NOTICE OF INTENT TO DRILL

WELL OR PROJECT NAME: Anahola, Job #51-KW-21
ISLAND: Kauai

OWNER OF WELL: State of Hawaii

DRILLING COMPANY: Roscoe Moss Co.

Proposed Construction Date: 7/79
Proposed Completion Date: 12/79
Proposed Depth: 660

PROPOSED USE OF WELL:
(a) Domestic: XX
(b) Irrigation
(c) Industrial (type)
(d) Cooling (type)
(e) Waste Disposal (type)
(f) Soils Invest.
(g) Foundation Invest.
(h) Others (specify)

LOCATION OF WELL: (Attach copy of tax map, USGS topographic map, plantation field map, road map, or prepared drawing showing exact location. If not available, prepare a hand-drawn sketch map (not necessarily to scale) in the space below showing sufficient landmarks, distances, and directions for location in the field)

TAX MAP KEY:

Date Submitted: 7/19/79
Signature: L H Runnell
Title (If Applicable): District Manager

FOR OFFICIAL USE
Latitude: 22 09 03
Longitude: 159 19 29
Well No.: 0919-03

FOR DRILLER'S USE
Job Name
Job No.

INSTRUCTIONS: Send three (3) copies to: Manager-Chief Engineer, Division of Water and Land Development, P. O. Box 373, Honolulu, HI 96809.

State of Hawaii
DEPARTMENT OF LAND & NATURAL RESOURCES
DIVISION OF WATER AND LAND DEVELOPMENT

DRILLER'S REPORT

DESCRIPTION

Date of report: 1/21/80
Person filing report: L.H. Runnellis

A. OWNER: State Of Hawaii
NAME: Anahola Well
ISLAND: Kauai

B. GENERAL LOCATION: Anahola

C. DRILLING COMPANY: Roscoe Moss Company

D. TYPE OF RIG: Cable Tool
DRILLING COMPLETED: 11/79
DRILLER: Ken Sanders

E. ELEVATION, msl: Top of drilling platform: 345.53 ft. Bench mark and method used to determine
Height of drilling platform above ground surface: 0 ft. elevation:

F. HOLE SIZE:
18 inch dia. to 490 ft. below drilling platform.
18 inch dia. to 490 ft. below drilling platform.
18 inch dia. to 490 ft. below drilling platform.

G. CASING INSTALLED: 14 in. I.D. x 312 in. wall solid section to 330 ft. below drilling platform.
14 in. I.D. x 312 in. wall perforated section to 451 ft. below drilling platform.

H. ANNULUS: Grouted 0 ft. to 108 ft. below drilling platform.
Gravel packed 0 ft. to 108 ft. below drilling platform.

I. PERMANENT PUMP INSTALLATION:
- Pump type, make, serial no.:
- Motor type, H.P., voltage, r.p.m.:
- Depth of pump intake setting:
- Depth of bottom of airline:
  Which elevation is:

HYDROLOGY

J. INITIAL WATER LEVEL: 334 ft. below drilling platform.
Date of measurement: 10/3/79

K. INITIAL CHLORIDE: ppm, total depth of well:
Date below drilling platform:
Reference point (R.P.) used:
which elevation is:

L. PUMPING TESTS:
Date 10-22-79
Start water level:
ft. below R. P.
End water level:
ft. below R. P.
Depth of well:
ft. below R. P.

Date 11-13-79
Start water level:
ft. below R. P.
End water level:
ft. below R. P.
Depth of well:
ft. below R. P.

Elapsed Time (hours)
Rate (gpm)
Drawdown (ft.)
Chl. (ppm)
Temp. (°F)

11:00 to 72 hrs
11:00 to to to to to to to to to to to

SUBSURFACE FORMATION

M. DRILLER'S LOG:

<table>
<thead>
<tr>
<th>Depth, ft.</th>
<th>Rock Description &amp; Remarks</th>
<th>Water Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 58</td>
<td>Clay and Boulder</td>
<td>349 to 369</td>
</tr>
<tr>
<td>58 to 68</td>
<td>Hard dark grey</td>
<td>369 to 379</td>
</tr>
<tr>
<td>68 to 126</td>
<td>Grey lava rock</td>
<td>379 to 389</td>
</tr>
<tr>
<td>126 to 176</td>
<td>Med. hard rock</td>
<td>389 to 399</td>
</tr>
<tr>
<td>176 to 179</td>
<td>Hard blue rock</td>
<td>399 to 406</td>
</tr>
<tr>
<td>179 to 283</td>
<td>Med. hard rock</td>
<td>406 to 421</td>
</tr>
<tr>
<td>283 to 288</td>
<td>Cinders, red</td>
<td>421 to 453</td>
</tr>
<tr>
<td>288 to 306</td>
<td>Hard grey rock</td>
<td>453 to 464</td>
</tr>
<tr>
<td>306 to 326</td>
<td>Sand, cinders red</td>
<td>464 to 484</td>
</tr>
<tr>
<td>326 to 338</td>
<td>Med. hard rock</td>
<td>484 to 500</td>
</tr>
<tr>
<td>338 to 349</td>
<td>Stones and gravel</td>
<td>to</td>
</tr>
</tbody>
</table>

N. REMARKS:

INSTRUCTIONS: Send three(3) copies to: Manager-Chief Engineer, Division of Water and Land Development, P. O. Box 373, Honolulu, Hawaii 96809.


FOR OFFICIAL USE
Latitude 22 09 03
Longitude 159 19 29
Well No. 0919-03

FOR DRILLER'S USE
Job Name
Job No.
**Drilling Log**

**RUSCOE MOSS COMPANY**

830 AHUA STREET • HONOLULU, HAWAII 96819
TELEPHONE (808) 839-6888 • 833-1444

---

**Date** Nov 16 1979  **Job No.** 5-79  **Hole No.** 0919-03  **Elevation** 345.83 ft.

**Customer**  DEPT. LAND & WATER  **Location** ANAHOLA, KUAI

**Driller** JAKE WEERDEN  **8 Hrs.** Rig 861  **Test Pump**

**Helper** TERRY RASMUSEN  **8 Hrs.** Gas  **Oil**

**Helper** RICCARD LEPKE  **8 Hrs.** Repairs

**Arv. Job**  **Lv. Job**  **Hrs.**  **Or. No.**

**Bit-Size**  **Type**

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

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

**Water Levels, Time**  **M**  **ft., Time**  **M**  **ft.**

---

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>Top</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Test Pumped 2.2 hrs.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Downwash 1000 GPM.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>AT 1000 GPM.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Stepped pumping at 11 AM</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pept line continuing 24 hrs.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Recovery check</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>We changed Rasmussen to</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Home.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lopez to pick up Sat. PM.</td>
<td></td>
</tr>
</tbody>
</table>

**Remarks:**

---

**Signed**  **Date** 19__
### DRILLING LOG

**Date**: Nov. 15, 1979  
**Job No.**:  
**Hole No.**: 0919-03  
**Elevation**: 345.53 ft.

**Customer**: Dept. of Land & Water  
**Location**: Waipahu, Kuuiahi

**Driller**: Jake Lechner  
**Helper**: Terry Husmann  
**Helper**: Richard Leipe  
**Arv. Job**:  
**Lv. Job**:  
**Hrs.**

**Rig**: 5L51  
**Test Pump**:  
**Gas**:  
**Oil**:  
**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**: M ft., Time M ft.  

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><strong>Started w/ 14 Bbl. Fuel</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Using approx 6 Bbl. Fuel</strong> in 94 hrs.</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Picked up 5 more Bbls.</strong></td>
</tr>
</tbody>
</table>

**Remarks**:  

**Signed**:  
**Date**: __________ 19__
**DRILLING LOG**

**RUSCOE MOSS COMPANY**

830 AHUA STREET * HONOLULU, HAWAII 96819
TELEPHONE (808) 839-6888 * 833-1444

Date: **Nov 14 1979**

Job No.: **899**

Hole No.: **0919 - 03**

Elevation: **345.53 ft.**

Customer: **DEPT. OF WATER**

Location: **Aiea, Hawaii**

Driller: **Larry Werner**

8 Hrs.

Rig: **361 Test Pump**

Helper: **Terry Rasmussen**

8 Hrs.

Gas: ___________

Oil: ___________

Helper: **Richard Lopez**

8 Hrs.

Repairs: ___________

Arv. Job: ___________

Lv. Job: ___________

Hrs.: ___________

Or. No.: ___________

---

Bit-Size: ___________

Type: ___________


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>___________</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>B</td>
<td>8 AM to 9 AM</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>9 AM to 12 PM</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>12 PM to 8 AM</td>
<td></td>
</tr>
</tbody>
</table>

Rented Generator quit after 2 hrs. Returned it. Used welder for light

**Remarks:**

---

Signed: ___________

Date: ___________ 19 ___________
**Date:** Nov. 13 1977  
**Job No.:** 575  
**Hole No.:** 0919-03  
**Elevation:** 345.53 ft.

**Customer:** Dept. of Land & Water  
**Location:** Anahole, Kauai

**Driller:** Jake Winsor  
**Helper:** Terry Rasmussen  
**Helper:** Richard Chapure

**Rig:** 86-L  
**Gas:** Oil  
**Reps:**

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

**Bit-Size:**  
**Type:**

**Casing-Size:** in., Length in hole 500 ft.  
**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>Jake &amp; Terry to Kauai</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rent Generator for lights - Prepare to test pump</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>72 has</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Start pumping at 11:45 AM</td>
<td></td>
</tr>
</tbody>
</table>

**Remarks:**

---

**Signed**:  
**Date**:  
**Labo**:  
**NOTE DEVELOPMENT**
Date: 10/30/79  
Job No: 51-K-11  
Hole No: 09/19-93  
Elevation: 346.53 ft.

Customer: Out of State and Natural Res.  
Location: Anahola, Kauai

Driller: Ken Sandlin  
Helper: Richard Loka  
Rig: 36-L B-F Collettock

Arv. Job  
Lv. Job  

Gas  
Oil

Repairs

Bit-Size  
Type

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

Depth Start  
ft., Depth Stop 500 ft.  
Feet Drilled

Water Levels, Time  
M  
ft., Time  
M  
ft.

Depth  
Formation  
Remarks  
Top

---

Remarks:  

You & equipment to Kauai. Could get it on dock till next day & take trip for 30k. to Hawaii on air line sliding by an aircraft. Didn't know the cost of shipping manholes on Kauai. Requested lock & slid it. Joel, right Tr visc. got to rental place.

Signed: Kenett Sandlin  
Date: 10/30/79
**Drilling Log**

Date: 10/29/79  
Job No.: 51-1  
Hole No.: 099.03  
Elevation: 3455 ft.

Customer: State of Santand Natural Res.  
Location: Anchorage, Alaska

Driller: Ray Sanders  
8 Hrs.  
Rig: 36-1 B.F. Caltilo.

Helper: Richard Jakes  
8 Hrs.  
Gas:  
Oil:

Helper:

Arv. Job:
Lv. Job:

Hrs.:

Or. No.:

Bit-Size:
Type:

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

Depth Start: ft., Depth Stop: 500+0 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>
</table>

Measurements:

Remarks:

- York water tank to pier, go fuel. Started Pump.
- Exit Carrier bearing on pump motor. Power take off.
- Pulled out, also developed a few to go wrong with pump.
- Shut pump test down, feet off gear head and power.

Signed: Kenneth L. Sanders  
Date: 10/29/79
DRILLING LOG

Date: 10/26 1979  Job No: 51-TW-21  Hole No: 0919-2  Elevation: 3465 ft.

Customer: _________________________  Location: _________________________

Driller: Ken Sandfire  9 Hrs.  Rig: _________________________

Helper: Richard Joffe  9 Hrs.  Gas: _____________

Helper: Earl Cheng  9 Hrs.  Oil: _____________

Arv. Job: _____________  E. 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>
<th>Top</th>
</tr>
</thead>
</table>

Measurements

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
</tr>
</thead>
</table>

Remarks: Scf Pumping well and skid Pumping till 2:30 Pm. Richard Joffe was on my pumping shift and he made arrangements for full and wet job next week bit. Am going to make arrangements for a man to take Earl's place next week.

Signed: Kenneth J. Sandfire  Date: 10/26 1979
## Drilling Log

### Details
- **Date:** October 24, 1979
- **Job No.:** 51
- **Customer:** Dept. of Land & Natural Resources, Honolulu, Hawaii
- **Location:** Honolulu, Hawaii
- **Elevation:** 3455 ft.

### Personnel
- **Driller:** Kim Sandin
  - **Hrs.:** 9
- **Helper:** Richard Lopez
  - **Hrs.:** 9
- **Helper:** Earl Ching
  - **Hrs.:** 9

### Drilling Details
- **Rig:** 
- **Gas:** 
- **Oil:** 
- **Repairs:** 

### Arrival and Departure
- **Arv. Job:** 
- **Lv. Job:** 
- **Hrs.:** 
- **Of. No.:** 

### Drilling Parameters
- **Bit Size:** 
- **Type:** 
- **Casing Size:** 
  - **in.:** 
  - **Length in hole:** 
  - **ft.:** 
  - **in.:** 
  - **Amt. Perforated:** 
  - **ft.:** 
  - **in.:** 
- **Depth Start:** 
- **Depth Stop:** 
- **Feet Drilled:** 

### Water Levels
- **Water Levels:** 
- **Time M ft:** 
- **Time M ft:**

### Measurements
<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Remarks
- **Remarks:**
  - 'Drilling well at 700 gal per min.'

### Signatures
- **Signed:** Joseph J. Ladner
- **Date:** October 24, 1979
Date: 10/24/79  
Job No: 51-W-21  
Hole No: 079-03  
Elevation: 3455 ft.

Customer:  
Dpt. of Fish and Natural Res.  
Location: Kaneohe, Hawaii

Driller: Ken Sanders  
9 Hrs.  
Rig: 36-L B-E Belltown

Helper: Richard Ho'oy  
9 Hrs.  
Gas:  
Oil:  
Repaired:  
Arv. Job:  
Lv. Job:  
Hrs.:  
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>
<th>Top</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Measurements**

**Remarks:** Test pumping with a 700 gph per min.

Signed: Ken Sanders  
Date: 10/25/79  

830 AMUA STREET • HONOLULU, HAWAII 96819  
TELEPHONE (808) 839-8800 • 833-1444
### Drilling Log

**Date:** 10/23 1979  
**Job No.:** 51-Ku-21  
**Hole No.:** 09-1903  
**Elevation:** 345.53 ft.

**Customer:** Dept of Nat & Natural Res.  
**Location:** Analy, Nave.

### Driller
- **Name:** Ken Sanders  
- **Hours:** 9 Hrs.
- **Rig:** 36-1 B-5 Castool

### Helper
- **Name:** Richard Loken  
- **Hours:** 9 Hrs.

### Helper
- **Name:** Earl Ching  
- **Hours:** 9 Hrs.

**Arv. Job:**  
**Lv. Job:**  
** Remark:** Repairs

### Bit-Size  
**Type:**

### Casing-Size
- **In., Length in hole:** ft. in., Amrt. 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>
</table>

### Remarks:
- Get pumping well a 700 gal per min.

**Signed:** Kenneth Sanders  
**Date:** 10/23 1979
**Date**: 10/22 1979  
**Job No.**: 51-Kw-21  
**Hole No.**: 0919.03  
**Elevation**: 345.53 ft.

