai St.  
Kapolei, HI 96707

Dear Mr. Ho:

Well Completion Report Part II for Well No. 2053-11

Thank you for submitting a Well Completion Report Part II for the pump replacement in the Fort Shafter Well No. 2 (Well No. 2053-11). However, matters which must be addressed before we accept your report as complete are as follows:

1. Please identify the Manufacturer and Model No. for the installed flowmeter.

2. Please provide a photograph showing the installed flowmeter.

Until these matters are addressed, we cannot issue the certificate(s) of well construction completion and/or pump installation completion that transfer(s) responsibility of all aspects of well usage and maintenance to the well operator/landowner. Please remember that the well may not be pumped for purposes other than well and aquifer testing until the certificates of 1) well construction completion and 2) pump installation completion have been issued, otherwise such pumpage would constitute a violation of the permit conditions. Since the permit is issued to the contractor, the contractor will be responsible for any non-testing pumpage violations when the certificates of completion have not been issued (where pumping tests are as defined in the Hawaii Well Construction and Pump Installation Standards). Please respond to the above item(s) within thirty (30) days of this letter's date. Failure to do so may result in fines of up to $5,000 per day.

If you have any questions, please contact Lenore Nakama of the Commission staff at 587-0218.

Sincerely,

[Signature]

Acting Deputy Director

LN:ss
1. State Well No.: 2053-11  
Well Name: Fort Shafter, Bldg 509 (Pump #1)  
Island: Oahu

2. Address: Fort Shafter  
Tax Map Key: 1-1-8:5


4. Date Pump Installed: 10/14/2006

5. PERMANENT PUMP INFORMATION

   Pump Type, Make, Serial No.: Vertical Line shaft, Goulds, 518920
   Rated Capacity: 1100 gpm at head of: 220 ft.
   Motor Type, H.P., Voltage, rpm: VHS, 75 HP, 460V, 1770 RPM
   Pump type (check one):
   [ ] Deep Well Turbine  [ ] Rotary  [ ] Propeller
   [ ] Submersible  [ ] Rotary-Displacement  [ ] Reciprocating
   [ ] Centrifugal  [ ] Rotary-Gear  [ ] Impulse

6. Method of flow measurement:
   [ ] Flowmeter Manufacturer McCrometer
   [ ] Weir  [ ] Open Pipe  [ ] Orifice  [ ] Other*, explain below
   Manufacturer Ultra Mag Model no. UM0412 Size 12"

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

8. Attach the rating curve for the installed pump.

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

10. Other remarks/comments:
   See Attached Photos.

Pump Installation Contractor (print) Beylik Drilling & Pump Svc Inc  
C-57/C-57a/A Lic. No. AC-21896

Signature Dwight Ho, Vice President  
Date 10/14/2006

WCR2 Form 2/23/06 Page 1 of 2
Mr. Dwight Ho  
Beylik Drilling & Pump Service, Inc.  
91-259A Olai St.  
Kapolei, HI 96707

Dear Mr. Ho:

Well Completion Report Part II for Well No. 2053-11

Thank you for submitting a Well Completion Report Part II for the pump replacement in the Fort Shafter Well No. 2 (Well No. 2053-11). However, matters which must be addressed before we accept your report as complete are as follows:

1. Please identify the Manufacturer and Model No. for the installed flowmeter.

2. Please provide a photograph showing the installed flowmeter.

Until these matters are addressed, we cannot issue the certificate(s) of well construction completion and/or pump installation completion that transfer(s) responsibility of all aspects of well usage and maintenance to the well operator/landowner. Please remember that the well may not be pumped for purposes other than well and aquifer testing until the certificates of 1) well construction completion and 2) pump installation completion have been issued, otherwise such pumpage would constitute a violation of the permit conditions. Since the permit is issued to the contractor, the contractor will be responsible for any non-testing pumpage violations when the certificates of completion have not been issued (where pumping tests are as defined in the Hawaii Well Construction and Pump Installation Standards). Please respond to the above item(s) within thirty (30) days of this letter's date. Failure to do so may result in fines of up to $5,000 per day.

If you have any questions, please contact Lenore Nakama of the Commission staff at 587-0218.

Sincerely,

[Signature]

Acting Deputy Director

LN:ss
1. State Well No.: 2053-11  
   Well Name: Fort Shafter, Bldg 509 (Pump #2)  
   Island: Oahu

2. Address: Fort Shafter  
   Tax Map Key: 1-1-8-5


4. Date Pump Installed: 10/14/2006

5. PERMANENT PUMP INFORMATION
   - Pump Type, Make, Serial No.: Vertical Lineshaft, Goulds, 518920
   - Rated Capacity: 1100 gpm at head of: 220 ft.
   - Motor Type, H.P., Voltage, rpm: VHS, 75 HP, 460V, 1770 RPM
   - Pump type (check one):
     - [✓] Deep Well Turbine
     - [ ] Rotary
     - [ ] Rotary-Displacement
     - [ ] Propeller
     - [ ] Reciprocating
     - [ ] Rotary-Gear
     - [ ] Impulse
   - Method of flow measurement:
     - [✓] Flowmeter  
       Manufacturer: [U]  
       Model no.: U04H0  
       Size: 12"
     - [ ] Weir  
     - [ ] Open Pipe  
     - [ ] Orifice*  
     - [ ] Other*, explain below
       *attach schematic

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

7. Attach the rating curve for the installed pump.

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

9. Other remarks/comments:
   See Attached Photos.

Pump Installation Contractor (print): Beylik Drilling & Pump Svc Inc  
C-57/C-57a/A  
Lic. No.: AC-21896

Signature: [Signature]  
Dwight Ho, Vice President  
Date: 10/14/2006
7. AS-BUILT POP SECTION (Please attach as-built if different from ram provided below)

3-2093-11 FL. SHALLOW

Ground
Bench mark elevation
surveyed to nearest 0.01 ft. = 27.14 ft. mean sea level

Elevation of top of chase tube
N/A ft. mean sea level

Pump intake depth = 26.08 ft.
(referenced to bench mark)

Chase tube depth = N/A ft.
(referenced to bench mark)

If airline installed,
bottom of airline elevation = _11_ ft. mean sea level
Pump:
Size: 11CHC (4 stages)
Type: Lineshaft
Synch speed: 1800 rpm
Curves: E3141-2
Specific Speeds:
Dia: 8.0625 in
N: 2130
Pump Notes for Standard Sizes:
Suction Size-8" Discharge Sizes-6",8"
Vertical Turbine:
Bowl size: 11 in
Max lateral: 0.75 in
Thrust K factor: 7 lb/ft
Pump Limits for Standard Construction:
Temperature: 120 °F
Pressure: 380 psi g

Search Criteria:
Flow: 1100 US gpm
Head: 219 ft
Fluid:
Water
SG: 1
Viscosity: 1.105 cP
NPSHa: — ft
Motor:
Standard: NEMA
Size: 100 hp
Speed: 1800
Sizing criteria: Max Power on Design Curve

--- Data Point ---
Flow: 1100 US gpm
Head: 224 ft
Eff: 82.9%
Power: 74.8 hp
NPSHr: 15.9 ft

- Design Curve -
Shutoff Head: 320 ft
Shutoff dp: 138 psi
Min Flow: — US gpm
BEP: 86.1% eff
@ 849 US gpm
NOL Pwr: 76.6 hp
@ 1290 US gpm

- Max Curve -
Max Pwr: 78.6 hp
@ 1300 US gpm

Performance Evaluation:

<table>
<thead>
<tr>
<th>Flow US gpm</th>
<th>Speed rpm</th>
<th>Head ft</th>
<th>Pump %eff</th>
<th>Power hp</th>
<th>Power ft</th>
<th>NPSHr ft</th>
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<td>1320</td>
<td>1770</td>
<td>168</td>
<td>73</td>
<td>76.5</td>
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<td>1100</td>
<td>1770</td>
<td>224</td>
<td>82.9</td>
<td>74.8</td>
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<td>880</td>
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<td>58.3</td>
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<td>1770</td>
<td>303</td>
<td>71.4</td>
<td>46.9</td>
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Turbine Pump Selection 2004e
Selected from catalog: Goulds Lineshaft 60HZ Vers: 3.03
TO
COMMISSION ON WATER RESOURCE MGMT

PO BOX 621
HONOLULU, HI 96809

WE ARE SENDING YOU ☑ Attached ☐ Under separate cover via __________________ the following items:

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications
☐ Copy of letter ☐ Change order ☐

<table>
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<tr>
<th>COPIES</th>
<th>DATE</th>
<th>NO.</th>
<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>1</td>
<td>10/14/06</td>
<td>WELL COMPLETION REPORT FOR FORT SHAFTER (2053-11)</td>
<td></td>
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</table>

THESE ARE TRANSMITTED as checked below:

☑ For approval ☐ Approved as submitted ☐ Resubmit ______ copies for approval
☐ For your use ☐ Approved as noted ☐ Submit ______ copies for distribution
☐ As requested ☐ Returned for corrections ☐ Return ______ corrected prints
☐ For review and comment ☐ _____________________________ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS

COPY TO 1450T / C FILE

SIGNED:

If enclosures are not as noted, kindly notify us at once. FOR: TONI GONSALVES
Method of flow measurement:
- □ Flowmeter
- □ Weir
- □ Open Pipe
- □ Orifice
- □ Other, explain below

Manufacturer: Bristol Babcock
Model no.: 250315B-235-212-010-100
Size: 12" **

Remarks/comments:

Ft. Shafter Water Plant Bldg. 509
Well No. 2053-10, 2053-10
BRISTOL BABCOCK SIGNAL TRANSMITTER

Landowner (print): ____________________________
Signature: ____________________________ Date: _______________________
State of Hawaii
COMMISSION ON WATER RESOURCE MANAGEMENT
Department of Land and Natural Resources
WATER METER INSTALLATION REPORT

Method of flow measurement:

- Flowmeter Manufacturer: ULTRA MAG
  Model no.: UM02-12
  Size: 12 in.

- Weir
- Open Pipe
- Orifice
- Other, explain below

Remarks/comments:
Ft. Shafter Water Plant, Bldg. 509
Well No. 20A-11
2053-11

Landowner (print) ____________________________
Signature ____________________________ Date ____________

Water Meter Report 4/29/2005
U.S. Army Directorate of Public Works  
(APVG-GWE-D)  
Bldg. 113 Wheeler Army Airfield  
Schofield Barracks, HI 96857  

ATTN: Mr. Jon Morisato

Dear Mr. Morisato:

Well Completion Report for Well No. 2053-13

We have received your Well Completion Report Part II for the Fort Shafter Well (Well No. 2053-13) and acknowledge that it is complete. Thank you for attention to this matter.