**Customer**: Drift of South Diamond Bar  
**Location**: Honolulu, Kauai

**Driller**: Ken Sands  
**Hrs.**: 9  
**Rig**: 36-1 BE  
**Type**: RE Cashtine

**Helper**: Richard LeRoy  
**Hrs.**: 9  
**Gas**: _______  
**Oil**: _______  
**Repairs**: _______

**Helper**: Earl Ching  
**Hrs.**: 9

**Arv. Job**: ______  
**Lv. Job**: ______

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

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

**Depth Start**: ft.  
**Depth Stop**: ft.  
**Feet Drilled**: _______

**Water Levels, Time**: M  
**Time**: M  
**Depth**: 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></td>
<td></td>
</tr>
</tbody>
</table>

**Remarks**:  
First Pumping well at Top job for minute  
Start 0 Pump Test at 11:00 A.M.  
East lid fell in  
Pump testing pumping and started at well while I went for light plant and to see if engine and casing were going Ok.

**Signed**: Ken Sands  
**Date**: 10/22 1979
Date: 10/19/79  
Job No.: 51-KE-21  
Hole No.: 0919-03  
Elevation: 345.53 ft.

Customer: Dept. of Land & Natural Res.  
Location: Anahola, Kauai

Driller: Ken Sanders  
Hrs.: 10  
Rig: 36-L B-E Cashtool

Helper: Richard Fobes  
Hrs.: 8  
Gas: Oil

Helper: Carl Pong  
Hrs.: 8  
Repairs:

Arv. Job: 7:00 AM; Job End: 5:00 PM; 10 Hrs.

Bit-Size:  
Type:  

Depth Start: 500 ft., Depth Stop: ft., Feet Drilled:  
Water Levels, Time: 8:00 AM 333.71 ft., Time: 4:00 PM 333.97 ft.

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Changed Oil in Pump, engine also oil and fuel filters, washed and cleaned rig brushes, ready for static pumping.</td>
</tr>
</tbody>
</table>

Remarks: 

No. 1 Pumping Rate Test for 1 hr. Pumped 1 hr. after swerving. Pumped at 1000 gpm for 1 hr. with 14 ft. drop diameter with 14 ft. drill pipe in hole at 26, it was clear, changing and replacing the pumps at 1750 B.P.M. water very dirty for 15 minutes, then cleaned up, no drilling mud contained, drilling that night.

Signed: Kenneth D. Sanders  
Date: 10/19/79
**Drilling Log**

**Rusco Moss Company**

830 Ahua Street • Honolulu, Hawaii 96819
Telephone (808) 839-6888 • 833-1444

---

**Date:** 10/18/79  
**Job No.:** J1-KW-21  
**Hole No.:** D-919-03  
**Elevation:** 345.5 ft.

**Customer:** Bell of Hawaii Natural Gas  
**Location:** Waikiki, Hawaii

**Driller:** Ken Sandefur  
**Hrs.:** 10  
**Rig:** 36-L B-F Cab-Trol

**Helper:** Michael Lopes  
**Hrs.:** 8  
**Gas:** Oil

**Helper:** Earl Ching  
**Hrs.:** 8  
**Oil:** Repairs

**Arv. Job:** 7:00 AM  
**Job End:** 4:00 PM  
**Hrs.:**

**Bit-Size:**  
**Type:**

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

**Depth Start:** 500 ft., Depth Stop ft., Feet Drilled 0

**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></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Remarks:**  

Not everything ready to put P.T.O. clutch on pump motor. Put after the machine shot to get clutch out, dit clutch back in. we added 10 min. to location and put it on and pumped 10 min. will put them in. Test tomorrow.

**Signed:** Kenneth D. Sandefur  
**Date:** 10/18/79
<table>
<thead>
<tr>
<th>Date</th>
<th>10/16 1979</th>
</tr>
</thead>
<tbody>
<tr>
<td>Job No.</td>
<td>51-KO-21</td>
</tr>
<tr>
<td>Hole No.</td>
<td>0912.03</td>
</tr>
<tr>
<td>Elevation</td>
<td>345.53 ft</td>
</tr>
</tbody>
</table>

**Customer:** City of Honolulu, Hawaii Location: Windward, Hawaii

**Driller:** Lou Island 7 Hrs.
**Helper:** Richard Sakaguchi 8 Hrs.  
**Helper:** Earl Ching 4 Hrs.
**Arv. Job:** 7:00 AM  
**Lv. Job:** 3:00 PM  
**8 Hrs.**

**Rig:** 36-1 B-F Cabled

**Gas:**  
**Oil:**

**Repairs:**

**Arv. Job:** 7:00 AM  
**Lv. Job:** 3:00 PM  
**8 Hrs.**

**Bit-Size:**
**Type:**

**Casing-Size:**

**in., Length in hole:**

**ft.**

**in., Amt. Perforated:**

**ft.**

**in.**

**Depth Start:** 500 ft.
**Depth Stop:**

**ft.**

**Feet Drilled:** 0

**Water Levels, Time:**

**M**

**ft.**

**M**

**ft.**

<table>
<thead>
<tr>
<th>Measurements</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
</table>

**Depth**

**Formation**

**Remarks**

**Top**

**Remarks:**

Sagged up choose at airport took parts to machine shop for repair and light bulb out. Getting ready to test pump.

**Signed:** Kenneth H. Sandune  
**Date:** 10/16 1979
## DRILLING LOG

**830 AHUA STREET • HONOLULU, HAWAII 96819**
**TELEPHONE (808) 839-6888 • 833-1644**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>10/15</td>
<td>0051-1</td>
<td>345.59 ft.</td>
<td>0919-03</td>
<td>Tim</td>
<td>10</td>
<td>36-1</td>
<td>B-E Cafeteria</td>
<td></td>
<td></td>
<td></td>
<td>7:00 AM</td>
<td>5:00 PM</td>
<td>10</td>
<td></td>
<td>Gas</td>
<td>Oil</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bit-Size</th>
<th>Type</th>
<th>Casing-Size</th>
<th>in., Length in hole</th>
<th>ft. in., Amt. Perforated</th>
<th>ft. 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>Depth Stop</th>
<th>Feet Drilled</th>
</tr>
</thead>
<tbody>
<tr>
<td>500</td>
<td></td>
<td>0</td>
</tr>
</tbody>
</table>

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

**Remarks:**
Hauled fuel from Post Ainer, Cleanout locations.

**Signed:**
Timothy L. Sanders
Signed: Timothy L. Sanders
Date: 10/15 1977
Date: 10/12/79  
Job No.: 51-KW-21  
Hole No.: 0919-09  
Elevation: 345.53 ft.  

Customer: Dept. of Land and Natural Resources  
Location: Onekala, Hawaii  

Driller: Ken Sundberg  
10 Hrs.  

Helper: Richard Lopez  
10 Hrs.  

Helper: Earl Ching  
10 Hrs.  

Arv. Job: 7:00 AM  
Job End: 5:00 PM  
10 Hrs.  

Rig: 36-1 B-E Cape Tool  

Gas:  
Oil:  
Repairs:  

Bit-Size:  
Type:  

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

Depth Start: 500 ft.  
Depth Stop:  
ft., Feet Drilled: 0  

Water Levels, Time:  
4:20 PM 333 ft., Time:  
f.

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

Remarks:  
foot pump was not assembled at Sugar Co. shop.  
Pulled pressure plate with pumps not seated not from  
leaking and called them in. Fan air line in able cleaned  
up tool box.  

Signed: Kenneth H. Sandusy  
Date: 10/12/1979
**Drilling Log**

**Ruscoe Moss Company**

830 Ahua Street • Honolulu, Hawaii 96819

Telephone (808) 839-6888 • 833-1444

---

**Date:** 10/11/1979  
**Job No.:** 51-KW-21  
**Location:** Anahola, Kauai  
**Elevation:** 3,455.53 ft.

**Customer:** Dept. of Water and Natural Res.

---

**Driller:** Tom Sander   
10 Hrs.  
**Helper 1:** Richard Logoy   
10 Hrs.  
**Helper 2:** Earl Ching   
7 Hrs.  
**Arv.Job:** 7:00 AM  
**Lv.Job:** 5:00 PM  
10 Hrs.

**Rig:** 36-1  
**B-F:** Caskettoe

---

**Bit-Size:**  
**Type:**

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

**Depth Start:** 500 ft.  
**Depth Stop:**  
**Feet Drilled:** 0

**Water Levels, Time:** M ft., Time M ft.

---

### Measurements

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Got pump engine started.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Then found out gas was out that clutch was out</td>
</tr>
<tr>
<td></td>
<td></td>
<td>of pump engine.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Good clutch housing and</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Staft slippaent pump</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Clutch to make repairs.</td>
</tr>
</tbody>
</table>

---

**Remarks:**  

... fixed up fuel line, checked to make sure that we would have enough fuel for test pumping.  

---

**Signed:** Kenneth B. Sander  
**Date:** 10/11/1979
Date: **10/10 1979**  
Job No.: 51-KW-21  
Hole No.: 0919-03  
Elevation: 345.53 ft.  

**Customer:**  
Dept. of Land and Natural Res. Location: Anaehoomalu, Kona  

**Driller:**  
Ten Sandy 10 Hrs.  

**Helper 1:**  
Richard Jokiz 10 Hrs.  

**Helper 2:**  
Jerry Rasmussen 10 Hrs.  

Arv. Job: 7:00AM  
Lv. Job: 5:00PM  
10 Hrs.  

**Or. No.:**

**Rig:**  
36-L B.E. Calibrated  

**Gas:** Oil  

**Repairs:**

---

**Bit-Size:**

**Type:**

**Casing-Size:**

**In., Length in hole:**

**ft., in., Amt. Perforated:**

**ft., In.**

**Depth Start:**

**600 ft., Depth Stop: 600 ft., Feet Drilled:**

---

**Water Levels, Time:**

M ft., Time M ft.,

---

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

**Richard Jokiz had to go back to rig for elemental from fuel pump. Too weak it 125 extra.**

**Signed:** Kenneth J. Sanders  
Date: **10/10 1979**
<table>
<thead>
<tr>
<th>Date</th>
<th>10/7/1979</th>
<th>Job No.</th>
<th>57-KW-21</th>
<th>Hole No.</th>
<th>0919-03</th>
<th>Elevation</th>
<th>345.53 ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer</td>
<td>Dept. of Land &amp; Natural Res.</td>
<td>Location</td>
<td>Anahola, Kauai</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Driller</td>
<td>Ken Sawers</td>
<td>10 Hrs.</td>
<td>Rig 36-L BF Cast Iron</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Helper</td>
<td>Richard Hinke</td>
<td>10 Hrs.</td>
<td>Gas Oil</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Helper</td>
<td>Jorgen Rasmussen</td>
<td>10 Hrs.</td>
<td>Repairs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arv. Job</td>
<td>7:00 AM, Lv. Job 5:00 PM</td>
<td>10 Hrs.</td>
<td>Or. No.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

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

<table>
<thead>
<tr>
<th>Depth Start</th>
<th>800 ft.</th>
<th>Depth Stop</th>
<th>ft.</th>
<th>Feet Drilled</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

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

Remarks: Ran 380 ft. Color white. Pumped out air. Started rigging up with lead. Pulled up oil pipe. Ran lead 8 Bbls measured 227.6 gal. gave in 600 ft. Picked up pump rod combination at airport.

Signed: Kenneth D. Sande Date: 10/7/1979
**DRILLING LOG**

830 AHUA STREET • HONOLULU, HAWAII 96819
TELEPHONE (808) 839-6888 • 833-1444

Date: 10/8 1979  
Job No: 51-KE-21  
Hole No: 0919-03  
Elevation: 345.53 ft.

Customer: Dept of Land & Natural Res  
Location: Anahola, Kauai

Driller: Tim Sanders  10 Hrs.  
Rig: 36-L B-E Casing

Helper: Richard Sipsey  10 Hrs.  
Gas:  
Oil:  
Repairs:  

Arv. Job: 7:00AM  
Lv. Job: 5:00PM  
Or. No.:  

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

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

<table>
<thead>
<tr>
<th>Depth Start</th>
<th>500 ft.</th>
<th>Depth Stop</th>
<th>ft.</th>
<th>Feet Drilled</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Water Levels, Time | 8:13AM | 33'4 ft. | Time | M ft. |

<table>
<thead>
<tr>
<th>Measurements</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

Remarks:  

- Held up Jerry at airport. Started running pump.  
- Ran out of casing, lost pump rode fell in for more.  
- Went and got hydraulic oil for pump.

Signed: Kenneth L. Sanders  
Date: 10/8 1979
Date: 10/14/79
Job No: 51-KW-21
Hole No: 099-03
Elevation: 345.53 ft.

Customer: Depth of Land and Natural Rise
Location: Anchole, Kauai

Driller: Ken Sanders
10 Hrs.

Rig: 36-L B-F Calibead

Helper: Richard Lopez
10 Hrs.

Gas: Oil

Repairs

Arv. Job: 7:00 AM
Lv. Job: 5:00 PM
10 Hrs.

Bit-Size

Type

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

Depth Start: 500 ft., Depth Stop: 7 ft., Feet Drilled: 0


Remarks:
Cementing hole with ready mix truck. Set elevators slings set for running pump.
No problems with cement job.

Signed: Kenneth S. Sanders
Date: 10/14/79
**Date:** 10/3 1979  
**Job No.:** 51-KW-21  
**Hole No.:** 0919-02  
**Elevation:** 345.53 ft.  
**Customer:** Dept. of Land Natural Res.  
**Location:** Anahola, Hawaii  
**Rig:** 36-L B-E Calf Hole  
**Rig:** Oil  
**Helper:** Richard Lofin  
**Arv. Job:** 7:00 AM  
**Lv. Job:** 5:00 PM  
**Or. No.:**  

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

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

<table>
<thead>
<tr>
<th>Depth Start</th>
<th>Depth Stop</th>
<th>Feet Drilled</th>
</tr>
</thead>
<tbody>
<tr>
<td>500</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Water Level, Time</th>
<th>M 334 ft., Time</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M 93 ft.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Run 6 Joints Lower Type screen with Casing shoe. 14.5 ft.</td>
</tr>
<tr>
<td>Casing shoe 122.24 ft.</td>
</tr>
<tr>
<td>Casing shoe .65 ft.</td>
</tr>
<tr>
<td>Run 11 Joints Spiral Weld Casing 14.5 ft. 221.14 ft.</td>
</tr>
<tr>
<td>Run 6 Joints Straight Weld Type Casing 14.5 ft. Total 107.15 ft.</td>
</tr>
<tr>
<td>Casing shoe: 14&quot; x 8&quot; x 3/4&quot;</td>
</tr>
<tr>
<td>14 1/2&quot; O.D. - 5/8&quot; W</td>
</tr>
<tr>
<td>Baker Yes Co. Cement Basket</td>
</tr>
<tr>
<td>17-1/2&quot; x 16-7/8&quot; x 25&quot;</td>
</tr>
<tr>
<td>Basket set at 108 ft.</td>
</tr>
</tbody>
</table>

**Remarks:** Finished running casing. Filled cement basket; 3 ft course gravel 2 ft fine gravel 2 ft sand and 2 ft concrete. Cement basket held perfectly.

**Signed:** Kenneth S. Sanders  
**Date:** 10/3 1979
Date: 10/12 1979
Job No.: 51-KW-21
Hole No.: 0919-03
Elevation: 345.53 ft.
Customer: Dilt of Land and Natural Res.
Location: Honolulu, Hawaii

Driller: Ken Sanders
10 Hrs. Rig: 36-L B. E. Cashboard

Helper: Richard Lepek
10 Hrs. Gas: Oil

Helper: 
Hrs. Repairs:

Arv. Job: 7:00 AM
Lv. Job: 5:00 PM
10 Hrs.

Bit-Size
Type

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

Depth Start: 500 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></td>
<td></td>
</tr>
</tbody>
</table>

Remarks: Running Casing

Signed: Kenneth D. Sanders
Date: 10/12 1979
**DRILLING LOG**

Date: 10/11/79  
Job No: 51-W-21  
Hole No: 0919-03  
Elevation: 345.53 ft.

Customer: Dep't of Land & Natural Res.  
Location: Anahola, Kauai

Driller: Ken Sanders  
Hrs: 10  
Rig: 36-L B.F. Calhoun

Helper: Richard Hafy  
Hrs: 10  
Gas:  
Oil:  
Repairs:  

Arv. Job: 7:00AM  
Lv. Job: 5:00PM  
Hrs: 10

Bit-Size:  
Type:  
Casing-Size:  
in., Length in hole:  
ft., in., Amt. Perforated:  
ft., in.

Depth Start: 500 ft., Depth Stop:  
ft., Feet Drilled: 0

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

Measurements

A  
B  

Remarks:  

- Not casing at pier and hauled to location.  
- Unloaded casing at well site. Started running casing.

Signed: Kenneth J. Sanders  
Date: 10/11/79
Date: 9/28 1979
Job No. 51-HK-21
Hole No. 599-03
Elevation: 845.53 ft.

Customer: City of Santa Monica, Calif.
Location: Santa Monica, Calif.

Driller: Kevin Sandberg
10 Hrs.
Rig: 36-1 B E Capfield

Helper: Richard LeBogart
10 Hrs.
Gas: Oil

Arv. Job: 7:00 AM
Lv. Job: 5:30 PM
10 Hrs.

Bit-Size: 13 in.
Type: Sellar


Depth Start: 50 ft., Depth Stop: 0 ft., Feet Drilled: 0


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>OK</td>
</tr>
</tbody>
</table>

Remarks:
Started running casing, ran 4 joints; screen will have to wait for the rest, must come in on barge.海南商品中转, need to get tests to pump to location. Still need to get diving time.

Signed: Kenneth M. Sandberg
Date: 9/28 1979

OK
Date 9/27/79        Job No. 51-KW-21        Hole No. 0919-03        Elevation 345.53 ft.
Customer      D.D. Green & Natural Res.    Location Anchala, Hawaii

Driller    Ken Sandlin         10 Hrs.     Rig 36-L B-E Catfish
Helper     Richard Leong         10 Hrs.     Gas          Oil
Helper
Arv. Job 7:00 AM. Job 5:00 PM 10 Hrs.  Repairs
Or. No.

Bit-Size  13 in.     Type Star

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

Depth Start 490 ft., Depth Stop 500 ft., Feet Drilled 10

Water Levels, Time 7:00 AM 338 ft., Time 4:30 PM 338 ft.

Depth  Formation  Remarks  Top
490               md. hard clay  OK
500               Rock  OK

Remarks: No change in water or well conditions.

Order to run casing at this point (500 ft.)

Signed  Kenneth D. Sandlin  Date 9/27/79
### DRILLING LOG

**RUSCOE MOSS COMPANY**

830 AHUA STREET • HONOLULU, HAWAI'I 96819
TELEPHONE (808) 839-6888 • 833-1444

<table>
<thead>
<tr>
<th>Date</th>
<th>9/25/79</th>
</tr>
</thead>
<tbody>
<tr>
<td>Job No.</td>
<td>51-KW-21</td>
</tr>
<tr>
<td>Hole No.</td>
<td>0919-03</td>
</tr>
<tr>
<td>Elevation</td>
<td>345.53 ft</td>
</tr>
<tr>
<td>Customer</td>
<td>Dept of Land and Natural Res.</td>
</tr>
<tr>
<td>Location</td>
<td>Ainakea, Hawaii</td>
</tr>
<tr>
<td>Driller</td>
<td>Ken Sanders 10 Hrs. Rig 36-1 B&amp;I Auger Tool</td>
</tr>
<tr>
<td>Helper</td>
<td>Richard Lopez 10 Hrs. Gas Oil</td>
</tr>
<tr>
<td>Arv. Job</td>
<td>7:00 AM Lv. Job 5:00 PM 10 Hrs. Hrs. Repairs Or. No.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Depth</th>
<th>13 in. Type Star</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bit Size</td>
<td>13 in. Type Star</td>
</tr>
<tr>
<td>Casing Size</td>
<td>13 in. Length in hole ft. in., Amt. Perforated ft. in.</td>
</tr>
<tr>
<td>Depth Start</td>
<td>1470 ft. Depth Stop 1490 ft. Feet Drilled 20</td>
</tr>
<tr>
<td>Water Levels, Time 7:10 AM 338 ft., Time 4:50 PM 338 ft.</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>1470</td>
<td>loose ash, clinters</td>
<td>ok</td>
<td>ok</td>
</tr>
<tr>
<td>1484</td>
<td>gravel and cut</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1490</td>
<td>mud and hard sand</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1490</td>
<td>rock</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Remarks: | no change in water or well conditions. |

**Signed:** Kenneth D. Sanders

**Date:** 9/25/79
**Drilling Log**

**830 Ahua Street • Honolulu, Hawaii 96819**
**Telephone (808) 839-6888 • 833-1444**

**R.M. Job # 6-29**

**Date:** 9/24/79  **Job No.:** 51-EL-21  **Hole No.:** 097-03  **Elevation:** 545.53 ft.

**Customer:** D.B. Sandifer Ltd.  **Location:** Anahola, Kauai

**Driller:** Ken Sandifer  **10 Hrs.**  **Rig:** 36-1 B-E Cafeteria

**Helper:** Richard Johnson  **10 Hrs.**  **Gas:** Oil

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

**Arv. Job:** 7:00 AM  **Lv. Job:** 5:00 PM  **10 Hrs.**  **Or. No.:**

**Bit-Size:** 1 1/2 **Type:** Star

<table>
<thead>
<tr>
<th>Casing-Size</th>
<th>in., Length in hole ft.</th>
<th>in., Amt. Perforated ft.</th>
<th>in.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>Tap</th>
</tr>
</thead>
<tbody>
<tr>
<td>460</td>
<td>Hard Lava</td>
<td></td>
<td></td>
</tr>
<tr>
<td>464</td>
<td>Rock</td>
<td></td>
<td></td>
</tr>
<tr>
<td>470</td>
<td>Loose ash, clinkers</td>
<td>grain act.</td>
<td></td>
</tr>
</tbody>
</table>

**Water Levels, Time:** 7:10 AM 338 ft.,  Time: 4:00 PM 338 ft.

**Measurements**

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
</tr>
</thead>
</table>

**Remarks:** No change in water conditions.

**Signed:** Kenneth D. Sandifer  **Date:** 9/24/79
### Drilling Log

**Ruscoe Moss Company**

830 Anua Street, Honolulu, Hawaii 96814

**Telephone:** (808) 839-6388 • 833-1444

---

- **Date:** 9/21 1979
- **Job No.:** S1-Ka-21
- **Hole No.:** O919-03
- **Elevation:** 345.63 ft.

**Customer:** Dept. of Honolulu Natural Gas, Location: Anahola, Kauai

<table>
<thead>
<tr>
<th>Driller</th>
<th>10 Hrs.</th>
<th>Rig: 36-1 B-E Coastline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Helper</td>
<td>10 Hrs.</td>
<td>Gas: Oil</td>
</tr>
</tbody>
</table>

**Arv. Job:** 7:00 AM, **Lv. Job:** 10 AM

- **Helper Hrs.**
- **Repair:**

<table>
<thead>
<tr>
<th>Bit-Size: 12 1/2 in. Type: Star</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depth Start: 450 ft., Depth Stop: 560 ft., Feet Drilled: 10</td>
</tr>
</tbody>
</table>

**Water Levels, Time:**

- 10:45 AM, **338 ft.**

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>450</td>
<td>Lava Rock</td>
<td>OK at</td>
</tr>
<tr>
<td>455</td>
<td>Naula Sand and Limestone</td>
<td></td>
</tr>
<tr>
<td>453</td>
<td>Plant and Hard</td>
<td></td>
</tr>
<tr>
<td>440</td>
<td>Lava Rock</td>
<td></td>
</tr>
</tbody>
</table>

- **Drilling Tools:** Finished rigging and changed drilling tools. Start drilling

**Remarks:**

- **No change in water level, no change in salt test. Water still has not cleared up. Took several days off. Water from water level after getting several days, water still not real clear. Cuttings still not washing away.**

**Signed:** Kenneth A. Sandau, **Date:** 9/21 1979
### DRILLING LOG

**RUSCOE MOSS COMPANY**

830 AHUA STREET • HONOLULU, HAWAII 96819
TELEPHONE (808) 839-6888 • 833-1444

---

**Date:** 9/20 1979  
**Job No.:** 51-KW-21  
**Hole No.:** 0919-03  
**Elevation:** 345.53 ft.

**Customer:** Office of Lands & Natural Res.  
**Location:** Anahola, Kauai

**Driller:** Kim Sandusky  
**Hrs.:** 10  
**Rig:** 36-t B-E Collator

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

**Helper:** Richard Lopez  
**Hrs.:** 10

**Arv. Job:** 7:00AM  
**Lev. Job:** 5:00PM  
**Hrs.:** 10

---

**Bit-Size:** 18 in.  
**Type:** mud friction

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

**Depth Start:** 450 ft., **Depth Stop:** ft., **Feet Drilled:** 0

**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></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**Remarks:** Finished putting rig together. Did some repair work on shack on top of rig.

---

**Signed:** Kenneth J. Sandusky  
**Date:** 9/20 1979
Date: 9/19 1979  
Job No: 51-KW-21  
Hole No: 029-08  
Elevation: 345.53 ft.

Customer: Dept of Land and Natural Res.  
Location: Anahola, Kauai

Driller: Ken Sandoe  
Helper: Richard Lehey  
Arv. Job: 7:00 AM  
Lv. Job: 5:00 AM  
Or. No.: __________

Rig: 36-L B-E Cable tool
Gas: ______  
Oil: ______  
Repairs: ______

Bit Size: 18 in.  
Type: Miter Leftlard

Casing Size: ______ in.  
Length in hole: ______ ft.  
Amt. Perforated: ______ ft.  

Depth Start: 150 ft.  
Depth Stop: ______ ft.  
Feet Drilled: 0

Water Levels: 
}

Remarks:  

Signed: Kenneth A. Sandoe  
Date: 9/19 1979
### Drilling Log

**Date:** 9/18 1979  
**Job No:** 51-KW-31  
**Hole No:** 0919-02  
**Elevation:** 345.53 ft.

**Customer:** Dept. of Land and Natural Res.

**Location:** Honolulu, Hawaii

**Driller:** Ken Sanders  
**Helper:** Richard Foley

**Rig:** 36-L B-E Cafel toda

**Gas:** Oil

**Arv. Job:** 7:00 AM  
**Lv. Job:** 5:00 PM  
**10 Hrs.**

**Bit-Size:** 18 in.  
**Type:** mudclamped

**Casing-Size:** 450 in., Length in hole: 450 ft., Amt. Perforated: 0 ft.

**Depth Start:** 0 ft., Depth Stop: 450 ft., Feet Drilled: 0

**Water Levels, Time:** M 338 ft., Time: M 0 ft.

---

**Depth**  | **Formation**  | **Remarks**  | **Top**  | **A** | **B**
---|---|---|---|---|---
---|---|---|---|---|---
---|---|---|---|---|---
---|---|---|---|---|---
---|---|---|---|---|---

**Remarks:**  
Just rig parts to machine shop to get reified. Straightened out frames and did some welding on rig.

**Signed:** Kenneth F. Sanders  
**Date:** 9/18 1979
### Drilling Log

**RUSCOE MOSS COMPANY**

830 AHUA STREET • HONOLULU, HAWAII 96819

TELEPHONE (808) 839-6888 • 833-1444

**0919-03**

Date: 9/17 1979  
Job No: 31 - KW-2  
Hole No: 2919-03  
Elevation: 346.53 ft.

Customer: DIET OF SAND AND NATURAL RES.  
Location: Naalehu, Kauai

Driller: Ken Sanders  
10 Hrs.  
Rig: 36-2 B.F. Lafitte

Helper: Richard Sozy  
10 Hrs.  
Gas: Oil

Helper:  
Hrs.  
Repairs: 

Arv. Job: 7:00 AM  
Lv. Job: 5:00 PM  
10 Hrs.  
Or. No.:

**Bit-Size:** 18 in.  
**Type:** motherlode

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

**Depth Start:** 450 ft.  
**Depth Stop:** ft.  
**Feet Drilled:** 0

**Water Levels, Time:** 3:38 M 338 ft., Time 5:00 M ft.

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

**Measurements**

**Remarks:** Disassembled rig derrick and removed broken parts to be repaired.

**Signed:** Kenneth J. Sanders  
**Date:** 9/17 1979
**Date:** 9/14 1979  
**Job No.:** 51  
**Driller:** Ken Sanders  
**Helper:** Richard Hoog  
**Rig:** 36-L B-E Cadet  
**Job:** Gas 
**Repairs:** 

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>Top</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.75</td>
<td>Loose Lara Boulder</td>
<td></td>
<td>OT OT</td>
</tr>
<tr>
<td>4.50</td>
<td>Gravel Sandes And</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Chalks</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Remarks:** Water still dirty (same as yesterday) also salt test still 12.5% & no change in water level.  
**Signed:** Kenneth S. Sanders  
**Date:** 9/14 1979
DRILLING LOG

Date: 9/13/79  
Job No: 51-KW-31  
Hole No: 098-65  
Elevation: 345.53 ft.

Customer: Dept. of Sanitation  
Location: Anahola, Kauai

Driller: Ken Sandeg  
10 Hrs.  
Rig: 36-L B-E Cofleetool

Helper: Richard Lopez  
10 Hrs.  
Gas:  
Oil:  
Reps.: 
Arv. Job:  
Avl. Job: 10 Hrs.  
Or. No.: 

Bit-Size: 18 in.  
Type: Paddle (mut. Ribbed type)

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

Depth Start: 425 ft.  
Depth Stop: 475 ft.  
Feet Drilled: 20


<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>Top</th>
</tr>
</thead>
<tbody>
<tr>
<td>49.5</td>
<td>Loose Sand</td>
<td>Water a little cleaner</td>
<td>ot ot</td>
</tr>
<tr>
<td>49.5</td>
<td>Water Cinders and</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Clastics</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Remarks:  
Still holding cutting, not washing away.  
Salt content improved slightly. Reading was:  
13.5 x 9 now 12.5 x 8.