If you have any questions, please contact Lenore Nakama of the Commission staff at 587-0218.

Sincerely,

LINNEL T. NISHIOKA  
Deputy Director

LN:ss
PART II.  PERMANENT PUMP INSTALLATION REPORT

20. Pump Installation Company: Roscoe Moss Hawaii, Inc.
21. Name of person performing work: Clayton Terasaki
22. Date Pump Installation Completed: July 1, 1997
23. PUMP INSTALLATION:
   Pump Type, Make, Serial No.: Lineshaft/Layne/905-04287  
   Capacity: 1100 gpm
   Motor type, H.P., Voltage, rpm: Vertical/100/460/1800
   Depth of Pump Intake Setting: 67'-1" ft. below Pump Base, which elevation is +26.73 ft.
   Depth to bottom of airline 67'-1" ft. below Pump Base, which elevation is +26.73 ft.
   Pumping Head is 250 ft. Type of flow meter:  which measures in

24. As-built drawings attached attached? Yes  No
25. Other remarks/comments: (See below)

Pump Installation Contractor (print): Roscoe Moss Hawaii, Inc. C-57 Lic. No. AC-16437
Signature  William C. Moore, President/ESK  Date 10/10/97
Applicant (print): Jon M. Morisato
Signature  Date 1/8/00

8.(cont'd)  DRILLER'S LOG (cont'd):

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<tr>
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<th>Rock Description, Remarks,</th>
<th>Water Level Dates (ft.)</th>
<th>Depth (ft.)</th>
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PUMP INSTALLATION PERMIT

Fort Shafter Well, Well No. 2053-13

In accordance with Department of Land and Natural Resources, Commission on Water Resource Management's Administrative Rules, Section 13-168, entitled "Water Use, Wells, and Stream Diversion Works", this document permits the pump installation for Fort Shafter Well (Well No. 2053-13) at Fort Shafter, Oahu, TMK 1-1-8:14, subject to the following conditions:

STANDARD PERMIT CONDITIONS

1. The Commission on Water Resource Management, P.O. Box 621, Honolulu, HI 96809, shall be notified, in writing, at least two (2) weeks before any work covered by this permit commences.

2. The pump installation permit shall be for installation of a 1100 gpm capacity, or less, pump in the well.

3. The permittee shall provide and maintain an approved meter or other appropriate means for measuring and reporting withdrawals and water levels, and appropriate devices or means for measuring chlorides and temperature. These data shall be measured monthly and reported to the Commission on a monthly basis, on forms provided by the Commission (attached).

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

5. The applicant shall complete and submit as-built drawings and Part II - (Permanent) Pump Installation Report of the Well Completion Report (attached) to the Commission within thirty (30) days after completion of work.

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

7. The pump installation permit application and staff submittal approved by the Commission at its March 1, 1996 meeting are incorporated into the permit by reference.

8. The permit may be revoked if work is not started within six (6) months after the date of approval or if work is suspended or abandoned for six (6) months, unless otherwise specified. The work proposed in the well construction permit application 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 a 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.

9. If the well is not to be used it must be properly capped. If the well is to be abandoned then the applicant must apply for a well abandonment permit in accordance with §13-168-12(f) prior to any well sealing or plugging work.

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

Date of Approval: 5/9/96
Expiration Date: 5/9/98

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: [Signature]
Date: 1/27/99

Printed Name: [Printed Name]
Firm or Title: [Firm or Title]

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

Attachment

USGS
Department of Health/ Safe Drinking Water & Wastewater Branches
Honolulu Board of Water Supply
Mr. T. Kishimori  
DPW, USAG-HI  
Attn: APVG-GWC-T  
Schofield Barracks, Hawaii 96857

Dear Mr. Kishimori:

Pump Installation Permit  
Fort Shafter (Well No. 2053-13)

Enclosed are two (2) copies of your approved Pump Installation Permit for the captioned well(s).

Please sign the permit copies and return one for our files. Also, copies of the well completion report and water use report forms are enclosed for your use.

If you have any questions, please call Rae M. Loui, Deputy Director, at 587-0278 or 1-800-468-4644 extension 70214.

Aloha,

MICHAEL D. WILSON  
Chairperson

Enclosures
Dear Mr. Kishimori:

Notice of Expiration of Pump Installation Permit and Well Completion Report Part I for Fort Shafter Well (Well No. 2053-13)

This is to notify you of the expiration of the pump installation permit for Well No. 2053-13 on May 9, 1998. If a pump was installed in the well, please submit an as-built drawing of the installed pump and complete and return the attached Well Completion Report Part II per Standard Permit Condition 5. Please also return a validated copy of the permit (copy enclosed). If no work was performed under the permit, we would appreciate notification in writing, by telephone (587-0218), or by email (www.hawaii.gov/dlnr/dwrm/dwrm.html).

We also request that you submit an elevation (referenced to mean sea level) survey for Well No. 2053-13 to be in compliance with Standard Permit Condition 5.b.

The permit states that the information requested above should be submitted within thirty (30) days after completion of the work. As that deadline has since passed, please submit the information within the next thirty (30) days. Please be advised that failure to comply with the terms and conditions of the permits may result in daily fines of up to $1,000.

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

Sincerely,

LINNEL T. NISHIOKA
Deputy Director

LN:ss
Attachments
Mr. Tracy Runnels  
Roscoe Moss Hawaii, Inc.  
91-259A Olai Street  
Kapolei, HI 96707

Dear Mr. Runnels:

Well Completion Report of Well No. 2053-13

Thank you for your letter of September 26, 1996 and a corrected copy of the pump test data. We appreciate your cooperation and assistance in clarifying the pump test results for our record.

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

Sincerely,

[Signature]

RAE M. LOUI  
Deputy Director

LN:ss
Mr. Tracy Runnels
Roscoe Moss Hawaii, Inc.
91-259A Olai Street
Ewa Beach, HI 96707

Dear Mr. Runnels:

Well Completion Report for Well No. 2053-13

We have received the well completion report for the Fort Shafter Well (Well No. 2053-13).

The pump test data that were submitted with your report show the chloride concentration was 19 ppm on 5/4/95 (at a pumping rate of 1100 gpm). A Report of Analytical Results by AECOS, included in the Preliminary Engineering Report For New Potable Water Source (Pre-Final 12/12/95), shows the chloride concentration is 115 mg/L (Analysis Date: 5/04/95). We have attached a copy of the AECOS test report and Roscoe Moss pump test data sheet.

We are concerned about the discrepancy in the two reports (19 ppm vs. 115 mg/L). Before we accept your report as complete, we request that you:

1. Recheck the pump test data and confirm the chloride and conductivity figures.
2. Provide an elevation (referenced to mean sea level, msl) survey by a Hawaii-licensed surveyor.

We request your written response within thirty (30) days from the date of this letter.

If you have any questions, please contact Lenore Nakama of the Commission staff at 587-0218.

Sincerely,

RAE M. LOUI
Deputy Director

LN:ss
Attachments

c: U.S. Army
Thank you for the opportunity to review the subject document. Our comments related to water resources are marked below.

In general, the CWRM strongly promotes the efficient use of our water resources through conservation measures and use of alternative non-potable water resources whenever available, feasible, and there are no harmful effects to the ecosystem. Also, the CWRM encourages the protection of water recharge areas which are important for the maintenance of streams and the replenishment of aquifers.

[ ] We recommend coordination with the county government to incorporate this project into the county’s Water Use and Development Plan.

[ ] We are concerned about the potential for ground or surface water degradation/contamination and recommend that approvals for this project be conditioned upon a review by the State Department of Health and the developer’s acceptance of any resulting requirements related to water quality.

[ ] A Well Construction Permit and a Pump Installation Permit from the CWRM would be required before ground water is developed as a source of supply for the project.

[ ] The proposed water supply source for the project is located in a designated water management area, and a Water Use Permit from the CWRM would be required prior to use of this source.

[ ] Groundwater withdrawals from this project may affect streamflows. This may require an instream flow standard amendment.

[ ] We recommend that no development take place affecting highly erodible slopes which drain into streams within or adjacent to the project.

[ ] If the proposed project diverts additional water from streams or if new or modified stream diversions are planned, the project may need to obtain a stream diversion works permit and petition to amend the interim instream flow standard for the affected stream(s).

[ ] Based on the information provided, it appears that a Stream Channel Alteration Permit pursuant to Section 13-169-50, HAR will be required before the project can be implemented.

[ ] Based on the information provided, it does not appear that a Stream Channel Alteration Permit pursuant to Section 13-169-50, HAR will be required before the project can be implemented.

[ ] An amendment to the instream flow standard from the CWRM would be required before any streamwater is diverted.

[ ] Any new development that is permitted along a stream that is not yet channelized should be based on the express condition that no streams will be channelized to prevent flooding of the development. Development in the open floodplain should not be allowed; other economic uses of the floodplain should be encouraged.

[ X ] OTHER:

Thank you for sending us the subject report and for the opportunity to provide comments. Well construction, pump installation, and water use permits for this source have been approved by the Commission on Water Resource Management. Copies of the well construction and pump installation permits, including any conditions attached to the permits, have been sent to the Department of Health Safe Drinking Water & Wastewater Branches.

We note that there is a discrepancy in the chloride concentrations reported by Roscoe Moss Hawaii, Inc., the well drilling contractor, and the AECOS Report of Analytical Results, which is included in the subject report (19 ppm vs. 115 mg/L). We are following up with the well drilling contractor to resolve this discrepancy.

We find the Department of Health’s Engineering Reports for New Potable Water Sources contain valuable information. We will be retaining the engineering report for our files. We had previously requested that the Department of Health provide to the Commission any extra copies of engineering reports for other potable water sources in the state. We would like to take this opportunity to resubmit our request.

If there are any questions, please contact Lenore Nakama at 587-0218.
COMMISSION ON WATER RESOURCE MANAGEMENT
(6/96)

FROM: [Name]  DATE: 8/28  SUSPENSE DATE

TO:  INIT.  TO:  INIT.
1 BAUER, G.  ______  LOUI, R.  ______
2 CHING, F.  ______  NAKAMA, L.  ______
3 FUJII, N.  ______  NAKANO, D.  ______
X HARDY, R.  ______  OHYE, M.  ______
4 HIGA, D.  ______  SAKODA, E.  ______
5 HIRANO, E.  ______  SUBIA, S.  ______
6 ICE, C.  ______  SWANSON, S.  ______
7 JINNAI, R.  ______  UWAIN, J.  ______
8 KUNIMURA, I.  ______  YODA, K.  ______

PLEASE:
____ Approval  ____ Review & Comment
____ Signature  ____ Take Action
____ Information  ____ Type Draft
____ See Me  ____ Type Final
____ Review & Comment  ____ Xerox ___ copies
____ Take Action  ____ File
____ Information  ____ Xerox ___ copies

Anything different than WCR info?

KLC  LONG TERM PUMP TEST  5/2-4/95  0 1100 GPM
CHLORINE  (19 PPM)

ALCOHOL REPEL  - CHLORINE (113 ml)

Also, no survey (EL.)

Xerox copies to both reports. Please send.
The Honorable Michael D. Wilson
Chairman of the Board
Department of Land and Natural Resources
1151 Punchbowl Street
Honolulu, HI 96813

Attn: Rae Loui, Deputy Director for Water Resource Management

Dear Mr. Wilson:

SUBJECT: PROPOSED SOURCE OF POTABLE WATER

Enclosed for your review and comments is a copy of the engineering report for the following source:

Fort Shafter Well
State Well No. 3-2053-13
Honolulu, Oahu

This report has been prepared pursuant to Hawaii Administrative Rules, Title 11, Chapter 20, Rules Relating to Potable Water Systems, section 11-20-29.

The Department of Health will use your comments in determining the potential impacts which may result by the proposed project.

Please submit your comments to the Safe Drinking Water Branch within 30 days from the date of this letter. You may also return the engineering report to this office if you do not need it for future reference.

If you should have any questions, please call the Safe Drinking Water Branch, Engineering Section, at 586-4258.

Sincerely,

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

Enclosure
Mr. T. Kishimori  
DPW, USAG-HI  
Attn: APVG-GWC-T  
Schofield Barracks, Hawaii 96857

Dear Mr. Kishimori:

Pump Installation Permit  
Fort Shafter (Well No. 2053-13)

Enclosed are two (2) copies of your approved Pump Installation Permit for the captioned well(s).

Please sign the permit copies and return one for our files. Also, copies of the well completion report and water use report forms are enclosed for your use.

If you have any questions, please call Rae M. Loui, Deputy Director, at 587-0214 or 1-800-468-4644 extension 70214.

Aloha,

MICHAEL D. WILSON  
Chairperson

Enclosures
PUMP INSTALLATION PERMIT

Fort Shafter Well, Well No. 2053-13

In accordance with Department of Land and Natural Resources, Commission on Water Resource Management's Administrative Rules, Section 13-168, entitled "Water Use, Wells, and Stream Diversion Works," this document permits the pump installation for Fort Shafter Well (Well No. 2053-13) at Fort Shafter, Oahu, TMK 1-1-8:14, subject to the following conditions:

STANDARD PERMIT CONDITIONS

1. The Commission on Water Resource Management, P.O. Box 621, Honolulu, HI 96809, shall be notified, in writing, at least two (2) weeks before any work covered by this permit commences.

2. The pump installation permit shall be for installation of a 1100 gpm capacity, or less, pump in the well.

3. The permittee shall provide and maintain an approved meter or other appropriate means for measuring and reporting withdrawals and water levels, and appropriate devices or means for measuring chlorides and temperature. These data shall be measured monthly and reported to the Commission on a monthly basis, on forms provided by the Commission (attached).

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

5. The applicant shall complete and submit as-built drawings and Part II - (Permanent) Pump Installation Report of the Well Completion Report (attached) to the Commission within thirty (30) days after completion of work.

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

7. The pump installation permit application and staff submittal approved by the Commission at its March 1, 1995 meeting are incorporated into the permit by reference.

8. The permit may be revoked if work is not started within six (6) months after the date of approval or if work is suspended or abandoned for six (6) months, unless otherwise specified. The work proposed in the well construction permit application 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 a 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.

9. If the well is not to be used it must be properly capped. If the well is to be abandoned then the applicant must apply for a well abandonment permit in accordance with §13-168-12(f) prior to any well sealing or plugging work.

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

MICHAEL D. WILSON, Chairperson
Commission on Water Resource Management

Date of Approval: 5/9/96
Expiration Date: 5/9/98

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

Attachment
cc: USGS
Department of Health/ Safe Drinking Water & Wastewater Branches
Honolulu Board of Water Supply
WELL COMPLETION REPORT

Instructions: Please print or type and submit completed report within 30 days after well completion. Failure to submit this report will result in remittance of $50 per day, prorated in 25-day periods, for each day this report is not received. Failure to submit the report may result in denial of reimbursement for drilled wells. For assistance, call the Commission Regulation Branch at 808-587-0225.

1. STATE WELL NO. 2053-13
2. LOCATION: Address: END OF I PLACE FORT SHAFTER
3. DRILLING OR PUMP INSTALLATION CONTRACTOR: ROSCOE MOSS HAWAII, INC.
4. CONTRACTOR’S C-57 LICENSE NUMBER: C-16437
5. NAME OF DRILLER WHO PERFORMED WORK: RODNEY COUCH
6. TYPE OF RIG/CONSTRUCTION: 2BL CABLE TOOL
7. DATE OF WELL DRILLING COMPLETION: 5/19/95

(Note: Report must be submitted within 30 days after this date)

8. GROUND ELEVATION (msl) 19.6 ft.

9. DRILLER’S LOG:

<table>
<thead>
<tr>
<th>Depth</th>
<th>Rock Description, Remarks</th>
<th>Date/Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-4</td>
<td>RED DIRT</td>
<td></td>
</tr>
<tr>
<td>4-12</td>
<td>RED CLAY</td>
<td></td>
</tr>
<tr>
<td>12-30</td>
<td>RIVER GRAY &amp; BOULDERS</td>
<td></td>
</tr>
<tr>
<td>30-45</td>
<td>GREY GRAVEL &amp; BOULDERS</td>
<td></td>
</tr>
<tr>
<td>45-113</td>
<td>BROWN CLAY</td>
<td></td>
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</tbody>
</table>

Water Level

<table>
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<th>Depth</th>
<th>Rock Description, Remarks</th>
<th>Date/Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-113</td>
<td>GREY LAVA SOLID</td>
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<td>12-140</td>
<td>BROWN CLAY</td>
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</tr>
<tr>
<td>140-180</td>
<td>LAVA LAVA STRINGERS</td>
<td></td>
</tr>
<tr>
<td>180-205</td>
<td>CLAY &amp; BOULDERS</td>
<td></td>
</tr>
<tr>
<td>205-220</td>
<td>BROWN CLAY</td>
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</tr>
</tbody>
</table>

10. TOTAL DEPTH OF WELL BELOW GROUND: 290 ft.

11. HOLE SIZE: 20 inch dia. from 0 ft. to 180 ft. below ground

12. CASING INSTALLED:

<table>
<thead>
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<th>Depth</th>
<th>CASING INSTALLATION</th>
<th>Date/Time</th>
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<tbody>
<tr>
<td>15.25</td>
<td>15 in. I.D. x .375 in. wall solid section to 180 ft. below ground</td>
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</tr>
<tr>
<td>28</td>
<td>15 in. I.D. x .375 in. wall perforated section to 180 ft. below ground</td>
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Type of Perforation: 

13. ANNULUS:

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<th>Date/Time</th>
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<tr>
<td>28</td>
<td>15 in. I.D. x .375 in. wall perforated section to 180 ft. below ground</td>
<td></td>
</tr>
</tbody>
</table>

14. INITIAL WATER LEVEL: .15 ft. above ground. Date and time of measurement 4/27/95 7:30 A

15. INITIAL CHLORIDE: 19 ppm Date and time of sampling 5/4/95 8:30 A

16. INITIAL TEMPERATURE: 68 °F Date and time of sampling 4/28/95 8:00 A

17. DATE OF PUMP INSTALLATION: 

18. PUMP INSTALLATION:

<table>
<thead>
<tr>
<th>Pump Type, Make, Serial No.</th>
<th>Capacity</th>
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<tbody>
<tr>
<td>Motor type, H.P., Voltage, rpm</td>
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</tr>
<tr>
<td>Depth of Pump Intake Setting</td>
<td>ft. below which elevation is</td>
</tr>
<tr>
<td>Depth of bottom of airline</td>
<td>ft. below which elevation is</td>
</tr>
<tr>
<td>Pumping Head is</td>
<td>ft.</td>
</tr>
</tbody>
</table>

19. PUMPING TESTS:

<table>
<thead>
<tr>
<th>Reference Point (R.P.) used:</th>
<th>Date 5/2/95</th>
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</thead>
<tbody>
<tr>
<td>Initial water level: 0 ft. below R.P.</td>
<td>96 ft. below R.P.</td>
</tr>
<tr>
<td>End water level: 0 ft. below R.P.</td>
<td>96 ft. below R.P.</td>
</tr>
<tr>
<td>Depth of well: 290 ft. below R.P.</td>
<td>290 ft. below R.P.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Elapsed Time (hours)</th>
<th>Rise (ppm)</th>
<th>Draw-down (ft.)</th>
<th>Cl. (ppm)</th>
<th>Temp. °F</th>
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</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>20</td>
<td>72</td>
<td>1100</td>
<td>2.27</td>
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Remarks: (If more space is needed, continue on back.)

20.53-13

For Official Use:

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<th>For Official Use:</th>
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<tbody>
<tr>
<td>Job Name:</td>
</tr>
<tr>
<td>Job No:</td>
</tr>
<tr>
<td>Well No: 2053-13</td>
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<tr>
<td>Longitude 157 53.15</td>
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<td>Latitude 21 20.49</td>
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**Driller's Log (cont'd):**

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<tr>
<th>Depth (ft.)</th>
<th>Rock Description, Remarks, Dates (cont'd)</th>
<th>Water Level (ft.)</th>
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<td>166 to 180</td>
<td>GREY LAVA SOLID</td>
<td>-7.5</td>
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<tr>
<td>180 to 260</td>
<td>GREY LAVA SOME BROKEN</td>
<td>-6.3</td>
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<tr>
<td>260 to 280</td>
<td>BROKEN LAVA, WATER TAIL &amp; CINDERS</td>
<td>-5</td>
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<tr>
<td>280 to 290</td>
<td>GREY LAVA FIRM</td>
<td>0.1</td>
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**Pumping Tests (cont'd):**

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<tr>
<th>Elapsed Time (hours)</th>
<th>Rate (gpm)</th>
<th>Draw-down (ft.)</th>
<th>Cl- (ppm)</th>
<th>Temp. °F</th>
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<tr>
<td>10</td>
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</tr>
</tbody>
</table>

Remarks (cont'd):
2053-13

9. PROPOSED WELL SECTION

- Elevation at top of casing: 20.77 ft, msl.
- Ground Elevation: 19.6 ft, msl.
- Cement Grout: 180 ft.
- Rock Packing: NA ft.
- Hole Diameter: 20 in.
- Total Depth: 290 ft.
- Solid Casing:
  - Material: STEEL A-53
  - Length: 180 ft.
  - Diameter: 16 Inch 0.8
  - Wall thickness: 0.375
- Casing:  
  - Perforated: No
  - Screen: No
  - Material: N/A
  - Length:  
  - Diameter:  
  - Wall thickness:  
  - Openings: sq. in./LF.
  - Open Hole:
    - Length: 110
    - Diameter: 15 INCH

*Approximate elevation at time of filing application. Ground elevation above mean sea level (msl) by a surveyor licensed by the State must be submitted at start of construction. Final elevations of well components shall be submitted in the well completion/well abandonment report.
September 26, 1996

STATE OF HAWAII
DEPARTMENT OF LAND & NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
P.O. BOX 621
HONOLULU, HI 96809

ATTN: LENORE NAKAMA

SUBJECT: WELL COMPLETION REPORT FOR WELL NO. 2053-13

Dear Lenore,

Thank you for your letter dated 9/11/96. We have enclosed a corrected copy of our pump test data.