Signed: Kenneth J. Sandeg  
Date: 9/13/79  
1979
<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>Top</th>
</tr>
</thead>
<tbody>
<tr>
<td>1470</td>
<td>Hard Blue Lava</td>
<td></td>
<td>0 ft</td>
</tr>
<tr>
<td>1491</td>
<td>Rock</td>
<td></td>
<td>0 ft</td>
</tr>
<tr>
<td>471</td>
<td>Loose Lava</td>
<td>This zone has contents</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>sand, silt and a good water bearing</td>
<td></td>
</tr>
<tr>
<td>475</td>
<td></td>
<td>and cinders.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>formation. Can not tell</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>if making any water or</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Not.</td>
<td></td>
</tr>
</tbody>
</table>

Remarks: water not hardly as muddy as before. No cuttings washing away as far as we can tell.

Signed: Kenneth Sanders Date: 9/12/79
Date: 9/11/79  
Job No.: 51-KW-2  
Hole No.: 0919-03  
Elevation: 445.53 ft.  

Customer: Dill of Lanai  
Location: Pond, Lanai  

Driller: Lin Sandus 10 Hrs.  
Rig: B-1  

Helper: Richard Loy 10 Hrs.  
Gas:  

Arv. Job: 7:00 AM  
Lv. Job: 5:00 PM  
10 Hrs.  

Bit-Size: 1  
Type: Star  

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

Depth Start: 41 ft.  
Depth Stop: 420 ft.  
Feet Drilled: 6  

Water Levels, Time: 7:20 AM 332 ft.  
Time: 4:40 PM 338 ft.  
334 ft. with sounding device  

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>Top</th>
</tr>
</thead>
<tbody>
<tr>
<td>414</td>
<td>Lohee Arina, Cliffs</td>
<td></td>
<td>OT</td>
</tr>
<tr>
<td>416</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>419</td>
<td>Hard Blue Lava</td>
<td>Rock</td>
<td></td>
</tr>
<tr>
<td>420</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>420</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Remarks: Water level up from 338 ft. to 332 ft. last higher. Water level back down at 4:40 PM to normal level 338 ft.  

Signed: Kenneth E. Sandus  
Date: 9/11/79
**DRILLING LOG**

830 AHUA STREET • HONOLULU, HAWAI'I 96819
TELEPHONE (808) 839-6888 • 833-1444

---

**Date:** 9/10 1979  
**Job No.:** 51-KwaI  
**Hole No.:** 099-02  
**Elevation:** 4445.53 ft.

**Customer:** Dept. of Land & Natural Res.  
**Location:** Anahola, Kauai

**Driller:** Ken Sandus  
**10 Hrs.**  
**Rig:** 36-L B-E Ceglesco

**Helper:** Richard Lats  
**10 Hrs.**  
**Gas:**  
**Oil:**

**Arv. Job:** 7:00 AM  
**Lv. Job:** 5:00 PM  
**10 Hrs.**

**Bit-Size:** 18 in.  
**Type:** Star

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

**Depth Start:** 400 ft.  
**Depth Stop:** 414 ft.  
**Feet Drilled:** 14 ft.

**Water Levels, Time:** 7:10 AM  
**M 4:30 P.M. 338 ft.**

---

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>Top</th>
</tr>
</thead>
<tbody>
<tr>
<td>400</td>
<td>Loose Cinder, Clinters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>406</td>
<td></td>
<td>Hard Blue Green</td>
<td></td>
</tr>
<tr>
<td>409</td>
<td></td>
<td>Rock</td>
<td></td>
</tr>
<tr>
<td>413</td>
<td></td>
<td>Cinder, Clinters, etc.</td>
<td></td>
</tr>
<tr>
<td>418</td>
<td></td>
<td>Hard Blue Rock</td>
<td></td>
</tr>
</tbody>
</table>

---

**Remarks:**

---

**Signed:** Kenneth A. Sandus  
**Date:** 9/10 1979
Date: 9/7/79
Job No.: 51-KW-51
Hole No.: 0917-02
Elevation: 455.5

Customer:
Dept. of Land & Natural Res.
Location: Honolulu, Hawaii

Driller: Ken Sanders
10 Hrs. Rig: 36-1 B-E Callitool
Helper: Richard Lopez
10 Hrs. Gas: 
Oil: 

Arv. Job: 7:00 AM, Lv. Job: 10 Hrs.
Or. No.:

Bit-Size: 1 8


Depth Start: 395 ft., Depth Stop: 400 ft., Feet Drilled: 5

Water Levels, Time:
7:20 AM 338 ft., Time:
4:40 PM 338 ft.

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>Top</th>
</tr>
</thead>
<tbody>
<tr>
<td>396</td>
<td>Loose Lava Rock</td>
<td></td>
<td>OK</td>
</tr>
<tr>
<td>397</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>397</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>399</td>
<td>Hard Blue Lava</td>
<td>Water still dirty</td>
<td></td>
</tr>
<tr>
<td>397</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>399</td>
<td></td>
<td>Rock</td>
<td></td>
</tr>
<tr>
<td>400</td>
<td>Loose Sandstone,</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Clastics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>400</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Remarks:
Dredged so far 6 hrs. Blue rock very hard.
No change in water level. Hole still holding cuttings.
Water still dirty.

Signed: Kenneth D. Sanders
Date: 9/7/79
### Drilling Log

**Ruscoe Moss Company**

830 Ahua Street, Honolulu, Hawaii 96819

Telephone (808) 839-6888 • 833-1444

---

**Date:** 9/6-9/79

**Job No.:** 51-KW-51

**Hole No.:** 0919-05

**Elevation:** 345.53 ft.

**Depth Start:** 375 ft., Depth Stop: 395 ft., Feet Drilled: 20

**Water Levels, Time:** 7:10 A.M. 338 ft., Time: 11:30 P.M. 338 ft.

---

<table>
<thead>
<tr>
<th>Depth (ft.)</th>
<th>Formation</th>
<th>Remarks</th>
<th>Top</th>
</tr>
</thead>
<tbody>
<tr>
<td>375</td>
<td>Porous Lava</td>
<td></td>
<td></td>
</tr>
<tr>
<td>375</td>
<td>Rock</td>
<td></td>
<td></td>
</tr>
<tr>
<td>375</td>
<td>Red Cinder, Clusters</td>
<td>No change in water level, water still very dirty</td>
<td></td>
</tr>
<tr>
<td>381</td>
<td>Porous Lava, Rock</td>
<td></td>
<td></td>
</tr>
<tr>
<td>381</td>
<td>Hard Blue Rock</td>
<td></td>
<td></td>
</tr>
<tr>
<td>392</td>
<td>Loose Lava Rock</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Remarks:** No change in water level, water still very dirty

---

**Signed:** Kenneth J. Sanders

**Date:** 9/6 1979
<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>Top</th>
</tr>
</thead>
<tbody>
<tr>
<td>364</td>
<td>Hard Blue Lava</td>
<td></td>
<td>OK</td>
</tr>
<tr>
<td>367</td>
<td>Rock</td>
<td></td>
<td>OK</td>
</tr>
<tr>
<td>375</td>
<td>Poreana Lava</td>
<td></td>
<td></td>
</tr>
<tr>
<td>378</td>
<td>Rock</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Remarks: Water still very dirty. No change in static water level today.

Signed: Kenneth J. Sanders  Date: 9/5/1979
### Drilling Log

**Company:** Ruscoe Moss Company  
**Address:** 830 Ahua Street • Honolulu, Hawaii 96819  
**Telephone:** (808) 839-6555 • (833-1444)

**Date:** 9/14/79  
**Job No.:** 51-GY-21  
**Hole No.:** 0-919-03  
**Elevation:** 345.53 ft.

**Customer:** City of Lava-Natural Ave  
**Location:** Anahola, Kauai

**Driller:** Ken Sandwe  
**Helper:** Richard Lopez  
**Rig:** 36-1 B-E Cafeteria

**Helper:**  
**Arv. Job:** 7:00 AM  
**Lv. Job:** 6:00 PM  
**Hrs.:** 10

**Bit-Size:** 18 in  
**Casing-Size:** in., Length in hole ft. in., Amt. Perforated ft. in.

**Depth Start:** 357 ft., **Depth Stop:** 364 ft., **Feet Drilled:** 7

**Water Levels:** Time 7:15 a.m. 332 ft., Time 4:30 p.m. 338 ft.

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>357</td>
<td>Blue Rock</td>
<td></td>
</tr>
<tr>
<td>361</td>
<td></td>
<td></td>
</tr>
<tr>
<td>362</td>
<td>Loose sand rock</td>
<td>Water level went down to 349 ft in this zone</td>
</tr>
<tr>
<td>363</td>
<td></td>
<td></td>
</tr>
<tr>
<td>364</td>
<td>Hard Blue Rock</td>
<td>Water very dirty now</td>
</tr>
<tr>
<td>365</td>
<td></td>
<td></td>
</tr>
<tr>
<td>366</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Remarks:** Can't bail hole down. Cutting not washing away. Water very dirty. Water level came back up to 338 ft where water was first encountered.

**Signed:** Kenneth J. Sandwe  
**Date:** 9/14/79
**DRILLING LOG**

**R.M. Job #5-79**

**Date:** 8/31/79  
**Job No.:** 51-KW-21  
**Hole No.:** 0919-03  
**Elevation:** 845.59 ft.

**Customer:** Dept. of Land and Natural Res.  
**Location:** Honolulu, Oahu

**Driller:** Ken Sanders  
**Helper:** Richard Lopez

**Rig:** 36-1 R-F Cafeteria  
**Gas:** Oil  
**Oil:**  
**Repairs:**

**Arv. Job:** 7:00 AM  
**Job 5:00 PM:** 10 Hrs.

**Bit-Size:** 18 in.  
**Type:** Star

**Casing-Size:** in., Length in ft.  
**Depth in ft., Amt. Perforated in ft.**

**Depth Start:** 357 ft.  
**Depth Stop:** 357 ft.  
**Feet Drilled:** 0

**Water Levels, Time:** 7/10 A M 332 ft., Time 4:30 P M 332 ft.

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

**Measurements**

**Signed:** Kenneth J. Sanders  
**Date:** 8/31/79

**Remarks:** Look out for obstructions. Best to poke school. Ready to start drilling.
DRILLING LOG

8/30/79

Date: 8/30/79  Job No: 51-KW-21  Hole No: 0919-03  Elevation: 345.53 ft.

Customer: Dept of Land & Natural Res  Location: Anahola, Kauai

Driller: Ken Sanders  10 Hrs.  Rig: 36-L R-E Gas, Oil
Helper: Richard Leary  10 Hrs.  Repairs
Arv. Job: 7:00 AM  Lm. Job: 5:00 PM  10 Hrs.

Bit-Size: 18 in.  Type: Star


Depth Start: 353 ft., Depth Stop: 357 ft., Feet Drilled: H

Water Levels, Time: 4:10 AM 332 ft., Time: 4:45 PM 332 ft.

<table>
<thead>
<tr>
<th>Depth</th>
<th>Remarks</th>
<th>Top</th>
</tr>
</thead>
<tbody>
<tr>
<td>353</td>
<td>Hard Lava Rock</td>
<td>OK OK</td>
</tr>
</tbody>
</table>

Remarks: Water has not cleared up completely. Still cloudy looking.

Signed: Kenneth D. Sanders  Date: 8/30/79
**DRILLING LOG**

**830 AHUA STREET • HONOLULU, HAWAII 96819**

**TELEPHONE (808) 839-6888 • 833-1444**

---

**Date:** 8/29 1979  
**Job No.:** 51-KW-21  
**Hole No.:** 2914-03  
**Elevation:** 345.53 ft.

**Customer:** Dept of Land and Natural Res  
**Location:** Naolah, Kauai

**Driller:** Ken Sanders  
**Hours:** 10 Hrs.  
**Rig:** 36-LB-3 Cashtel  

**Helper:** Richard Itoz  
**Gas:** Oil  
**Oil:** Oil

**Arr. Job:** 7:00AM  
**Lv. Job:** 5:00PM  
**Hrs.:** 10 Hrs.

---

**Bit-Size:** 12 in.  
**Type:** Steel  

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

**Depth Start:** 349 ft.  
**Depth Stop:** 353 ft.  
**Feet Drilled:** 4

**Water Levels, Time:** 7:15 AM 332 ft.  
**Time:** 4:40 PM 332 ft.

---

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>Top</th>
</tr>
</thead>
</table>
| 349   | Hard Lava Rock | Blue | OK |"ok
| 353   |           |         |     |

---

**Remarks:** Can't lower level with bailer as well will make more than 100 ft. p.m. cuttings do not wash away in hole. Formation very hard at this point.

---

**Signed:** Kenneth E. Sanders  
**Date:** 8/29 1979
<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>Top</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.25</td>
<td>Med. Hard lava</td>
<td>Grey</td>
<td>OK</td>
<td>OK</td>
<td></td>
</tr>
<tr>
<td>3.38</td>
<td>Rock</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.38</td>
<td>Loose lava</td>
<td>Water in this zone</td>
<td>OK</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.49</td>
<td></td>
<td>and gravel</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.49</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Remarks: Formation got hard at 3.49 ft.

Signed: Kenneth S. Sanders Date: 8/28/79
### Drilling Log

**Date:** 8/27/1979  
**Job No.:** 51-EW-21  
**Hole No.:** 0919-07  
**Elevation:** 3455.5 ft.

**Driller:** Ken Sandre  
**Helper:** Richard Hakey  
**Arv. Job:** 7:00 AM  
**Lv. Job:** 5:00 PM  
**Hrs.:** 10 Hrs.

**Rig:** 36 - 1 BE Collar

**Customer:** Dept of Land & Natural Res.  
**Location:** Ahahula, Kauai

---

**Bit-Size:** 18 in.  
**Type:** Stae  
**Casing-Size:** in., Length in hole ft., Amt. Perforated ft. in.

**Depth Start:** 320 ft.  
**Depth Stop:** 335 ft.  
**Feet Drilled:** 15

**Water Levels, Time:** M ft., Time M ft.

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>320</td>
<td>Red Sand &amp; Peck</td>
<td></td>
<td>DK</td>
<td>OK</td>
</tr>
<tr>
<td>326</td>
<td>Formation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>335</td>
<td>Sand &amp; Lava</td>
<td>Gray</td>
<td></td>
<td></td>
</tr>
<tr>
<td>335</td>
<td>Rock</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Remarks:**

---

**Signed:** Kenneth S. Sandre  
**Date:** 8/27/1979
DRILLING LOG

Date: 8/24/1979  Job No: 5-29  Hole No: 0919-03  Elevation: ______ ft.