The chloride concentration previously reported in error was the number of drops used in a field titration kit. The number of silver nitrate drops should have been multiplied by 10 and again by .6 to achieve actual chlorides:

19 drops silver nitrate

\[ \times 10 \]

190 total sodium chloride ppm

\[ \times 0.6 \]

114 total chloride ppm

We have also corrected the conductivity readings. Our conductivity meter can be set at 0x, 10x, or 100x. The meter readings should have been multiplied by 10x, and not the 0x. Further testing of water samples we have dated 6/25/96 taken while running the permanent pump show similar chloride concentrations to that reported by Aecos Laboratory.

I have forwarded your letter to the Army Corp. of Engineers for the Licensed Survey as that is not part of my contract.

Sincerely,

TRACY RUNNELS, MGR DRILLING OPERATIONS
## Description of Well
1. Elevation: ground surface 19.6 ft., top of casing 20.77 ft., rotary table N/A ft., referenced to OAHU benchmark.
2. Total depth of well 290 ft., or -270.4 ft. elevation, msl.
3. 16 in. solid casing to 180 ft. depth, perforated to N/A ft. depth.

## Description of Pump and Pump Setting
5. Turbine type pump with 10 stage bowl assembly.
6. O.R.O.: diesel electric, power with 120 horsepower.
7. Shaft speed: 1550 rpm at 1000 gpm flow.
8. Depth of pump intake: 49 ft. below CASING; or -28.23 ft. elevation msl.
9. Depth of airline bottom: 20.2 ft. below CASING; or -57 ft. elevation msl.
10. Center of gage: ft. elev., msl. flow measured with METER.

## Test Conducted by
Rodney Couch

<table>
<thead>
<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. (mmbios 25°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0830</td>
<td>STATIC WATER LEVEL</td>
<td>.96 FT OR +19.81 MSL</td>
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<tr>
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<tr>
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</table>

Sheet No. 1 of 1 | Total Sheets
## Description of Well

1. **Elevation:**
   - Ground surface: 19.6 ft.
   - Top of casing: 20.77 ft.
   - Rotary table: N/A ft., referenced to benchmark.

2. **Total depth of well:** 290 ft., or 270 ft. elevation, msl.

3. **In. solid casing to:** 180 ft. depth, perforated to N/A ft. depth.

4. **Static water level on 4/28/95:** -96 ft. below-the top of casing; or 19.81 ft. elevation, msl.

## Description of Pump and Pump Setting

5. **Type of pump:** Turbine
   - 10 stage bowl assembly

6. **Shaft speed:** 1550 rpm at 1100 gpm flow

7. **Depth of pump intake:** 49 ft. below casing; or -28.23 ft. elevation, msl.

8. **Depth of airline bottom:** 20.2 ft. below casing; or -57 ft. elevation, msl.

9. **Center of gage:** 0 ft. elevation, ms flow measured with METER

## Test Conducted by Rodney Couch

### Date & Time | Sample | Pumping Rate (gpm) | Airline Drawdown (feet) | Chlorides (ppm) | Temp. (°F) | Cond. (mmHg 25°C)
---|---|---|---|---|---|---
5/2/95 | STATIC WATER LEVEL | -96 FT OR +19.81 MSL | 2.27 | 114 | 69 | 590
0820 | #1 | 1100 | 2.27 | 114 | 69 | 590
0830 | 1100 | 2.27 | 585
0840 | 1100 | 2.27 | 585
0850 | 1100 | 2.27 | 585
0900 | 1100 | 2.27 | 585
0930 | 1100 | 2.27 | 585
1000 | 1100 | 2.27 | 585
1030 | 1100 | 2.27 | 585
1100 | 1100 | 2.27 | 585
Pumping Test Record

FORT SHAFTER For

MOANALUA Island OAHU Project or Job No. FY94 19

Well 2053-13 (No.) PKG A-23

Description of Well
1. Elevation: ground surface 19.6 ft., top of casing 20.77 ft., rotary table N/A ft., referenced to N/A ft. elevation, msl
2. Total depth of well 290 ft., or -270.4 ft. elevation, msl
3. 16 in. solid casing to 180 ft. depth, perforated to N/A ft. depth
4. Static water level on 4/28/95 19.96 ft. below top of casing; or N/A ft. elevation msl measured method

Description of Pump and Pump Setting
5. TURBINE type pump with 10 stage bowl assembly
6. SHAFT speed: 1550 rpm at 1100 gpm flow
8. Depth of pump intake: 49 ft. below CASING; or 28.33 ft. elev. msl
9. Depth of airline bottom: 20.2 ft. below CASING; or -22.57 ft. elev. msl
10. Center of gage: N/A ft. elev., msl flow measured with METER
11. Test conducted by RODNEY COUCH

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

**For**

**FORT SHAFTER**

**Well 2053-13**

**MOANALUA Island OAHU**

**PKG A-23**

**Project or Job No.** FY94 19

---

**Description of Well**

1. Elevation: ground surface 19.6 ft., top of casing 20.77 ft., rotary table N/A ft., referenced to benchmark.
2. Total depth of well 290 ft., or 270.4 ft. elevation, msl
3. 16 in. solid casing to 180 ft. depth, perforated to N/A ft. depth
4. Static water level on 4/28 1995: -96 ft. below top of casing; or 1995 ft. elevation msl measured method

---

**Description of Pump and Pump Setting**

5. TURBINE type pump with 10 stage bowl assembly
6. DIESEL, electric, power with 120 horsepower
7. Shaft speed: 1550 rpm at 1100 gpm flow
8. Depth of pump intake: 49 ft. below CASING; or -28.23 ft. elev. msl
9. Depth of airline bottom: 20.2 ft. below CASING; or -57 ft. ele msl
10. Center of gage: ft. elev., msl. flow measured with METER

---

**Date & Time** | **Sample No.** | **Pumping rate (gpm)** | **Airline (feet)** | **Drawdown (feet)** | **Chlorides (ppm)** | **Temp. (°F)** | **Cond. (mmbhos 25°C)**
---|---|---|---|---|---|---|---
1400 | | 1100 | | 2.27 | | 69 | 580
1500 | | 1100 | | 2.27 | | 69 | 580
1600 | | 1100 | | 2.27 | | 69 | 580
1700 | | 1100 | | 2.27 | | 69 | 580
1800 | | 1100 | | 2.27 | | 69 | 580
1900 | | 1100 | | 2.27 | | 69 | 580
2000 | | 1100 | | 2.27 | | 69 | 580
2100 | | 1100 | | 2.27 | | 69 | 580
2200 | | 1100 | | 2.27 | | 69 | 580
2300 | | 1100 | | 2.27 | | 69 | 580
2400 | | 1100 | | 2.27 | | 69 | 580
0100 | | 1100 | | 2.27 | | 69 | 580
0200 | | 1100 | | 2.27 | | 69 | 980
0300 | | 1100 | | 2.27 | | 69 | 580
0400 | | 1100 | | 2.27 | | 69 | 580
0500 | | 1100 | | 2.27 | | 69 | 580
0600 | | 1100 | | 2.27 | | 69 | 580
0700 | | 1100 | | 2.27 | | 69 | 580
0800 | #3 | 1100 | | 2.27 | 114 | 69 | 580
0900 | | 1100 | | 2.27 | | 69 | 580

---

**END TEST INSTANT RECOVERY**

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**Sheet No. 3 of 3 Sheets**
Fort Shafter Well No. 2053-13

Water level 19.75 MSL
Gnd 19.6 MSL

Top Casing 20.77 MSL

20 inch dia bore

16 inch O.D.
Sch. 40 Steel Pipe

Cemented Annulus

400 bags neat cement
Casing Guides at 50 ft Intervals

Steel Drive Shoe

15 inch dia
Open Hole

180' below GND
Elev = -160.4 MSL

290' below GND
Elev = -270.4 MSL
DRAWDOWN DATA FOR WELL 2053-11
DURING LONG TERM TEST ON WELL 2053-13
05/02/95 THRU 05/04/95

DATUM POINT WAS TOP OF EXISTING SOUNDING TUBE INSTALLED WITH EXISTING PUMP. NO ELEVATION AVAILABLE.

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<th>TIME &amp; DATE</th>
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DRAWDOWN DATA FOR WELL 2053-10
DURING LONG TERM TEST ON WELL 2053-13
05/02/95 THRU 05/04/95

DATUM POINT WAS TOP OF PUMP BASE PLATE. WATER LEVEL WAS 8.2 FT THROUGHOUT TEST WITH NO CHANGE.
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Pumping Test Record

For STEP TEST

FORT SHAFTER

Well 2053-13

PKG A-23

MOANALUA Island

OAHU Project or Job No. FY94 19

Description of Well

1. Elevation: ground surface 19.6 ft., top of casing 20.77 ft., rotary table N/A ft., referenced to benchmark.

2. Total depth of well 290 ft., or -270.4 ft. elevation, msl.

3. 16 in. solid casing to 180 ft. depth, perforated to N/A ft. depth.

4. Static water level on 4/28 19.95 ft. below top of casing; or _______ ft. elevation. msl measured _______ method.

Description of Pump and Pump Setting

5. TURBINE type pump with 10 stage bowl assembly.

6. Diesel electric power with 120 horsepower.

7. Shaft speed: 1550 rpm at 1100 gpm flow.

8. Depth of pump intake: 49 ft. below CASING; or -28.23 ft. elevation msl.

9. Depth of airline bottom: 20.2 ft. below CASING; or -57 ft. elevation msl.

10. Center of gage: _______ ft. elevation. msl. flow measured with ____ method.

11. Test conducted by RODNEY COUCH.

<table>
<thead>
<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>
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Sheet No. 1 of 1 Sheets
C
Pumping Test Record

FOR SHAFTER

Well 2053-13

MOANALUA Island OAHU Project or Job No. FY94 19

PKG A-23

Description of Well

1. Elevation: ground surface 19.6 ft., top of casing 20.77 ft., rotary table N/A ft., referenced to benchmark.
2. Total depth of well 290 ft., or -270.4 ft. elevation, msl.
3. 16 in. solid casing to 180 ft. depth, perforated to N/A ft.
4. Static water level on 4/28/95: +96 ft. below top of casing; or -96 ft. elevation msl measured method.

Description of Pump and Pump Setting

5. TURBINE type pump with 10 stage bowl assembly
6. Diesel electric power with 120 horsepower
7. Shaft speed: 1550 rpm at 1100 gpm flow
8. Depth of pump intake: 49 ft. below CASING; or -28.23 ft. elev. msl.
9. Depth of airline bottom: 20.2 ft. below CASING; or -57 ft. ele msl.
10. Center of gage: ft. elev., msl. flow measured with METER
11. Test conducted by RODNEY COUCH

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<th>Chlorides (ppm)</th>
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Sheet No. 1 of 3 Sheets
**Pumping Test Record**

**FORT SHAFTER**

**Well 2053-13**

**MOANALUA Island**

**OAHU**

**PKG A-23**

**Project or Job No.** FY94 19

**Description of Well**

1. Elevation: ground surface 19.6 ft. , top of casing 20.77 ft., rotary table N/A ft., referenced to benchmark.
2. Total depth of well 290 ft., or -270.4 ft. elevation, msl
3. 16 in. solid casing to 180 ft. depth, perforated to N/A ft. depth
4. Static water level on 4/28/95: -96 ft. below top of casing; or -28.23 ft. elevation msl measured method

**Description of Pump and Pump Setting**

5. TURBINE type pump with 10 stage bowl assembly
6. Shaft speed: 1550 rpm at 1100 gpm flow
7. Depth of pump intake: 49 ft. below CASING ; or -28.23 ft. elev. msl
8. Depth of airline bottom: 20.2 ft. below CASING ; or -.57 ft. elev msl
9. Center of gage: ft. elev., msl. flow measured with METER
10. Test conducted by RODNEY COUCH

<table>
<thead>
<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>
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Sheet No. 2 of 3 Sheets
**Pumping Test Record**

**FORT SHAFTER**

**Well 2053-13**

MOANALUA Island, OAHU Project or Job No. FY94 19

**Description of Well**

1. Elevation: ground surface 19.6 ft., top of casing 20.77 ft.,
   rotary table N/A ft., referenced to benchmark.
2. Total depth of well 290 ft., or -270.4 ft. elevation, msl
3. 16 in. solid casing to 180 ft. depth, perforated to N/A ft.
4. Static water level on 4/28/95: -96 ft. below top of casing; or
   ft. elevation msl measured method

**Description of Pump and Pump Setting**

5. **TURBINE** type pump with 10 stage bowl assembly
6. Shaft speed: 1550 rpm at 1100 gpm flow
7. Depth of pump intake: 49 ft. below CASING; or -28.23 ft. elev.
8. Depth of airline bottom: 20.2 ft. below CASING; or -.57 ft. ele
   msl
9. Center of gage: ft. elev., msl. flow measured with **METER**
10. Test conducted by **RODNEY COUCH**

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<tr>
<th>Date &amp; Time</th>
<th>Sample No.</th>
<th>Pumping rate (gpm)</th>
<th>Airline Drawdown (feet)</th>
<th>Chlorides (ppm)</th>
<th>Temp. (°F)</th>
<th>Cond. (mmhos 25°C)</th>
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**END TEST INSTANT RECOVERY**
FORT SHAFTER WELL #2053-13
WELL PLUMBNESS REPORT 5/6/95

CASING: 180' 15 1/4 I.D. STEEL
CAGE DIA: 14 3/4"
GUIDE PULLEY HEIGHT: 20 FT.

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<th>DEPTH FEET</th>
<th>EAST INCHES</th>
<th>SOUTH INCHES</th>
<th>ACTUAL DRIFT INCHES</th>
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Alignment test performed 05/15/95: Dummy traveled freely top to bottom.
WELL COMPLETION REPORT

In the blank: Please print or type and submit completed report within 30 days after well completion to the Commission on Water Resource Management, P.O. Box 521, Honolulu, Hawaii 96816. An as-built drawing of the well and chemical analysis should also be submitted. For assistance call the Commission Regulation Branch at 587-0025.

1. STATE WELL NO. 2052-10 WELL NAME Fort Shafter ISLAND Oahu
2. LOCATION: Address End of I Place Tax Map Key 1-1-8:14
3. DRILLING OR PUMP INSTALLATION CONTRACTOR Roscoe Moss Hawaii, Inc.
4. CONTRACTOR'S C-57 LICENSE NUMBER C-16437
5. NAME OF DRILLER WHO PERFORMED WORK Rodney Couch
6. TYPE OF RIG/CONSTRUCTION Crane Truck
7. DATE OF WELL DRILLING COMPLETION 06/09/95

8. GROUND ELEVATION (msl) 19.6 ft.
   Top of Drilling Platform (msl) N/A ft.
   Height of Drilling Platform above Ground surface N/A ft.
   Bench Mark and Method Used to Determine Ground Elevation ____________ ft.

9. DRILLER'S LOG:

<table>
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<tr>
<th>Depth (ft.)</th>
<th>Rock Description, Remarks, Dates</th>
<th>Water Level (ft.)</th>
<th>Rock Description, Remarks, Dates</th>
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10. TOTAL DEPTH OF WELL BELOW GROUND ____________ ft.

11. HOLE SIZE: R.Bag. 12 inch dia. from _______ ft. to 155 ft. below grnd
    open hole 11 inch dia. from 155 ft. to 267 ft. below grnd

12. CASING INSTALLED:
    6 in. I.D. x 280 in. wall solid section to 168 ft. below grnd
    6 in. I.D. x _______ in. wall perforated section to _______ ft. below grnd

13. ANNULUS:
    Grouted from _______ ft. below ground to _______ ft. below grnd
    Gravel packed from _______ ft. below ground to _______ ft. below grnd

14. INITIAL WATER LEVEL _______ ft. below ground. Date and time of measurement _______]

15. INITIAL CHLORIDE _______ ppm Date and time of sampling _______]

16. INITIAL TEMPERATURE _______ °F Date and time of sampling _______]

17. DATE OF PUMP INSTALLATION _______]

18. PUMP INSTALLATION:

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

19. PUMPING TESTS:

   Reference Point (R.P.) used: _______ , which elevation is _______ ft.

   | Date | Start water level _______ ft. below R.P. | Start water level _______ ft. below R.P. |
   |      | End water level _______ ft. below R.P.   | End water level _______ ft. below R.P.   |
   |      | Depth of well _______ ft. below R.P.     | Depth of well _______ ft. below R.P.     |
   |      | Elapsed Time (hours) _______              | Elapsed Time (hours) _______              |
   |      | Rate (ppm) _______                       | Rate (ppm) _______                       |
   |      | Draw-down (ft.) _______                  | Draw-down (ft.) _______                  |
   |      | Cl- (ppm) _______                        | Cl- (ppm) _______                        |
   |      | Temp. _______                           | Temp. _______                           |

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

Remarks: Work included removal of existing 8" pump, swabbing of existing 12" steel

Contractor (print) Roscoe Moss Hawaii, Inc
Signature Rodney Couch
Title Field Sup.
Date 6/20/95

For Official Use: Job Name Job No. 2053-10
For Official Use: Well No. 2053-10
Copyright 2019 State of Hawaii
Remarks, Explanations (cont'd): 

- Ring to remove scale, video survey of well to assist cement basket placement, verify existing casing depth, total depth, and condition. Install 6" steel casing with cement basket and pressure grout 70 sacks next cement. Leave 6" casing 3 ft. above cement slab complete with removable 6" blind flange.

2053-10

9. PROPOSED WELL SECTION

Elevation at top of casing: 22.6 ft. mal.

Ground Elevation: 19.6 ft. mal*

Cement Grout: 150 ft.

Rock Packing: N/A ft.

Hole Diameter: 12 in.

Total Depth: 267 ft.

Solid Casing:
- Material: Steel
- Length: 168
- Diameter: 6" I.D.
- Wall thickness: .280

Casing: ☐ Perforated ☐ Screen
- Material: N/A
- Length
- Diameter
- Wall thickness
- Openings sq. in./L.F.

Open Hole:
- Length: 112
- Diameter: 11 inch

*Approximate elevation at time of filing application. Ground elevation above mean sea level (msl) by a surveyor licensed by the State must be submitted at the start of construction. Final elevations of well components shall be submitted in the well completion/well abandonment report.
Fort Shafter Well No. 2053-10

6 inch blind Flange
Existing 12" P+I

Existing 12 inch pipe

Cemented Annulus
70 bags neat cement

Bottom Existing 12"
155' below GND

Bottom New 6" Pipe
163' below GND

Bottom of Existing Hole
267' below GND

Packer and Sand
155' to 150'
Mr. T. Kishimori  
DPW, USAG-HI  
Attn: APVG-GWC-T  
Schofield Barracks, HI 96857  

Dear Mr. Kishimori:  

Approval of Well Construction, Pump Installation, and Water Use Permits for Well Nos. 2053-10, 11, & 13 Moanalua Groundwater Management Area, Oahu  

On March 1, 1995, the Commission on Water Resource Management (Commission) approved your well construction/pump installation and water use permit applications for the Fort Shafter battery (Well Nos. 2053-11 & 13) and your well construction permit application to modify Well No. 2053-10.  

Enclosed with this letter of approval are the following:  

1. Your well construction/pump installation permit for Well No. 2053-13  
2. Your well construction permit for Well No. 2053-10  
3. Your water use permit  
4. Your official monthly water use report form  

Please be sure to read the conditions of your approved permits. If you accept these terms, please sign and return one copy of each 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. Additionally, please note that Condition 19 was retroactively applied to your, and all existing, water use permits as directed by the Commission at its October 27, 1993 meeting.
In addition, you are required to submit a water shortage plan to the Commission. Your water shortage plan simply identifies what you are willing to do should the Commission declare a water shortage situation in the Moanalua Groundwater 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 Lenore Nakama at 587-0218.