Customer: Dept of Land & Natural Res  Location: Gas hole

Driller: Ken Lazaro  10 Hrs.  Rig: 36 L
Helper: Richard Lagoe  10 Hrs.  Gas:  ______ Oil:  ______
Helper:  ______ Hrs.  Repairs:  ______
Arv. Job: 7:00 AM  Job End: 5:00 PM  10 Hrs.  Or. No.:  ______

Bit-Size: 18 in.  Type:  Star


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>366</td>
<td>Hard grey layer</td>
<td>H艮e</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rock</td>
<td></td>
<td></td>
</tr>
<tr>
<td>330</td>
<td>Sand &amp; shale form.</td>
<td>Red in</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>color</td>
<td></td>
</tr>
</tbody>
</table>

Comments:

Remarks: Formation starting at 306 dulls like sandstone,
 Irving sh one end. Acid.

Signed: Kenneth E. Lazaro  Date: 8/24/1979
**DRILLING LOG**

---

**ROSCOE MOSS COMPANY**

---

830 AHUA STREET • HONOLULU, HAWAII 96819
TELEPHONE (808) 839-6888 • 833-1444

---

**Date 8/23 1979**

**Job No. 5-79**

**Hole No. 0919-03**

**Elevation**

---

**Customer**

Dept. of Land and Natural Res.

**Location**

Anchola

---

**Driller**

Ken Sanders

**Helper**

Richard Fatig

**Helper**

Robert Brown

---

**Arv. Job**

7:00 AM

**Lv. Job**

5:00 PM

---

**Rig**

361

---

**Depth Start**

285 ft.

**Depth Stop**

300 ft.

**Feet Drilled**

15

---

**Water Levels**

Time M ft. Time M ft.

---

**Remarks:**

Grey lava. Rock is red, sharp, cross fit out fast.

---

**Signed**

Kenneth H. Sanders

**Date**

8/23 1979
Date: 8/22 1979
Job No.: 5-79
Hole No.: 6919-03
Elevation: ____________ ft.
Customer: Dept. of Land and Natural Re. Location: Anahola

Driller: Ken Sandusy
Helper: Richard Hafey
Arv. Job: 7:00 AM
Lv. Job: 5:00 PM
10 Hrs.

Rig: 34-L

Gas: ____________ Oil: ____________

Repairs: ____________

Arr. Job: 7:00 AM
Lv. Job: 5:00 PM
10 Hrs.

Bit-Size: 18


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

Water Levels, Time: M ____________ ft., Time: M ____________ ft.

Depth

Formation

Remarks

Top

9.68

Mud and lava

Red in Color

9.63

Rock

9.65

Casing, loose lava

Remarks:

A

B

OK

OK

Signed: KENNETH J. SANDUSY
Date: 8/22 1979
**DRILLING LOG**

RUSCOE MOSS COMPANY

830 AHUA STREET • HONOLULU, HAWAII 96819
TELEPHONE (808) 839-6888 • 833-1444

---

**Date:** 8/21 1979  
**Job No.:** 579  
**Hole No.:** 0919-03  
**Elevation:** [Blank] ft.  
**Location:** Anchols

---

**Driller:** Ken Sanders  
**Helper:** Richard Toggo  
**Arv. Job Time:** 7:00AM, Lv. Job 6:00PM  
**10 Hours:**  
**Rig:** 36L  
**Gas:**  
**Oil:**  
**Repairs:**

---

**Bit-Size:** 18 in.  
**Casing-Size:**  
**Depth Start:** 255 ft., Depth Stop: 265 ft., Feet Drilled: [Blank]

---

**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>05/15</td>
<td>Mad Lava</td>
<td></td>
<td>OK</td>
</tr>
<tr>
<td>265</td>
<td>Rock</td>
<td></td>
<td>OK</td>
</tr>
</tbody>
</table>

---

**Remarks:** Worked on bit, adjusted clutches and brace on rig, picked up parts from air freight repair shop earlier. Drilling.

---

**Signed:** Kenneth H. Sanders  
**Date:** 8/21 1979
**DRILLING LOG**

Ruscoe Moss Company

830 Ahua Street • Honolulu, Hawaii 96819
Telephone (808) 839-6888 • 833-1444

---

Date: 8/20 1979  
Job No.: 5-20  
Hole No.: 0919-03  
Elevation: __________ ft.

Customer: Dept. of Land & Natural Rec.  
Location: Anahala

Driller: Ken Sanfier  
10 Hrs.  
Rig: 36 L

Helper: Richard Kakey  
10 Hrs.  
Gas: Oil

Arv. Job: 7:00 AM  
Lv. Job: 5:00 PM  
10 Hrs.  
Or. No.: __________

---

Bit-Size: 18 in.  
Type: Star

Casing-Size: __________ in., Length in hole: __________ ft.  
in.

Depth Start: 245 ft.  
Depth Stop: 255 ft.  
Feet Drilled: 10

Water Levels, Time: __________ M ft., __________ ft.  
Time: __________ M ft., __________ ft.

---

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>Top</th>
</tr>
</thead>
<tbody>
<tr>
<td>245</td>
<td>myl Spill Java</td>
<td>Rock</td>
<td>OK</td>
</tr>
<tr>
<td>255</td>
<td></td>
<td></td>
<td>OK</td>
</tr>
</tbody>
</table>

---

Remarks: Broke bolts on spooling gear shaft @ 1:45 PM  
Ordered new bolts from Honolulu.

---

Signed: Kenneth J. Sandier  
Date: 8/20 1979
### DRILLING LOG

**Customer:** Dep of San and Natural Res

**Location:** ANA HOLA

**Date:** 8/17/79

**Job No.:** 5-79

**Hole No.:**

**Elevation:** NOT EST YET

---

**Driller:** Ken Sanchez

**Helper:** Richard Babey

**Arv. Job:** 7:00AM, Job 5:00PM

**Rig:** 36L

**Gas:** Oil

---

**Bit-Size:** 18 in.

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

**Depth Start:** 228 ft., Depth Stop 245 ft., Feet Drilled 17

**Water Levels, Time:** M ft., Time M ft.

---

**Depth** | **Formation** | **Remarks** | **Top**
---|---|---|---
928 | medium Java Rock | of OK
945 | |

**Remarks:** Drilling

---

**Signed:** Keneth S. Sanders

**Date:** 8/17/79
<table>
<thead>
<tr>
<th>Date</th>
<th>8/16 1979</th>
<th>Job No.</th>
<th>5-79</th>
<th>Hole No.</th>
<th>Elevation</th>
<th>NOT ESTABLISHED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer</td>
<td>Dept of Sand &amp; Silt</td>
<td>Location</td>
<td>KANAKAOLA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Driller</td>
<td>Les Sanders</td>
<td>10 Hrs.</td>
<td>Rig</td>
<td>34 C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Helper</td>
<td>Richard Sallay</td>
<td>10 Hrs.</td>
<td>Gas</td>
<td>Oil</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Helper</td>
<td></td>
<td></td>
<td></td>
<td>Rest Pole Roof</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arv. Job</td>
<td>7:00 AM</td>
<td>5:00 PM</td>
<td>10 Hrs.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bit-Size</td>
<td>10 in.</td>
<td>Type</td>
<td>Silt</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Casing-Size</td>
<td>in., Length in hole</td>
<td>ft.</td>
<td>in., Amt. Perforated</td>
<td>ft.</td>
<td>in.</td>
<td></td>
</tr>
<tr>
<td>Depth Start</td>
<td>213 ft.</td>
<td>Depth Stop</td>
<td>228 ft.</td>
<td>Feet Drilled</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Water Levels, Time</td>
<td>M ft.</td>
<td>Time</td>
<td>M ft.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>Top</th>
</tr>
</thead>
<tbody>
<tr>
<td>213</td>
<td>Mil Hard lava Rock</td>
<td>OK</td>
<td>OK</td>
</tr>
</tbody>
</table>

Remarks: Drilling

Signed: Kenneth L. Sanders Date: 8/16 1979
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>8/15</td>
<td>5-79</td>
<td>-</td>
<td>-</td>
<td>Ken Sanders</td>
<td>36 C</td>
<td>Richard Lakey</td>
<td>-</td>
<td>7:00 AM</td>
<td>5:00 PM</td>
<td>10 Hrs</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bit-Size</th>
<th>Casing-Size</th>
<th>Formation</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 in.</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Depth</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>198</td>
<td>-</td>
</tr>
<tr>
<td>213</td>
<td>-</td>
</tr>
</tbody>
</table>

**Remarks:** Changed back to Star Oct.

Signed: Kent J. Sanders  Date: 8/15/79
### Drilling Log

#### Details:
- **Date:** 8/14/99
- **Job No.:** 579
- **Hole No.:** NA
- **Elevation:** NA
- **Location:** ANAHOLA
- **Driller:** Ken Sandusky
- **Helper:** Richard Foley
- **Arv. Job:** 7:00AM
- **Lv. Job:** 5:00PM
- **Hrs.:** 10 Hrs., 10 Hrs.
- **Rig:** 36 L
- **Gas:** 
- **Oil:** 
- **Reps.:** 
- **Or. No.:** 
- **Bit-Size:** 18 in.
- **Casing-Size:** 

#### Measurements:

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>192</td>
<td>Hard Blue Lava</td>
<td></td>
</tr>
<tr>
<td>194</td>
<td>Rock</td>
<td></td>
</tr>
<tr>
<td>194</td>
<td>Md Hard Lava</td>
<td></td>
</tr>
<tr>
<td>198</td>
<td>Rock</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Top</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0 ft</td>
<td>0 ft</td>
</tr>
</tbody>
</table>

#### Remarks:
- Beam 1 hole last straight. Drilling ahead.

#### Signed:
- **Kenneth D. Sandusky**
- **Date:** 8/14/99
**DRILLING LOG**

830 AHUA STREET, WAIKIKI, HAWAII 96819
TELEPHONE (808) 944-2688 - 933-1444

**Date:** 8/13/79  **Job No.:** 5-79  **Hole No.:** 9  **Elevation:** 9' 20
**Customer:** Dept. of Land and Natural Res.  **Location:** Anahola, YET

**Driller:** Tim Sandusky  **10 Hrs.**  **Rig:** 36 CENT
**Helper:** Richard Lofte  **10 Hrs.**  **Gas:**
**Helper:**  **10 Hrs.**  **Oil:**
**Arv. Job:** 7:00 AM, Lv. Job  **5:00 PM**  **10 Hrs.**  **Or. No.**

<table>
<thead>
<tr>
<th>Bit-Size</th>
<th>18 in.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Buffalo</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>192 ft.</th>
<th>Depth Stop</th>
<th>ft.</th>
<th>Feet Drilled</th>
<th>0</th>
</tr>
</thead>
</table>

**Water Levels, Time:**
<table>
<thead>
<tr>
<th>M</th>
<th>ft.</th>
<th>M</th>
<th>ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Remarks:**

Signed: Kenneth S. Sandusky  **Date:** 8/13/1979
**DRILLING LOG**

830 AHUA STREET • HONOLULU, HAWAII 96819
TELEPHONE (808) 839-6888 • 833-1444

Date: 8/10 1979  
Job No.: 5-79  
Hole No.:       
Customer: Dep. of Land & Natural Res.  
Location: Anahola  

Driller: Ken Sandusy  
10 Hrs. Rig: 

Helper: Richard Kokey  
10 Hrs. Gas: Oil: 

Arv. Job 7:00 A.M. Job 5:00 P.M. 10 Hrs.  

Bit-Size: 18 in.  
Type: Steel and motherlaided  

Depth Start: 189 ft., Depth Stop: 192 ft., Feet Drilled 3  

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>189</td>
<td>Hard blue lava</td>
<td>Rock.</td>
<td></td>
</tr>
<tr>
<td>192</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Remarks: Hole went off east on motherlaided bit to reach fresh straight. Star bit came too slow. Some time to change bits.

Signed: Kenneth S. Sandusy  
Date: 8/10 1979
# DRILLING LOG

- **Date**: 8/19 1979
- **Job No.**: 5-79
- **Hole No.**: _____
- **Elevation**: NO
- **Customer**: Dept of Sanitation and Natural Resources
- **Location**: ANAhOLA
- **Driller**: Ken Sanders
- **Helper**: Richard Kawakami
- **Rig**: 36L
- **Helper Hrs.**: 10 Hrs.
- **Gas**: Oil
- **Arv. Job**: 7:00 AM
- **Lv. Job**: 5:00 PM
- **Depth Start**: 179 ft.
- **Depth Stop**: 189 ft.
- **Feet Drilled**: 10
- **Bit-Size**: 18 in.
- **Type**: Star
- **Casing-Size**: in., Length in hole ft. in., Amt. Perforated ft. in.
- **Water Levels, Time**: M ft. Time M ft.
- **Depth Formation Remarks**: OK OK
- **Top**:

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
</tr>
</thead>
<tbody>
<tr>
<td>179</td>
<td>mid seabed lava</td>
</tr>
<tr>
<td>189</td>
<td>rock</td>
</tr>
</tbody>
</table>

- **Remarks**: ___________________________________

- **Signed**: Kenneth D. Sanders
- **Date**: 8/19 1979
**DRILLING LOG**

**RUSCOE MOSS COMPANY**

830 AHAU STREET • HONOLULU, HAWAII 96819

TELEPHONE (808) 839-6888 • 833-1444

---

**Date:** 8/18/1979

**Job No.:** 5-79

**Hole No.:** ___

**Elevation:** Survey

**Customer:** Dept. of Land and Natural Res.

**Location:** ANAHOLA

---

**Driller:** Ken Sandlin

**Helper:** Richard Saby

**Arv. Job:** 7:00 AM, Lv. Job 5:00 PM

**Or. No.:** ___

**10 Hrs.**

**Rig:** 36 C

**Gas:**

**Oil:**

**Hrs.**

**Repairs:**

---

**Bit Size:** 18 in.

**Type:** Matter Hubbard

---

**Casing Size:** ___ in., Length in hole ___ ft., Length Perforated ___ ft., Length in hole ___ in.

**Depth Start:** 179 ft., Depth Stop ___ ft., Feet Drilled 0

**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>179</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**Remarks:** Put on matter Hubbard (Saddle) bit, reopened hole, back straight. Put star bit back on.