Sincerely,

[Signature]

RAE M. LOUI
Deputy Director

LN:ss

Attachment
WELL MODIFICATION PERMIT

for

Fort Shafter Wells
(Well No. 2052-10)

Moanalua, Honolulu, O'ahu

TO: Department of the Army
   Directorate of Public Works
   Schofield Barracks, HI 96857

In accordance with Department of Land and Natural Resources Administrative Rules, Section 13-168, entitled "Water Use, Wells, and Stream Diversion Works", your application to modify a well (Well No. 2052-10) at Fort Shafter, TMK 1-1-8:14, converting it to a monitor well, is approved with the following conditions:

STANDARD WELL CONSTRUCTION PERMIT CONDITIONS

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

2. The following shall be submitted to the Commission within thirty (30) days after completion of work:
   a. Well completion report.
   b. As-built sectional drawing of the well.

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

4. The well construction permit application and staff submittal approved by the Commission at its March 1, 1995 meeting are incorporated into the permit by reference.
5. The permit shall be subject to review by the Attorney General.

Michael D. Wilson, Chairperson
Commission on Water Resource Management
MAY 4 1995
Date of Issuance

I have read the conditions and terms of this permit and understand them. I accept and agree to meet these conditions as a prerequisite and underlying condition of my ability to proceed.

Applicant's Signature: ____________________________ Date: ________________
Printed Name: Dennis J. Fontana
Firm or Title: COL, EN, Director of Public Works

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

cc: Department of Health
   Safe Drinking Water Branch
   Ground Water Protection Program
   Wastewater Branch
   Honolulu Board of Water Supply
WELL CONSTRUCTION AND PUMP INSTALLATION PERMIT

for

Fort Shafter Wells
(Well No. 2052-13)
Moanalua, Honolulu, O‘ahu

TO: Department of the Army
Directorate of Public Works
Schofield Barracks, HI 96857

In accordance with the Department of Land and Natural Resources Administrative Rules, Section 13-168, entitled "Water Use, Wells, and Stream Diversion Works", your application to construct, test, and install a pump in Fort Shafter Wells (Well No. 2052-13) at Fort Shafter, TMK 1-1-8:14, is approved subject to the following conditions:

STANDARD WELL CONSTRUCTION/PUMP INSTALLATION PERMIT CONDITIONS

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

2. The well construction/pump installation permit shall be for construction, testing, and installation of 1,100 gpm capacity, or less, pumps in the well, as determined by the pumping test results. The applicant shall coordinate with the Commission and conduct a pumping test in accordance with the attached protocol. A one-inch diameter (minimum) galvanized pipe shall be permanently installed, in a manner acceptable to the Commission, to accurately record water levels. The applicant shall submit to the Commission the test results and proposed permanent pump information, based on the test, for approval by the Chairperson.

3. The proposed use shall not adversely affect existing or future legal uses of water in the area, including any surface water or established instream flow standards. This permit or the authorization to construct and pump water from a well shall not constitute a determination of correlative water rights. The permittee is notified and by this provision
WELL CONSTRUCTION AND PUMP INSTALLATION PERMIT
(Well No. 2052-13)

understands that the quantity of water taken from the well could be reduced by the Commission in the future. This permit is not a commitment that the pump capacity permitted here or even some lesser amount is guaranteed in the future.

4. An approved flowmeter 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, to conform with the Commission's September 16, 1992 direction on reporting requirements.

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

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

7. The well construction/pump installation permit application and staff submittal, approved by the Commission at its March 1, 1995 meeting, are incorporated into the permit by reference.

8. The permit may be revoked if work is not started within six (6) months after the date of issuance or if work is suspended or abandoned for six (6) months, unless otherwise specified. The work proposed in the well construction permit application 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 a 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.
SPECIAL CONDITION

9. The final pump capacity shall be approved by the Chairperson upon completion of the drilling and aquifer testing.

MICHAEL D. WILSON, Chairperson
Commission on Water Resource Management
MAY 4, 1985
Date of Issuance

I have read the conditions and terms of this permit and understand them. I accept and agree to meet these conditions as a prerequisite and underlying condition of my ability to proceed.

Applicant's Signature: [Signature] Date: 11 May 95
Printed Name: Dennis J. Fontana
Firm or Title: COL, EN, Director of Public Works

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

Attachment
cc: USGS
   Department of Health
   Safe Drinking Water Branch
   Ground Water Protection Program
   Wastewater Branch
   Honolulu Board of Water Supply
AQUIFER (PUMP) TEST PROCEDURES

The pump test procedure for new wells shall consist of a step-drawdown test followed by a long-term continuous aquifer test. Testing the well and aquifer in the prescribed manner should result in the hydrologic information needed to determine: 1) the well's performance with regard to yield and water quality (chloride concentration), and 2) the nearby hydraulic properties of the aquifer.

General Recording Requirements

The records required for analysis and the tolerance in measurement acceptable for the step-drawdown and long-term continuous aquifer test are as follows:

1. Discharge from the well shall not fluctuate beyond ± 10 percent.
2. Depth to water measurements in the pumped well shall be measured and recorded to the nearest 0.01 feet.
3. Time shall be accurate within ± 1 percent.
4. Water discharged from the well during the step-drawdown and long-term test shall be carried away from the well to a distance sufficient to preclude circulation of the discharge water downward to the ground-water table.
5. Recording of data should be on a form similar to Table 1. All information shown in Table 1 shall be provided. In addition, data shall be plotted on Graph 1 and provided.

Step-Drawdown Test

The purpose of the step-drawdown test is to establish the efficiency of the well and to provide preliminary information on the yield of the well, both from a quantity and quality standpoint.

1. Measurement of water level in the pumped well shall be made every 12 hours for a period of no less than two days prior to the initiation of the step-drawdown test in order to obtain the pretest trend in water levels.
2. The step-drawdown test will consist of continuously pumping the well for four hours at four different rates.
   a. The change from one pumping rate to the next must be sufficient to induce an observable change in water level in the well from the previous pumpage rate.
   b. If desired, the four different rates should represent the full range of pump capacity (if the yield can sustain this), but this is not necessary.
3. Each pumping rate should be continued for one hour, after which the new rate should be instituted as rapidly as possible.
4. Pumping should begin at the lowest rate and conclude with the highest rate.
5. Pumping should be continuous through the entire step-drawdown test.
6. Measurement of chloride concentration and temperature of the discharge water shall be measured at least five times:
   a. at the end of each pumping rate during the step-drawdown test, and
   b. at the very beginning of the test.
AQUIFER (PUMP) TEST PROCEDURES

7. A sufficient number of water level measurements shall be made in the pumped well following the termination of the step-drawdown test to establish that the water level fully recovers from each test to pretest levels.

Long-Term Continuous Test

The purpose of the long-term continuous test is to determine the hydraulic properties of the aquifer to explore for and identify nearby aquifer boundaries such as streams or dikes, and to observe the trend in chloride concentration of the discharge water.

1. The long-term test should not commence until the water level in the pumped well has fully recovered from the step-drawdown test. Generally, the time required for this recovery will be slightly greater than four hours. The water level in the pumped well should be measured immediately before initiation of the long-term test.

2. The pump rate for the long-term test should be sufficient to create an observable drawdown.

3. The test should be run 24 hours per day for at least seven days. If during the test, the water level remains the same for a period of 24 hours, the test can be terminated.

4. Measurement of chloride concentration and temperature of the discharge water during the long-term test shall be made at the beginning of the test and every six hours thereafter.

5. Depth to water in all wells shall be measured with sufficient frequency that each logarithmic cycle in time on the data plots (Graph 1) contains at least 10 data points spread through the cycle. Thus, depth to water should be made at t=0 (immediately prior to start of the test), and as close as possible at t=1, 1.5, 2, 2.5, 3, 4, 5, 6, 7, and 8 minutes for the first ten minutes and at all succeeding decimal multiples of these numbers to the end of the test (t=10, 15, 20, 25, 30, 40, 50, 60, 70, and 80 minutes for the log cycle 10 to 100 minutes, etc.)

6. A sufficient number of water level measurements shall be made in the pumped well following termination of the long-term continuous test to establish that the water level fully recovers from each test to pretest levels.
### AQUIFER TEST DATA

<table>
<thead>
<tr>
<th>County:</th>
<th>Observation well no.:</th>
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<tbody>
<tr>
<td>Location:</td>
<td>Pumped well no.:</td>
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</table>

Average Q: __________ gpm  
Distance between Observation & Pumped Well ______ ft.

<table>
<thead>
<tr>
<th>Date</th>
<th>Hour (min)</th>
<th>Depth to water (ft)</th>
<th>Adjust. as (ft)</th>
<th>Q (gpm)</th>
<th>Cl^-</th>
<th>Temp. °F or °C</th>
<th>Remarks</th>
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</tbody>
</table>
WE ARE SENDING YOU ☑ Attached ☐ Under separate cover via the following items:

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications

☐ Copy of letter ☐ Change order ☑ Permits, test reports, and videos for Section# 02670.

<table>
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<th>DATE</th>
<th>NO.</th>
<th>DESCRIPTION</th>
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<tbody>
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<td>Ground Water Use Permit - Paragraph 1.3 SD09</td>
</tr>
<tr>
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<td></td>
<td>Well Modification Permit - Paragraph 1.3 SD09</td>
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<td>Well Construction and Pump Installation Permit - Paragraph 1.3 SD09</td>
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<td>Well Plumbness and Alignment Report - Paragraph 1.3 SD09</td>
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<td>Well Video Well # 2053-13 - Paragraph 3.3.3.</td>
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<td>Well Video Well # 2053-10 - Paragraph 1.2.3</td>
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<td>Copy of Well Completion Report and Pump Test Data - Paragraph 1.3 SD09</td>
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</tbody>
</table>

THESE ARE TRANSMITTED as checked below:

☐ For approval ☐ Approved as submitted ☐ Resubmit copies for approval

☐ For your use ☐ Approved as noted ☐ Submit copies for distribution

☑ As requested ☐ Returned for corrections ☐ Return corrected prints

☐ For review and comment ☐

☐ FOR BIDS DUE 19 ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS

Permit originals were mailed by the State Water Commission to the well owner. These are copies only.
<table>
<thead>
<tr>
<th>SURVEY BRANCH</th>
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<tr>
<td>R. LOUI</td>
<td>J. UWaine</td>
<td>F. CHING</td>
<td>S. SUBIA</td>
<td>K. YODA</td>
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<tr>
<td>REGULATION BRANCH</td>
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<td>E. SAkODA</td>
<td>D. HIGA</td>
<td>L. NAKAMA</td>
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<td>E. HIRANO</td>
<td>G. BAUER</td>
<td>PLANING BRANCH</td>
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<td>M. OHYE</td>
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<td>I. KUNIMURA</td>
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Glenn W/BWS called the well permit for 2053-10 # 13 (Ft. Shafter Wells) show well No. 2052-13 instead of 2053-10 # 13. Any problem?

(Just passing this info on...)

02/95

**Recommend letter correcting well # on permit:**

"It has come to our attention that the well in question was inadvertently given an incorrect #; our records show that the correct well # for this permit is 2053-10 # 13.

If needs correction - let's correct.

**MINOR TYPO - MAP SHOWS CORRECT LOCATION - LOCATION DO NOT CHANGE.**

Notification: OK?

OK

Done: [Signature] 5/10/95
WELL CONSTRUCTION AND PUMP INSTALLATION PERMIT

for

Fort Shafter Wells
(Well No. 2052-13)
Moanalua, Honolulu, O'ahu

TO: Department of the Army
Directorate of Public Works
Schofield Barracks, HI 96857

In accordance with the Department of Land and Natural Resources Administrative Rules, Section 13-168, entitled "Water Use, Wells, and Stream Diversion Works", your application to construct, test, and install a pump in Fort Shafter Wells (Well No. 2052-13) at Fort Shafter, TMK 1-1-8:14, is approved subject to the following conditions:

STANDARD WELL CONSTRUCTION/PUMP INSTALLATION PERMIT CONDITIONS

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

2. The well construction/pump installation permit shall be for construction, testing, and installation of 1,100 gpm capacity, or less, pumps in the well, as determined by the pumping test results. The applicant shall coordinate with the Commission and conduct a pumping test in accordance with the attached protocol. A one-inch diameter (minimum) galvanized pipe shall be permanently installed, in a manner acceptable to the Commission, to accurately record water levels. The applicant shall submit to the Commission the test results and proposed permanent pump information, based on the test, for approval by the Chairperson.

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

4. An approved flowmeter 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, to conform with the Commission's September 16, 1992 direction on reporting requirements.

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

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

7. The well construction/pump installation permit application and staff submittal, approved by the Commission at its March 1, 1995 meeting, are incorporated into the permit by reference.

8. The permit may be revoked if work is not started within six (6) months after the date of issuance or if work is suspended or abandoned for six (6) months, unless otherwise specified. The work proposed in the well construction permit application 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 a 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.
SPECIAL CONDITION

9. The final pump capacity shall be approved by the Chairperson upon completion of the drilling and aquifer testing.

MICHAEL D. WILSON, Chairperson
Commission on Water Resource Management
MAY - 4 1995
Date of Issuance

I have read the conditions and terms of this permit and understand them. I accept and agree to meet these conditions as a prerequisite and underlying condition of my ability to proceed.

Applicant’s Signature: ___________________________ Date: __________

Printed Name: __________________________________________________________

Firm or Title: ____________________________________________________________

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

Attachment
cc: USGS
Department of Health
Safe Drinking Water Branch
Ground Water Protection Program
Wastewater Branch
Honolulu Board of Water Supply
AQUIFER (PUMP) TEST PROCEDURES

The pump test procedure for new wells shall consist of a step-drawdown test followed by a long-term continuous aquifer test. Testing the well and aquifer in the prescribed manner should result in the hydrologic information needed to determine: 1) the well's performance with regard to yield and water quality (chloride concentration), and 2) the nearby hydraulic properties of the aquifer.

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The records required for analysis and the tolerance in measurement acceptable for the step-drawdown and long-term continuous aquifer test are as follows:

1. Discharge from the well shall not fluctuate beyond ± 10 percent.
2. Depth to water measurements in the pumped well shall be measured and recorded to the nearest 0.01 feet.
3. Time shall be accurate within ± 1 percent.
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1. Measurement of water level in the pumped well shall be made every 12 hours for a period of no less than two days prior to the initiation of the step-drawdown test in order to obtain the pretest trend in water levels.
2. The step-drawdown test will consist of continuously pumping the well for four hours at four different rates.
   a. The change from one pumping rate to the next must be sufficient to induce an observable change in water level in the well from the previous pumpage rate.
   b. If desired, the four different rates should represent the full range of pump capacity (if the yield can sustain this), but this is not necessary.
3. Each pumping rate should be continued for one hour, after which the new rate should be instituted as rapidly as possible.
4. Pumping should begin at the lowest rate and conclude with the highest rate.
5. Pumping should be continuous through the entire step-drawdown test.
6. Measurement of chloride concentration and temperature of the discharge water shall be measured at least five times:
   a. at the end of each pumping rate during the step-drawdown test, and
   b. at the very beginning of the test.
AQUIFER (PUMP) TEST PROCEDURES

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Long-Term Continuous Test

The purpose of the long-term continuous test is to determine the hydraulic properties of the aquifer to explore for and identify nearby aquifer boundaries such as streams or dikes, and to observe the trend in chloride concentration of the discharge water.

1. The long-term test should not commence until the water level in the pumped well has fully recovered from the step-drawdown test. Generally, the time required for this recovery will be slightly greater than four hours. The water level in the pumped well should be measured immediately before initiation of the long-term test.

2. The pump rate for the long-term test should be sufficient to create an observable drawdown.

3. The test should be run 24 hours per day for at least seven days. If during the test, the water level remains the same for a period of 24 hours, the test can be terminated.

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6. A sufficient number of water level measurements shall be made in the pumped well following termination of the long-term continuous test to establish that the water level fully recovers from each test to pretest levels.
WELL MODIFICATION PERMIT

for

Fort Shafter Wells
(Well No. 2052-10)
Moanalua, Honolulu, O'ahu

TO: Department of the Army
    Directorate of Public Works
    Schofield Barracks, HI 96857

In accordance with Department of Land and Natural Resources Administrative Rules, Section 13-168, entitled "Water Use, Wells, and Stream Diversion Works", your application to modify a well (Well No. 2052-10) at Fort Shafter, TMK 1-1-8:14, converting it to a monitor well, is approved with the following conditions:

STANDARD WELL CONSTRUCTION PERMIT CONDITIONS

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

2. The following shall be submitted to the Commission within thirty (30) days after completion of work:
   a. Well completion report.
   b. As-built sectional drawing of the well.

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

4. The well construction permit application and staff submittal approved by the Commission at its March 1, 1995 meeting are incorporated into the permit by reference.
5. The permit shall be subject to review by the Attorney General.

Michael D. Wilson, Chairperson
Commission on Water Resource Management

MAY 4 1995
Date of Issuance

I have read the conditions and terms of this permit and understand them. I accept and agree to meet these conditions as a prerequisite and underlying condition of my ability to proceed.

Applicant's Signature: __________________________ Date: __________

Printed Name: __________________________

Firm or Title: __________________________

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

cc: Department of Health
    Safe Drinking Water Branch
    Ground Water Protection Program
    Wastewater Branch
    Honolulu Board of Water Supply
TO:         Mr. Edwin Watson, Acting Supervisor  
            Division of Land/Transportation  
            Office of the Attorney General  

ATTN:     Mr. William Tam, Deputy Attorney General  

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

SUBJECT: Issuance of Water Use Permit  

Transmitted for your review and signature are two (2) copies of a water use permit for Well No. 2053-13. We request your approval as to the form of the permit document. Please return the permits with your signature to the Commission on Water Resource Management.

LN:ss  
Attachment
TO: Mr. Edwin Watson, Acting Supervisor
Division of Land/Transportation
Office of the Attorney General

ATTN: Mr. William Tam, Deputy Attorney General

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

SUBJECT: Issuance of Water Use Permit

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LN:ss
Attachment
APPLICATION FOR PERMIT

1. APPLICANT: (may be a, b, c, but all must be filled in)
   (a) WELL OWNER
   Firm/Name ____________________________ Department of Army
   Contact Person _________________________ T. Klahmori Ph: 655-6383
   Address ______________________________ Attn: APVC-GWC-T
   SCHOFIELD BARRACKS, HI 96857-5000

   (b) LANDOWNER
   Firm/Name ____________________________ Department of Army
   Contact Person _________________________ T. Klahmori Ph: 655-6383
   Address ______________________________ Attn: APVC-GWC-T
   SCHOFIELD BARRACKS, HI 96857-5000

   (c) CONTRACTOR
   Firm/Name ____________________________ ROSCOE MOSS HAWAII, INC. Ph: 682-5856
   Address ______________________________ Contractor’s C-57 License No.: C-16437
                                           91-259A OLAI STREET KANOLE, HI 96707

2. WELL LOCATION/NAMES: FORT SHAFTER WELLS #2052-10
   Island OAHU
   Address BLDG 509, WALKER DR., FT. SHAFTER, HI

   (Attach a USGS map, scale 1"=2000’, and a property tax map showing well location referenced to established property boundaries.)

3. (a) PROPOSED WORK: □ Drill New Well □ Modify Existing Well □ Redrill
   □ Install New Pump □ Replace Pump □ Centrifugal
   □ Deep Well Turbine □ Submersible □ Propeller
   □ Motor: □ Diesel □ Gas □ Electric, rated horsepower of
   □ Propeller-Gear □ Reciprocating □ Impluse
   □ Drilled □ Radial
   □ Is this well a part of a battery of wells? Yes No
   (Briefly describe and fill in the diagram on the back of this form.)

4. PROPOSED PUMP INFORMATION: Rated Pump Capacity: N/A gallons per minute
   Pump Type: □ Deep Well Turbine □ Submersible □ Motor: □ Diesel
   □ Centrifugal □ Propeller-Gear □ Gas □ Impulse
   □ Reciprocating □ Propeller

5. PROPOSED USE: □ Municipal (including hotels, stores, etc.) □ Military
   □ Domestic (individual, noncommercial water sys.) □ Industrial
   □ Irrigation (crop) □ Other (explain)
   □ State Land Use District: □ Urban □ Agriculture □ Rural □ Conservation
   □ County Zoning (describe)
   (If more space is needed, continue below under remarks, explanations.)

6. (a) PROPOSED AMOUNT OF WITHDRAWAL: N/A gallons per day
   (b) METHOD OF FLOW MEASUREMENT:
       □ Flow-meter □ Open-pipe □ Orifice Plate □ Weir

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

8. REMARKS, EXPLANATIONS: Well to be converted to a 6" monitor well. Will pull existing
   pump, brush existing 12" casing, video log and cement new 6" casing in place per
   drawing.

   (If more space is needed, continue on back)

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

Well Owner
DEPARTMENT OF ARMY
Dennis J. Pontana, CPT, BAs, DFp
Signature ___________ Date: 30 Nov. 1994

Landowner
DEPARTMENT OF ARMY
Dennis J. Pontana, CPT, EN, DFp
Signature ___________ Date: 30 Nov. 1994

Contractor ROSCOE MOSS HAWAII, INC.
Signature ___________ Date: 11/29/94

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

Longitude ____________________________
Latitude ____________________________

Aquifer System Name ___________________
State Well No. 2653-10

8/24/92 WCR P
**8. PROPOSED WELL SECTION**

- **Elevation at top of casing**: +22.3 ft., ml.
- **Ground Elevation**: 21.3 ft., ml*
- **Cement Grout**: 168 ft.
- **Rock Packing**: __ ft.
- **Hole Diameter**: 12 in.
- **Total Depth**: 279 ft.