---

**Signed:** Kenneth J. Sandlin

**Date:** 8/18/79

---
### DRILLING LOG

**RUSCOE MOSS COMPANY**

830 AHUA STREET • HONOLULU, HAWAII 96819
TELEPHONE (808) 839-6888 • 833-1444

**Date**: 8/7 1979

**Job No.**: 5 - 79

**Hole No.**:

**Elevation**:

**Customer**: Dept. of Land and Natural Res.

**Location**: ANAHOLA

**Driller**: Ken Sandies

**Tracker**:

**Helper**: Richard Levy

**Driller Hrs.**: 10 Hrs.

**Rig**: 36 C

**Gas**:

**Oil**:

**Arv. Job**: 7:00 AM

**Lv. Job**: 5:00 PM

**Hrs. Repairs**:

**Arv. Job**:

**Lv. Job**:

**Hrs.**

**Depth Start**: 177 ft.

**Depth Stop**: 179 ft.

**Feet Drilled**: 2

**Water Levels, Time**:

**A**

**B**

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>Top</th>
</tr>
</thead>
<tbody>
<tr>
<td>177</td>
<td>Hard Lava Rock</td>
<td>Blue</td>
<td></td>
</tr>
</tbody>
</table>

**Remarks**: Hole going off.

**Signed**: Kenneth J. Sanders

**Date**: 8/7 1979
## Drilling Log

### Details
- **Date**: 8/16/79
- **Job No.**: 5-79
- **Hole No.**: 1
- **Location**: Ana Hot Springs
- **Customer**: Dept. of Land and Natural Rec.
- **Driller**: Ken Sandler
- **Bit-Size**: 18 in.
- **Casing-Size**: 18 in.
- **Formation**: Hard blue lave, Rock

### Measurements

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>175</td>
<td>Hard Blue Lava</td>
<td></td>
</tr>
<tr>
<td>176</td>
<td>Rock</td>
<td></td>
</tr>
<tr>
<td>177</td>
<td>Hard Blue Lava</td>
<td></td>
</tr>
<tr>
<td>178</td>
<td>Rock</td>
<td></td>
</tr>
</tbody>
</table>

### Remarks:

- Signed: Kenneth S. Sanders
- Date: 8/16/79
### DRILLING LOG

**Company:** RUSCOE MOSS COMPANY  
**Address:** 830 AHUA STREET • HONOLULU, HAWAII 96819  
**Telephone:** (808) 839-6888 • 833-1444

<table>
<thead>
<tr>
<th>Date</th>
<th>8/3 1979</th>
<th>Job No.</th>
<th>5-79</th>
<th>Hole No.</th>
<th>Elevation</th>
<th>ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer</td>
<td>Dept. of Land &amp; Natural Res.</td>
<td>Location</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Driller</td>
<td>Ken Sandifer</td>
<td></td>
<td>10 Hrs.</td>
<td>Rig</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Helper</td>
<td>Richard Lopez</td>
<td></td>
<td>16 Hrs.</td>
<td>Gas</td>
<td>Oil</td>
<td></td>
</tr>
<tr>
<td>Helper</td>
<td></td>
<td></td>
<td>Hrs.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arrv. Job</td>
<td>7:00 AM</td>
<td>Arrv. Job</td>
<td>5:00 PM</td>
<td>10 Hrs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Or. No.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Or. No.</td>
<td></td>
</tr>
<tr>
<td>Bit-Size</td>
<td>18 in</td>
<td></td>
<td>Type</td>
<td>Star</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Casing-Size</td>
<td></td>
<td>in., Length in hole</td>
<td>ft.</td>
<td>in., Amt. Perforated</td>
<td>ft.</td>
<td>in.</td>
</tr>
<tr>
<td>Depth Start</td>
<td>165 ft.</td>
<td>Depth Stop</td>
<td>175 ft.</td>
<td>Feet Drilled</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Water Levels, Time</td>
<td>M ft., Time</td>
<td>M ft.</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>165 ft.</td>
<td>hard sand lave</td>
<td>Hard streaks few inches</td>
<td>OK</td>
</tr>
<tr>
<td>175 ft.</td>
<td>rock</td>
<td>Thick</td>
<td></td>
</tr>
</tbody>
</table>

### Remarks:
Holding drilling tools back to kick hole straight. Hole will fill very fast but it will drift off if tools are not held real tight.

Signed: Kenneth J. Sandifer  
Date: 8/3 1979
## DRILLING LOG

### Information

- **Date:** 8/12 1979
- **Job No.:** 5779
- **Location:** Honolua, Maui, HI 96726
- **Telephone:** (808) 839-6888 • 833-1444

### Drilling Details

<table>
<thead>
<tr>
<th>Driller</th>
<th>Hours</th>
<th>Rig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ken Sanders</td>
<td>10</td>
<td>Gas</td>
</tr>
</tbody>
</table>

### Helper Information

<table>
<thead>
<tr>
<th>Helper</th>
<th>Hours</th>
<th>Gas</th>
<th>Oil</th>
<th>Repairs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Richard Tafoya</td>
<td>10</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

### Arv. Job

- Arv. Job: 7:00 AM
- Lv. Job: 5:00 PM
- Hours: 10

### Measurements

- **Depth Start:** 163 ft.
- **Depth Stop:** 165 ft.
- **Feet Drilled:** 2

### Water Levels

- **Time:** M
- **Depth:** M

### Formation

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>Top</th>
</tr>
</thead>
<tbody>
<tr>
<td>163 ft</td>
<td>Med and lava</td>
<td>Rock</td>
<td>OK-OK</td>
</tr>
</tbody>
</table>

### Remarks

- Made rig repairs after haul came in from Honolua. Shift up but made all rig repairs on rig. Started drilling.

### Signature

- Signed: Kenneth J. Sanders
- Date: 8/12 1979
**DRILLING LOG**

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>Top</th>
</tr>
</thead>
<tbody>
<tr>
<td>15'</td>
<td>Sand等候</td>
<td>Sand/Thick layers in 0 ft. or less</td>
<td></td>
</tr>
<tr>
<td>163'</td>
<td>Rock</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Remarks:** Rig broke down at 11:30 AM. Ruptured gas at 4:00 PM. Full removal. Call Honolulu for repair. 0°-0° rig frame and Velocity.

**Signed:** Kenneth H. Anderson  Date: 3/11 1979
**DRILLING LOG**

**830 AHUA STREET • HONOLULU, HAWAII 96819**
**TELEPHONE (808) 839-6888 • 833-1444**

---

**Date** 7/31 1979 **Job No.** 5-29 **Hole No.** 7-29 **Elevation** __________ ft.

**Customer:** Dept. of Land and Natural Resources

---

**Driller:** Ken Sanders 10 Hrs.  **Rig** __________

**Helper:** Richard Lahay 10 Hrs.  **Gas** __________ **Oil** __________

**Helper** __________ **Hrs.**  Repairs __________

**Arv. Job 7:00 AM, Lv. Job 5:00 PM 10 Hrs.**  **Or. No.** __________

---

**Bit-Size** 18 in.  **Type** Star __________

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

**Depth Start** 146 ft., Depth Stop 157 ft., Feet Drilled __________

**Water Levels, Time** __________ M ft. __________ ft., Time __________ M ft. __________ ft.

---

**Depth** __________  **Formation** __________  **Remarks** __________  **Top** __________

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>Top</th>
</tr>
</thead>
<tbody>
<tr>
<td>146</td>
<td>mid hard lava</td>
<td>Hard layers a few inches of ok rock</td>
<td></td>
</tr>
<tr>
<td>157</td>
<td>rock</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Remarks:** Holding drilling tools up to keep hole straight

---

**Signed** Kenneth H. Sanders  **Date** 7/31 1979
DRILLING LOG

Date 7/30 1979  Job No. 579 Hole No.  Elevation ft.
Customer Dept of Land and Natural Rec Location Anahola, Hawaii
Driller Ken Sanders 10 Hrs. Rig
Helper Richard Lobay 10 Hrs. Gas Oil
Helper  Hrs. Repairs
Arr. Job 7:00 AM  Lv. Job 5:00 PM  10 Hrs. Or. No.

Bit-Size 18 in. Type Star
Casing-Size in., Length in hole ft. in., Amt. Perforated ft. in.
Depth Start 136 ft., Depth Stop 146 ft., Feet Drilled 10
Water Levels, Time M ft. Time M ft.

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>Top A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>136</td>
<td>Mi. Head Lana</td>
<td></td>
<td>OK</td>
<td>OK</td>
</tr>
<tr>
<td>146</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Remarks: Have to reload drilling tools back, if not hole will drift off.

Signed Kenneth Sanders Date 7/30 1979
# DRILLING LOG

**RUSCOE MOSS COMPANY**

830 AHUA STREET • HONOLULU, HAWAII 96819
TELEPHONE (808) 839-6888 • 833-1444

<table>
<thead>
<tr>
<th>Date</th>
<th>7/17/77</th>
<th>Job No.</th>
<th>6179</th>
<th>Hole No.</th>
<th>Elevation</th>
<th>ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer</td>
<td>Dept of Land &amp; Natural Res</td>
<td>Location</td>
<td>Anahola, Hawaii</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Driller</th>
<th>Ken Saunders</th>
<th>Hrs.</th>
<th>Rig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Helper</td>
<td>Richard Taylor</td>
<td>Hrs.</td>
<td>Gas</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Arv. Job</th>
<th>7:00 AM</th>
<th>Lv. Job</th>
<th>5:00 PM</th>
<th>Hrs.</th>
<th>Or. No.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Bit-Size</th>
<th>1 1/2 in.</th>
<th>Type</th>
<th>Star</th>
</tr>
</thead>
<tbody>
<tr>
<td>Casing-Size</td>
<td>in., Length in hole</td>
<td>ft.</td>
<td>in., Amt. Perforated</td>
</tr>
<tr>
<td>Depth Start</td>
<td>126 ft.</td>
<td>Depth Stop</td>
<td>136 ft.</td>
</tr>
<tr>
<td>Water Levels, Time</td>
<td>M ft.</td>
<td>Time</td>
<td>M ft.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>Top</th>
</tr>
</thead>
<tbody>
<tr>
<td>126</td>
<td>mid hard lava</td>
<td></td>
<td>OK</td>
</tr>
<tr>
<td>136</td>
<td>rock</td>
<td></td>
<td>OK</td>
</tr>
</tbody>
</table>

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

**Remarks:** Drilling ahead slowly. Getting started in harder formations.

**Signed:** Kenneth D. Sanders  
**Date:** 7/17/77 1977
Date: 7/26/1979

<table>
<thead>
<tr>
<th>Job No.</th>
<th>Hole No.</th>
<th>Elevation (ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Customer: Dept. of Land & Natural Rec.
Location: Anahola, Kauai

Driller: Ron Sanders
Helper: Richard Joseph
Arv. Job: 7:00 AM
Lv. Job: 5:00 PM
Hrs.: 10 Hrs.

Rig: Gas
Oil: 
Repairs: 

Bit-Size: 
Type: 
Casing-Size: 

Depth Start: 124 ft., Depth Stop: 126 ft., Feet Drilled: 2

Water Level: 

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>Top</th>
</tr>
</thead>
<tbody>
<tr>
<td>124</td>
<td>Hard Lava Rock</td>
<td>OK</td>
<td>OK</td>
</tr>
<tr>
<td>124</td>
<td>Ledge</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Remarks:
Brought hole back in line. Drilling slowed slowly to help Ledge speeded off as I drilled. Formation not too hard but Ledge is real hard.

Signed: Kenneth S. Sanders
Date: 5/26/1979
Date: 5/25/79  
Job No.: 5-79  
Hole No.: A  
Elevation: ______ ft.  

Customer:  

Driller: Ken Sande  
Hrs.: Rig:  
Helper: Richard Seguy  
Hrs.: Gas: Oil:  
Helper:  
Arv. Job: 7:00 AM  
Lv. Job: 5:00 PM  
Hrs.: Or. No.:  

Bit Size: 18 in.  
Type: N/A  

Depth: Start: ______ ft., Depth Stop: ______ ft., Feet Drilled: 0  


<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>

Measurements:  

Remarks: Reaming job at 122 ft. Hard ledge at that point. Job working slowly back in line.  

Signed: Kenneth J. Sande  
Date: 5/25/79
**DRILLING LOG**

830 AHUA STREET • HONOLULU, HAWAII 96819  
TELEPHONE (808) 839-6888 • 833-1444

---

**Date:** 5/24 1979  
**Job No.:** 5-79  
**Hole No.:**  
**Elevation:**  
**Customer:** Dept of Land & Natural Reas  
**Location:** Anahola, Kauai

**Driller:** Ken Sanders  
**Hrs.:** 10

**Helper:** Richard Lofey  
**Hrs.:** 10

**Arv. Job:** 7:00 AM  
**Lv. Job:** 5:00 PM  
**Hrs.:** 10

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

**Or. No.:**

---

**Bit-Size:** 18  
**Type:** Star

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

**Depth Start:** 124 ft.  
**Depth Stop:** ft.  
**Feet Drilled:** 0

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

---

**Depth**  
**Formation**  
**Remarks**  
**Top**  

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

**Remarks:**  
Steaming hole, coming back slowly.

---

**Signed:** Kenneth J. Sanders  
**Date:** 5/24 1979

---
DRILLING LOG

Date: 7/23 1979  Job No.: 5-77  Hole No.:  Elevation ft.
Customer: Dept of Land & Natural Res  Location: Anchola, Kauai

Driller: Kim Sanders  10 Hrs.  Rig:
Helper: Richard Day  10 Hrs.  Gas
Helper:  Hrs.  Repairs:
Arv. Job: 7:00 AM  Lv. Job: 5:00 PM  Or. No.: 10 Hrs.

Bit-Size: 18 in.  Type: Steel

Depth Start: ft., Depth Stop: 124 ft., Feet Drilled: 0

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

Measurements

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

Remarks: Drilling out cement to bring hole back in line
Hole running back slowly.

Signed: Kenneth S. Spradlin  Date: 7/23 1979
### Drilling Log

**Date:** 7/20 1979  
**Job No.:** 5-79  
**Hole No.:**  
**Elevation:**  

**Customer:** Dept of Standard Natural Rec.  
**Location:** Oahu, Hawaii

**Driller:** Ken Sanders  
**Helper:** Richard Togby  
**Arv. Job:** 7:00AM  
**Lv. Job:** 5:00AM  
**Or. No.:**  

**Time:** 10 Hrs.  
**Rig:**  

**Time:** 10 Hrs.  
**Gas:**  
**Oil:**  
**Repairs:**

**Bit Size:** 18 in  
**Type:** Star

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

**Depth Start:** 124 ft.  
**Depth Stop:** ft.  
**Feet Drilled:** 0

**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></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>A</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>B</td>
</tr>
</tbody>
</table>

**Measurements**

**Remarks:** Strung up casing blocks. Date of bit and lay it down to work our pattern and fix it to ream self. Bit sweet edge socket. Put bit and make socket back on stem ready to start reaming and drilling cement.

**Signed:** Kenneth J. Sanders  
**Date:** 7/20  1979
**DRILLING LOG**

Date: 7/19 1979  |  Job No.: 5-79  |  Hole No.:  |  Elevation: __ ft.

Customer: Dept of Land and Natural Res  |  Location: Anahola, Kauai

Driller: Ken Sankey  |  Hours: 10 Hrs.  |  Rig: ___

Helper: Richard Hedges  |  Hours: 10 Hrs.  |  Gas: ___  |  Oil: ___

Arv. Job: 7:00 AM  |  Dlv. Job: 5:00 PM  |  10 Hrs.  |  Or. No.: ___

---

**Bit Size:** 18 in  |  Type: Star


Depth Start: 124 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>
</table>

**Measurements**

**Remarks:**

Remaining hole till 1:00 P.M., then plugged hole back 15 ft. with 24 bags cement. Hole formation too soft on low side to pump, so I cemented to hold tool up and redrill hole.

Signed: Kenneth J. Sandus  Date: 7/19 1979
**DRILLING LOG**

830 AHUA STREET • HONOLULU, HAWAII 96819
TELEPHONE (808) 839-6666 • 833-1444

<table>
<thead>
<tr>
<th>Date</th>
<th>7/18 1979</th>
<th>Job No.</th>
<th>5-79</th>
<th>Hole No.</th>
<th>Elevation</th>
<th>ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer</td>
<td>Dept of Land &amp; Natural Res.</td>
<td>Location</td>
<td>Lunalilo, Hawaii</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Driller</td>
<td>Ken Sanders</td>
<td>10 Hrs.</td>
<td>Rig</td>
<td>Oil</td>
<td>Gas</td>
<td>Oil</td>
</tr>
<tr>
<td>Helper</td>
<td>Richard Tafey</td>
<td>10 Hrs.</td>
<td>Hrs.</td>
<td>Repairs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arv. Job</td>
<td>7:00 AM</td>
<td>Lv. Job 5:00 PM</td>
<td>10 Hrs.</td>
<td>Or. No.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bit-Size</th>
<th>18 in.</th>
<th>Type</th>
<th>Star</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depth Start</td>
<td>124 ft.</td>
<td>Depth Stop</td>
<td>ft., Feet Drilled</td>
</tr>
<tr>
<td>Water Levels, Time</td>
<td>M ft., Time</td>
<td>M ft.</td>
<td></td>
</tr>
</tbody>
</table>

**Measurements**

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

**Remarks:**

- Reaming hole.

**Signed:** Kenneth G. Sanders
**Date:** 7/18 1979
Date: 7/17 1979  
Job No: 5-79  
Hole No:  
Elevation: ft.  

Customer: Dull of Sand and Water, Inc.  
Location: Oahu, Hawaii  

Driller: Ken Sanders  
Helper: Richard Kaye  
Arv. Job: 7:00 AM  
Lv. Job: 5:00 PM  
Hrs: 10 Hrs.  

Rig:  
Gas:  
Oil:  
Reps:  

Casing Size: 18 in.  
Bit Size: 18 in.  

Depth Start: 12 ft.  
Depth Stop:  
Feet Drilled: 0  

Water Levels, Time: M ft., Time: M ft.  

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

Remarks: Remover bole. Hole had some hard layers, that don't want to wire. Very soft formation otherwise. Reamer 1/2 ft. to 1 ft.  

Signed: Kenneth J. Sanders  
Date: 7/17 1979
DRILLING LOG

[Company Information]

Date: 7/16 1979  Job No.: 5-29  Hole No.:  
Elevation:  
Customer: Dept of Land & Natural Res. Location: Wahiawa, Hawaii

Driller: Ken Sanders  10 Hrs. Rig:  
Helper: Richard Poksay  10 Hrs. Gas:  Oil:  
Arv. Job: 7:00 AM  Lvd. Job: 5:00 PM  10 Hrs. Repairs: Or. No.:  

Arv. Job: 7:00 AM  Lvd. Job: 5:00 PM  10 Hrs. Or. No.:  

Bit-Size: 18 in. Type:  
Casing-Size:  
in., Length in hole:  ft.  in., Amt. Perforated:  ft.  in.  
Depth Start: 115  ft., Depth Stop: 124 ft., Feet Drilled: 9  
Water Levels, Time: M  ft.  M  ft.  

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>Top</th>
</tr>
</thead>
<tbody>
<tr>
<td>115</td>
<td>Gray lawyer rock</td>
<td></td>
<td></td>
</tr>
<tr>
<td>124</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Measurements

Remarks: Hole drifting off. Drilling andreaming hole.

Signed: Kenneth J. Sanders  Date: 7/16 1979
## DRILLING LOG

**Date**: 7/13 1979  
**Job No.**: 5-79  
**Hole No.**:  
**Elevation**: ft.  

**Customer**: Dept. of Land and Natural Res.  
**Location**: Chinakaha Beach  
**Telephone**: (808) 839-6888 • 833-1444  

### Driller
- Name: Ken Sanders  
- Hrs.: 10  
- Rig:  
- Gas:  
- Oil:  

### Helper
- Name: Richard Jakay  
- Hrs.: 10  
- Gas:  
- Oil:  

### Helper
- Name:  
- Hrs.:  
- Repairs:  

### Arv. Job
- Time: 7:00AM  
- Job End Time: 5:00PM  
- Hours: 10  
- Or. No.:  

### Bit-Size
- Size: 18 in.  
- Type: Star  

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

### Depth Start
- 100 ft.  
- Depth Stop: 115 ft.  
- Feet Drilled: 15  

### Water Levels, Time
- M ft., Time:  

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>Top</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>Dry lava rock</td>
<td>formation getting a little</td>
<td>OK OK</td>
</tr>
<tr>
<td>115</td>
<td></td>
<td>harder, also hole wants</td>
<td>to go off toward the ocean</td>
</tr>
</tbody>
</table>

### Remarks:
Wanted on rig 3 hrs., trying to fix shuddling gear bearing.

### Signed
- Name: Kenneth W. Sanders  
- Date: 7/13 1979
## Drilling Log

**Ruscoe Moss Company**

830 Ahua Street • Honolulu, Hawaii 96819

Telephone (808) 839-8888 • 833-1444

### Date: 7/12 1979

<table>
<thead>
<tr>
<th>Job No.</th>
<th>Hole No.</th>
<th>Elevation</th>
<th>ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-79</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Customer:** Dull of Lanai Natural Resources

**Location:** Lanai, Hawaii

---

### Driller:

Ken Sande

10 Hrs.

**Rig:**

---

### Helper:

Richard Taky

10 Hrs.

**Gas:**

---

### Helper:

**Oil:**

---

### Arv. Job:

7:00 AM

**Lv. Job:**

5:00 PM

10 Hrs.

---

### Or. No.:

---

---

## Bit-Size:

18 in.

**Type:**

---

---

## Casing-Size:

---

**in., Length in hole:**

---

**ft.**

---

**in., Amt. Perforated:**

---

**ft.**

---

### Depth Start:

70 ft.

**Depth Stop:**

100 ft.

**Feet Drilled:**

50

---

### Water Levels, Time:

---

**M ft., Time:**

---

**M ft.**

---

---

## Depth

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>Top</th>
</tr>
</thead>
<tbody>
<tr>
<td>70</td>
<td>Dry Lava Rock</td>
<td></td>
<td>OK</td>
</tr>
<tr>
<td>100</td>
<td></td>
<td></td>
<td>OK</td>
</tr>
</tbody>
</table>

---

### Remarks:

Water the hole was making from 58 to 62 ft has begun watered. Seeking very little.

---

**Signed:** Kenneth E. Sande

**Date:** 7/12 1979
<table>
<thead>
<tr>
<th>Date</th>
<th>7/11 1979</th>
<th>Job No.</th>
<th>5-79</th>
<th>Hole No.</th>
<th>Elevation</th>
<th>ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer</td>
<td>Office of Land and Natural Res.</td>
<td>Location</td>
<td>Anchola, Kansas</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Driller</td>
<td>Ken Sandau</td>
<td>10 Hrs.</td>
<td>Rig</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Helper</td>
<td>Richard Haley</td>
<td>10 Hrs.</td>
<td>Gas</td>
<td>Oil</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Helper</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arv. Job</td>
<td>7:00 AM</td>
<td>Lv. Job 5:00 PM</td>
<td>10 Hrs.</td>
<td>Or. No.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bit-Size</th>
<th>20 in.</th>
<th>Type</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Casing-Size</td>
<td>in., Length in hole.</td>
<td>ft.</td>
<td>in., Amt. Perforated</td>
</tr>
<tr>
<td>Depth Start</td>
<td>45</td>
<td>ft.</td>
<td>Depth Stop</td>
</tr>
<tr>
<td>Water Levels, Time</td>
<td>M ft., Time</td>
<td>M ft.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>Top</th>
<th>Measurements</th>
</tr>
</thead>
<tbody>
<tr>
<td>45</td>
<td>Red Clay W/ some</td>
<td></td>
<td></td>
<td>OK OK</td>
</tr>
<tr>
<td>58</td>
<td>Building</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>58</td>
<td>Vene Sand, Last</td>
<td>Small amount water in this formation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>68</td>
<td>Grey</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>69</td>
<td>Grey Grues Last</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>70</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Remarks: _______________________________________

Signed: Keshitka S. Sandau Date: 7/11/1979
**DRILLING LOG**

---

**Customer:** 402 Pacific and Natural Res.
**Location:** Anchola, Kansas

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>7/10</td>
<td>5479</td>
<td></td>
<td></td>
<td>Ken Sanders</td>
<td>10 Hrs.</td>
<td>Richard Toggy</td>
<td>10 Hrs.</td>
<td>7:00 AM</td>
<td>5:00 PM</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rig</th>
<th>Gas</th>
<th>Oil</th>
<th>Repairs</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>
<th>18 in.</th>
<th>SLS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Casing-Size</th>
<th>in., Length in hole</th>
<th>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>Depth Stop</th>
<th>Feet Drilled</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 ft.</td>
<td>45 ft.</td>
<td>25</td>
</tr>
</tbody>
</table>

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

**Measurements**

<table>
<thead>
<tr>
<th>Depth</th>
<th>Formation</th>
<th>Remarks</th>
<th>Top</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>Red clay &amp; stone</td>
<td></td>
<td></td>
</tr>
<tr>
<td>45</td>
<td>Boulder</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Remarks:**

---

Signed: Kenneth H. Sanders  Date: 7/10 1979
Date: 7/9 1979  
Job No.: 5-79  
Hole No.:  
Elevation:  
Customer:  
Driller: Ken Sundbye  
Helper: Richard Foley  
Arv. Job: 7:00AM  
Lv. Job: 5:00PM  
10 Hrs.  
Rig:  
Gas:  
Oil:  
Repairs:  
Location:  
Or. No.:  
Bit-Size: 18 in  
Type: Star  
Casing-Size:  
in.  
Length in hole:  
ft.  
Amt. Perforated:  
in.  
Depth Start: 0 ft.  
Depth Stop: 20 ft.  
Foot Drilled: 20  
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>0</td>
<td>Clay with some</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Bedding</td>
<td></td>
<td>OK</td>
</tr>
</tbody>
</table>

Remarks:  

Signed: Kenneth Sundbye  
Date: 7/9 1979
MEMO FOR THE RECORD

FROM: Geol-Hydro. (Ed)
SUBJECT: Anahola Well 0919-03 Pumping Test Results, 22-26 Oct.,1979

1. Location & Ownership: The well is located on the eastern slope of Hokualele approximately 3/4 of a mile northwesterly of the community of Anahola, Kauai (Figure 1). The parcel of land, Tax Map Key 4-8-03-7, is owned by the Department of Hawaiian Home Lands.

2. Data:
   Top of casing: 345.5 ft. MSL
   Casing size: 14 inches
   Total depth of well: 500 ft. (to -154.5 ft., MSL)
   Length of solid casing: 328 ft. (to -17.5 ft., MSL)
   Length of perforated casing: 123 ft. (to -105.5 ft., MSL)
   Size of open hole: 12 inches
   Length of open hole: 49 feet
   Static Water Level: 11.5 ft., MSL on October 22, 1979, 11:00 a.m.
   Pumping Test: 90 hrs. @ 700 gpm; Chlorids 60 (at start) to 50 (ending) ppm; Temp; 23°C (73.4°F); Drawdown - 11ft.

Anahola Well 0919-03 was pump tested for 90 hours from October 22 to October 26, 1979 at the rate of 700 gpm. Chlorides ranged from 60 ppm at the start of the test and decreased to 50 ppm at the end of the test. Temperature of the water remained at 23°C (734°F) throughout the test. The drawdown ranged from 8ft at the start of the test and dropped to 11 feet. The drawdown did not stabilize.

PUMP TEST RESULTS: GRAPH

ED SAKODA
ES:ey
| DATE  | TIME | SODIUM | MAGNESIUM | CALCIUM | POTASSIUM | SULFATE | FLUORIDE | SILICA | PAMPA | ARSENIC | SODIUM | MAGNESIUM | CALCIUM | SULFATE | POTASSIUM | SODIUM | MAGNESIUM | CALCIUM | SULFATE | POTASSIUM | SODIUM | MAGNESIUM | CALCIUM | SULFATE | POTASSIUM | SODIUM | MAGNESIUM | CALCIUM | SULFATE | POTASSIUM | SODIUM | MAGNESIUM | CALCIUM | SULFATE | POTASSIUM | SODIUM | MAGNESIUM | CALCIUM | SULFATE | POTASSIUM | SODIUM | MAGNESIUM | CALCIUM | SULFATE | POTASSIUM | SODIUM | MAGNESIUM | CALCIUM | SULFATE | POTASSIUM | SODIUM | MAGNESIUM | CALCIUM | SULFATE | POTASSIUM | SODIUM | MAGNESIUM | CALCIUM | SULFATE | POTASSIUM | SODIUM | MAGNESIUM | CALCIUM | SULFATE | POTASSIUM | SODIUM | MAGNESIUM | CALCIUM | SULFATE | POTASSIUM | SODIUM | MAGNESIUM | CALCIUM | SULFATE | POTASSIUM | SODIUM | MAGNESIUM | CALCIUM | SULFATE | POTASSIUM | SODIUM | MAGNESIUM | CALCIUM | SULFATE | POTASSIUM | SODIUM | MAGNESIUM | CALCIUM | SULFATE | POTASSIUM | SODIUM | MAGNESIUM | CALCIUM | SULFATE | POTASSIUM | SODIUM | MAGNESIUM | CALCIUM | SULFATE | POTASSIUM | SODIUM | MAGNESIUM | CALCIUM | SULFATE | POTASSIUM | SODIUM | MAGNESIUM | CALCIUM | SULFATE | POTASSIUM | SODIUM | MAGNESIUM | CALCIUM | SULFATE | POTASSIUM | SODIUM | MAGNESIUM | CALCIUM | SULFATE | POTASSIUM | SODIUM | MAGNESIUM | CALCIUM | SULFATE | POTASSIUM | SODIUM | MAGNESIUM | CALCIUM | SULFATE | POTASSIUM | SODIUM | MAGNESIUM | CALCIUM | SULFATE | POTASSIUM | SODIUM | MAGNESIUM | CALCIUM | SULFATE | POTASSIUM | SODIUM | MAGNESIUM | CALCIUM | SULFATE | POTASSIUM | SODIUM | MAGNESIUM | CALCIUM | SULFATE | POTASSIUM | SODIUM | MAGNESIUM | CALCIUM | SULFATE | POTASSIUM | SODIUM | MAGNESIUM | CALCIUM | SULFATE | POTASSIUM | SODIUM | MAGNESIUM | CALCIUM | SULFATE | POTASSIUM | SODIUM | MAGNESIUM | CALCIUM | SULFATE | POTASSIUM | SODIUM | MAGNESIUM | CALCIUM | SULFATE | POTASSIUM | SODIUM | MAGNESIUM | CALCIUM | SULFATE | POTASSIUM | SODIUM | MAGNESIUM | CALCIUM | SULFATE | POTASSIUM | SODIUM | MAGNESIUM | CALCIUM | SULFATE | POTASSIUM | SODIUM | MAGNESIUM | CALCIUM | SULFATE | POTASSIUM | SODIUM | MAGNESIUM | CALCIUM | SULFATE | POTASSIUM | SODIUM | MAGNESIUM | CALCIUM | SULFATE | POTASSIUM | SODIUM | MAGNESIUM | CALCIUM | SULFATE | POTASSIUM | SODIUM | MAGNESIUM | CALCIUM | SULFATE | POTASSIUM | SODIUM | MAGNESIUM | CALCIUM | SULFATE | POTASSIUM | SODIUM | MAGNESIUM | CALCIUM | SULFATE | POTASSIUM | SODIUM | MAGNESIUM | CALCIUM | SULFATE | POTASSIUM | SODIUM | MAGNESIUM | CALCIUM | SULFATE | POTASSIUM | SODIUM | MAGNESIUM | CALCIUM | SULFATE | POTASSIUM | SODIUM | MAGNESIUM | CALCIUM | SULFATE | POTASSI |
ANAHOLA WELL 0919-03

AS BUILT SECTION

DRILLED: NOV. 1979
DRILLER: ROSCOE MOSS CO.