**Solid Casing**
- **Material**: Steel
- **Length**: 169 ft.
- **Diameter**: 6 in.
- **Wall thickness**: 0.280 in.

**Casing**
- **Perforated**: □
- **Screen**: □
- **Material**: N/A
- **Length**: __ ft.
- **Diameter**: __ in.
- **Wall thickness**: __ in.
- **Openings**: __ sq. in./L.F.

**Open Hole**
- **Length**: 110 ft.
- **Diameter**: __ in.

*Approximate elevation at time of filing application. Ground elevation above mean sea level (ml) by a surveyor licensed by the State must be submitted at start of construction. Final elevations of well components shall be submitted in the well completion/well abandonment report.
REMOVAL PLAN

SCALE: 1" = 10'

VENTED CAP
EL. = +21.3 ±
GROUND SURFACE

EXIST 12" Ø STEEL CASING
CONDITION UNKNOWN

EXIST ANNULUS BACKFILL
AND BORE DIAMETER UNKNOWN

6" Ø STEEL CASING
TREMIE NEAT CEMENT
GROUT TO FILL ANNULUS
OF CASINGS

TREMIE PLUG OR PACKER

SECTION FOR CONVERTING EXISTING
WATER WELL TO MONITORING WELL

NOT TO SCALE (GOVERNMENT OPTION)
**APPLICATION FOR PERMIT**

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

(a) **WELL OWNER**

- Firm/Name: Department of Army
- Contact Person: T. Kishimoto
- Phone: 655-6383
- Address: Schofield Barracks, HI 96857-5000

(b) **LANDOWNER**

- Firm/Name: Department of Army
- Contact Person: T. Kishimoto
- Phone: 655-6383
- Address: Attn: APWG-GMC-T
- Address: Schofield Barracks, HI 96857-5000

(c) **CONTRACTOR**

- Firm/Name: ROSECORE MOSS HAWAII, INC.
- Phone: 682-5856
- Address: 91-259A Olai Street, Kapolei, HI 96707
- Contractor's C-57 License No: C-16437

**2. WELL LOCATION/NAME:** FORT SHAFTER WELLS

- Island: Oahu
- Address: BLDG 509, WALKER DR., FT. SHAFTER, HI
- Tax Map Key: 1-1-08:14

(Attach a USGS map, scale 1"=2000', and a property tax map showing well location referenced to established property boundaries.)

**3. (a) PROPOSED WORK:**

- Drill New Well
- Modify Existing Well
- Redrill
- Install New Pump

* Be sure to complete and submit well abandonment report upon completion of work.

(b) **WELL TYPE:**

- Drilled
- Bored
- Radial

Is this well a part of a battery of wells? **Yes**

(Note: describe and fill in the diagram on the back of this form.)

**4. PROPOSED PUMP INFORMATION:**

- Rated Pump Capacity: ______________ gallons per minute

<table>
<thead>
<tr>
<th>Pump Type</th>
<th>Motor</th>
<th>Other (explain)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deep Well Turbine</td>
<td>Diesel</td>
<td></td>
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<tr>
<td>Submersible</td>
<td>Gas</td>
<td></td>
</tr>
<tr>
<td>Centrifugal</td>
<td>Electric, rated horsepower of</td>
<td></td>
</tr>
</tbody>
</table>

**5. PROPOSED USE:**

- Municipal (including hotels, stores, etc.)
- Domestic (individual, noncommercial water systems)
- Irrigation (crop)
- State Land Use District
- Urban
- Agriculture (County Zoning, describe)
- Military
- Industrial
- Other (explain)
- Rural
- Conservation

**6. (a) PROPOSED AMOUNT OF WITHDRAWAL:** 1,035 millions gallons per day

**7. PENDING ACTIONS:**

- ODUA
- DD
- EIS
- EA
- NONE
- Other (explain)

**8. REMARKS, EXPLANATIONS:** Record of Environmental Consideration has been completed. Well will operate alternately with well #2052-11 and will not exceed current allocation. Well #2052-10 will either be closed or converted to a water monitoring well.

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

For Official Use Only:

- Date Received
- Date Accepted
- Field Checked By
- Date

State Well No: 2052-13

Date: 6/24/92 WCR F1
9. PROPOSED WELL SECTION

Elevation at top of casing: 27 ft., msl.

Ground Elevation: 20 ft., msl*

Cement Grout: 180 ft.

Solid Casing:
- Material: steel
- Length: 180 ft.
- Diameter: 16.0 in.
- Wall thickness: 0.25 in.

Rock Packing: 0 ft.

Hole Diameter: 20 in.

Total Depth: 260 ft.

Casing:
- □ Perforated
- □ Screen
- Material: Open hole in deep aquifer
- Length: ft.
- Diameter: in.
- Wall thickness: in.
- Openings: sq. in./L.F.

Open Hole:
- Length: 200 ft.
- Diameter: 12 in.

*Approximate elevation at time of filing application. Ground elevation above mean sea level (msl) by a surveyor licensed by the State must be submitted at start of construction. Final elevations of well components shall be submitted in the well completion/well abandonment reports.
OPEN BORE HOLE (ADDITIONAL WATER WELL DEPTH)

12" Ø OPEN BOREHOLE

50' 150'

16" O.D. SOLID STEEL CASING

180' ±

20" Ø BOREHOLE GUIDES

50'

TREMmie PLACED NEAT CEMENT GROUT-180'

SECTION THRU NEW WELL

NOT TO SCALE

EL. = -360' MSL

12" DIA.

GROUND EL. = +19.6'

SEE SECTION 3-15-3 FOR CONT.
APPLICATION FOR PERMIT

P.O. Box 201, Honolulu, Hawaii 96859. 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 808-681-2225.

1. APPLICANT: (may be a, b, or c, but all must be filled in)
   (a) WELL OWNER
   Firm/Name: Department of Army
   Contact Person: T. Kishimoto Ph: 653-6383
   Address: Attn: APVC-GMC-T
   SCHOFIELD BARRACKS, HI 96857-5000

   (b) LANDOWNER
   Firm/Name: Department of Army
   Contact Person: T. Kishimoto Ph: 653-6383
   Address: Attn: APVC-GMC-T
   SCHOFIELD BARRACKS, HI 96857-5000

   (c) CONTRACTOR
   Firm/Name: ROSCOE MOSS HAWAII, INC. Ph: 682-5856
   Address: 91-239A OLANI STREET KAPOLI, HI 96707
   Contractor's C-57 License No. C-16437

2. WELL LOCATION/NAME:
   FORT SHAFTER WELLS
   Island: OAHU
   Tax Map Key: 1-1-08:14
   Address: BLDG 509, WALKER DR., FT. SHAFTER, HI
   (Attach a USGS map, scale 1"=2000', and a property tax map showing well location referenced to established property boundaries.)

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

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

4. PROPOSED PUMP INFORMATION:
   Rated Pump Capacity: _______ gallons per minute
   Pump Type: 
   Deep Well Turbine
   Submersible
   Centrifugal
   Motor:
   Diesel
   Gas
   Electric, rated horsepower of _______ Hp.

5. PROPOSED USE:
   [ ] Municipal (including hotels, stores, etc.)  
   [ ] Domestic (individual, noncommercial water use)  
   [ ] Irrigation (crop)  
   [ ] Industrial  
   [ ] Other (explain)
   State Land Use District: 
   [ ] Urban  
   [ ] Agriculture  
   [ ] Rural  
   [ ] Conservation
   County Zoning (describe)  
   (If more space is needed, continue below under remarks, explanations.)

6. (a) PROPOSED AMOUNT OF WITHDRAWAL: _______ million gallons per day  
   (b) METHOD OF FLOW MEASUREMENT: 
   [ ] Flow-meter
   [ ] Open-pipe
   [ ] Orifice Plate
   [ ] Well

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

8. REMARKS, EXPLANATIONS: Well will operate alternately with 2052-11 and will not exceed current allocation.

   (If more space is needed, continue on back)

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

Well Owner: DEPARTMENT OF ARMY
Dennis J. Rodana, Lt. EN, WP
Signature: ____________________________ Date: 04/12/87

Landowner: DEPARTMENT OF ARMY
Dennis J. Rodana, Lt. EN, WP
Signature: ____________________________ Date: 04/12/87

Contractor: ROSCOE MOSS HAWAII, INC.
Signature: ____________________________ Date: 04/12/87

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

Longitude ____________________________ Latitude ____________________________
Aquifer System Name ____________________________ State Well No. ____________________________

8/24/92 WCR P
June 25, 1981

Department of the Army
Headquarters U.S. Army Support
Command, Hawaii
Fort Shafter, Hawaii 96850

Attn: Colonel Adolph A. Right, EN
Director of Engineering & Housing

Gentlemen:

Honolulu Ground Water Control Area

We acknowledge receipt on June 4, 1981, your Declaration of Existing Water Withdrawal and Use in the Honolulu Ground Water Control Area. Our staff will review the data and may contact you for a field inspection of your well(s) before certification of your declared water use is made by the Board of Land and Natural Resources.

We appreciate your early filing of the declaration of existing water use.

Very truly yours,

ROBERT T. CHUCK
Manager-Chief Engineer

ES: dh
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See Me
Take action by
Route to your branch
Review & comment
Draft reply by
For information
Xerox distributed
Acknowledge receipt

Jane Sakai
Doris Hamada
Lorraine Nanbu
Jean Starot
Elsie Yonamine

MILT ACKNOWLEDGED
MEAL

Pass deadline?
Just make it.
DEPARTMENT OF THE ARMY
HEADQUARTERS UNITED STATES ARMY SUPPORT COMMAND, HAWAII
FORT SHAFTER, HAWAII 96858

REPLY TO
ATTENTION OF:

APZV-EHU

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

Gentlemen:

Completed forms are inclosed per your request of 16 March 1981. We have lumped data together for the battery of wells at Moanalua (Tripler) and Fort Shafter. Also, we have forwarded the forms for the Punamana Well to the owner, US Air Force.

Sincerely,

ADOLPH A. NIGHT
COL, EN
Director of Engineering and Housing
Department of Land & Natural Resources  
Division of Water & Land Development  
P. O. Box 373  
Honolulu, Hawaii 96809

Gentlemen:

Completed forms are inclosed per your request of 16 March 1981. We have lumped data together for the battery of wells at Moanalua (Tripler) and Fort Shafter. Also, we have forwarded the forms for the Punamano Well to the owner, US Air Force.

Sincerely,

Original signed by

ADOLPH A. HIGHT
COL, EN
Director of Engineering and Housing