NIPPLE

345.5 FT. MSL - TOP OF CASING
344.2 FT. MSL - FINISH GRADE

CEMENT BASKET

11.5 FT. ABOVE MSL
STATIC WATER LEVEL

CASING GUIDE

500 FEET
BACKFILL DEPTH DRILLED HOLE, IN. DIAMETER

123 FEET
FULL-FLO SHUTTER, I.D. X 14 IN. WALL

49 FEET
OPEN HOLE, SCREEN, I.D. X 14 IN. WALL

CONCRETE CAP

-154 FT. MSL
BOTTOM OF WELL

ORIGINAL DEPTH DRILLED HOLE, IN. DIAMETER

MATERIAL

NOT TO SCALE
\[ A_0 = 1.75 \]

\[ T = 150,800 \text{ gpm} \]
PUMPING TEST RECORD

for

ANOHOLA Well 0919-03

(Name) (No.)

Location: Island 51-KW-2 Project or Job No. 19

Description of Well—
1. Elevation: ground surface ___ ft., top of casing 345.5 ft.,
   rotary table ___ ft., referenced to _______ benchmark.
2. Total depth of well 600 ft.; or 15.7 ft. elevation, msl
3. 14 in. solid casing to ___ ft. depth, perforated to ___ ft. depth
4. Static water level on Nov. 15 19__: ___ ft. below ground
   surface, top of casing; or 13.7 ft. elevation msl
   measured _______ method

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

<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. (mmhos 25°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>11/13/79</td>
<td>0</td>
<td>(26.2)</td>
<td>314</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10/30</td>
<td>0</td>
<td>0</td>
<td>314</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10/06</td>
<td>0</td>
<td>0</td>
<td>314</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10/05</td>
<td>0</td>
<td>0</td>
<td>314</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11/00</td>
<td>0</td>
<td>0</td>
<td>314</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>01/01</td>
<td>0</td>
<td>0</td>
<td>314</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>01/07</td>
<td>0</td>
<td>0</td>
<td>314</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>01/11</td>
<td>0</td>
<td>0</td>
<td>314</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>01/15</td>
<td>0</td>
<td>0</td>
<td>314</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>01/19</td>
<td>0</td>
<td>0</td>
<td>314</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>01/23</td>
<td>0</td>
<td>0</td>
<td>314</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Date &amp; Time</td>
<td>Sample No.</td>
<td>Pumping rate (gpm)</td>
<td>Airline (feet)</td>
<td>Drawdown (feet)</td>
<td>Chlorides (ppm)</td>
<td>Temp. (°F)</td>
<td>Cond. (mmhos 25°C)</td>
</tr>
<tr>
<td>------------</td>
<td>------------</td>
<td>-------------------</td>
<td>--------------</td>
<td>---------------</td>
<td>----------------</td>
<td>-----------</td>
<td>------------------</td>
</tr>
<tr>
<td>11/1/19</td>
<td>1</td>
<td>100</td>
<td>146</td>
<td>140</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/15/20</td>
<td>2</td>
<td>142</td>
<td>14.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/15/20</td>
<td>3</td>
<td>141</td>
<td>14.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/16/20</td>
<td>4</td>
<td>137.5</td>
<td>14.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/17/20</td>
<td>5</td>
<td>131.5</td>
<td>15.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/17/20</td>
<td>6</td>
<td>130.5</td>
<td>15.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/18/20</td>
<td>7</td>
<td>129</td>
<td>15.5</td>
<td>41</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/18/20</td>
<td>8</td>
<td>129.5</td>
<td>15.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/18/20</td>
<td>9</td>
<td>126</td>
<td>15.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/19/20</td>
<td>10</td>
<td>126</td>
<td>16.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/19/20</td>
<td>11</td>
<td>120</td>
<td>16.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/19/20</td>
<td>12</td>
<td>115</td>
<td>16.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/19/20</td>
<td>13</td>
<td>118</td>
<td>16.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/19/20</td>
<td>14</td>
<td>120</td>
<td>16.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/19/20</td>
<td>15</td>
<td>120</td>
<td>16.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/19/20</td>
<td>16</td>
<td>122</td>
<td>16.6</td>
<td>50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/19/20</td>
<td>17</td>
<td>110</td>
<td>17.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/19/20</td>
<td>18</td>
<td>110</td>
<td>17.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/19/20</td>
<td>19</td>
<td>106</td>
<td>17.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/19/20</td>
<td>20</td>
<td>107.5</td>
<td>17.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Date &amp; Time</td>
<td>Sample No.</td>
<td>Pumping rate (qpm)</td>
<td>Airline (feet)</td>
<td>Drawdown (feet)</td>
<td>Chlorides (ppm)</td>
<td>Temp. (°F)</td>
<td>Cond. (mmhos 25°C)</td>
</tr>
<tr>
<td>------------</td>
<td>------------</td>
<td>-------------------</td>
<td>---------------</td>
<td>---------------</td>
<td>---------------</td>
<td>-----------</td>
<td>-----------------</td>
</tr>
<tr>
<td>11/14/79</td>
<td></td>
<td>14 1000</td>
<td>106</td>
<td>17.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1400</td>
<td></td>
<td>14 1000</td>
<td>107</td>
<td>17.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1500</td>
<td></td>
<td>14 1000</td>
<td>104.5</td>
<td>17.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1600</td>
<td></td>
<td>14 1000</td>
<td>104.5</td>
<td>17.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1700</td>
<td></td>
<td>14 1000</td>
<td>104.5</td>
<td>17.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1800</td>
<td></td>
<td>15 1000</td>
<td>104.5</td>
<td>17.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1900</td>
<td></td>
<td>15 1000</td>
<td>104.5</td>
<td>17.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td></td>
<td>15 1000</td>
<td>104.5</td>
<td>17.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2100</td>
<td></td>
<td>15 1000</td>
<td>104.5</td>
<td>17.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2200</td>
<td></td>
<td>15 1000</td>
<td>104.5</td>
<td>17.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2300</td>
<td></td>
<td>15 1000</td>
<td>104.5</td>
<td>17.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2400</td>
<td></td>
<td>15 1000</td>
<td>104.5</td>
<td>17.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11/15/79</td>
<td></td>
<td>95 1000</td>
<td>95</td>
<td>17.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0100</td>
<td></td>
<td>95 1000</td>
<td>95</td>
<td>17.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0200</td>
<td></td>
<td>95 1000</td>
<td>95</td>
<td>17.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0300</td>
<td></td>
<td>95 1000</td>
<td>95</td>
<td>17.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0400</td>
<td></td>
<td>95 1000</td>
<td>95</td>
<td>17.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0500</td>
<td></td>
<td>95 1000</td>
<td>95</td>
<td>17.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0600</td>
<td></td>
<td>95 1000</td>
<td>95</td>
<td>17.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0700</td>
<td></td>
<td>95 1000</td>
<td>95</td>
<td>17.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0800</td>
<td></td>
<td>95 1000</td>
<td>95</td>
<td>17.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0900</td>
<td></td>
<td>95 1000</td>
<td>95</td>
<td>17.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1000</td>
<td></td>
<td>95 1000</td>
<td>95</td>
<td>17.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1100</td>
<td></td>
<td>95 1000</td>
<td>95</td>
<td>17.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1200</td>
<td></td>
<td>95 1000</td>
<td>95</td>
<td>17.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1300</td>
<td></td>
<td>95 1000</td>
<td>95</td>
<td>17.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1400</td>
<td></td>
<td>95 1000</td>
<td>95</td>
<td>17.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1500</td>
<td></td>
<td>95 1000</td>
<td>95</td>
<td>17.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1600</td>
<td></td>
<td>95 1000</td>
<td>95</td>
<td>17.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1700</td>
<td></td>
<td>95 1000</td>
<td>95</td>
<td>17.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1800</td>
<td></td>
<td>95 1000</td>
<td>95</td>
<td>17.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1900</td>
<td></td>
<td>95 1000</td>
<td>95</td>
<td>17.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td></td>
<td>95 1000</td>
<td>95</td>
<td>17.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2100</td>
<td></td>
<td>95 1000</td>
<td>95</td>
<td>17.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2200</td>
<td></td>
<td>95 1000</td>
<td>95</td>
<td>17.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2300</td>
<td></td>
<td>95 1000</td>
<td>95</td>
<td>17.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2400</td>
<td></td>
<td>95 1000</td>
<td>95</td>
<td>17.5</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### PUMPING TEST RECORD

**Name: ANAHOLO**  
**Well No.: 0919-03**  
**Project or Job No.: 19**

<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. (mmhos 25°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15/19</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1900</td>
<td>21</td>
<td>88</td>
<td>1.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td></td>
<td>85</td>
<td>1.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2100</td>
<td></td>
<td>86.5</td>
<td>1.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2200</td>
<td></td>
<td>88</td>
<td>1.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2300</td>
<td>22</td>
<td>86.5</td>
<td>1.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2400</td>
<td></td>
<td>83.5</td>
<td>1.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16/19</td>
<td></td>
<td>85.5</td>
<td>1.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0100</td>
<td></td>
<td>85.5</td>
<td>1.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0200</td>
<td></td>
<td>74.5</td>
<td>1.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0300</td>
<td></td>
<td>87.5</td>
<td>1.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0400</td>
<td></td>
<td>83.5</td>
<td>1.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0500</td>
<td></td>
<td>75.5</td>
<td>1.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0600</td>
<td>24</td>
<td>72</td>
<td>1.9</td>
<td>48</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0700</td>
<td></td>
<td>72</td>
<td>1.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0800</td>
<td></td>
<td>72</td>
<td>1.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0900</td>
<td></td>
<td>72</td>
<td>1.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1000</td>
<td></td>
<td>72</td>
<td>1.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**WATER SAMPLE (GAL) METER READING**

<table>
<thead>
<tr>
<th>Time</th>
<th>0:00</th>
<th>14:19</th>
<th>2971800</th>
</tr>
</thead>
<tbody>
<tr>
<td>126</td>
<td>01</td>
<td>227</td>
<td>7.3</td>
</tr>
<tr>
<td>081</td>
<td>241</td>
<td>7.5</td>
<td></td>
</tr>
<tr>
<td>024</td>
<td>244</td>
<td>5.9</td>
<td></td>
</tr>
<tr>
<td>026</td>
<td>247</td>
<td>5.6</td>
<td></td>
</tr>
<tr>
<td>026</td>
<td>250</td>
<td>4.9</td>
<td></td>
</tr>
<tr>
<td>026</td>
<td>251</td>
<td>5.3</td>
<td></td>
</tr>
<tr>
<td>026</td>
<td>253.5</td>
<td>4.8</td>
<td></td>
</tr>
<tr>
<td>026</td>
<td>255</td>
<td>5.8</td>
<td></td>
</tr>
</tbody>
</table>
### PUMPING TEST RECORD

for

<table>
<thead>
<tr>
<th>Island</th>
<th>Project or Job No.</th>
<th>Well 01/11</th>
</tr>
</thead>
</table>

(Name)  (No.)

<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. (mmhos 25°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>11/17</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11/18</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11/20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11/22</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11/28</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11/29</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11/30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/13</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/14</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/16</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/17</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/18</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/19</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/21</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/22</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/23</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/24</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/25</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/26</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/27</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/28</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/29</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Semi-logarithmic 5 cycles x 70 divisions

Keuffel & Esser Co. Made in U.S.A.

Anadore 3:49 p.m.
Recovery 1
AMER 72 hrs.
9, 1000, 9 pm.
Nov. 26, 1999
<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Date Taken</th>
<th>Sample (ml)</th>
<th>Burette Rdg. Before</th>
<th>Burette Rdg. After</th>
<th>AgNO₃ (ml)</th>
<th>AGNO₃ - .2 ml</th>
<th>Multi. Factor</th>
<th>Chlorides (ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1/3/79</td>
<td>50</td>
<td>8.4</td>
<td>15.05</td>
<td>6.00</td>
<td>6.00</td>
<td>10</td>
<td>44</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td>13.9</td>
<td>19.1</td>
<td>5.2</td>
<td>5.0</td>
<td>10</td>
<td>50</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>8.75</td>
<td>13.85</td>
<td>5.1</td>
<td>4.9</td>
<td>10</td>
<td>49</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>1/4/79</td>
<td>14.05</td>
<td>19.1</td>
<td>5.15</td>
<td>4.95</td>
<td>10</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>1/15</td>
<td>50</td>
<td>6.1</td>
<td>13.7</td>
<td>5.0</td>
<td>4.8</td>
<td>10</td>
<td>48</td>
</tr>
<tr>
<td>24</td>
<td>7/16</td>
<td>50</td>
<td>1.7</td>
<td>14.7</td>
<td>5.0</td>
<td>4.8</td>
<td>10</td>
<td>48</td>
</tr>
</tbody>
</table>
### PUMPING TEST RECORD

**for**

**ANAHUCA**  Well **0919-03**  
(Name)  (No.)

**Island**  **Project or Job No.**  **29 Oct 1979**

### Description of Well--

1. Elevation: ground surface ft., top of casing ft., rotary table ft., referenced to benchmark.
2. Total depth of well 500 ft.; or -15 ft. elevation, msl
3. in. solid casing to ft. depth, perforated to ft. depth
4. Static water level on OCT 29 1979: ft. below ground surface, top of casing; or 10.33 ft. elevation msl measured method -- 1030 ft.

### Description of Pump and Pump Setting--

5. type pump with stage bowl assembly
6. Gasoline diesel, electric, power with horsepower
7. Shaft speed: rpm at gpm flow
8. Depth of pump intake: 287.41 ft. below ; or -41.17 ft. elev. msl
9. Depth of airline bottom: ft. below ; or 72.5 ft. elev. msl
10. Center of gage: ft. elev., msl. Flow measured with

### Test conducted by **Ed Sakoka**

<table>
<thead>
<tr>
<th>Date &amp; Time</th>
<th>Sample No.</th>
<th>Pumping rate (gpm)</th>
<th>Airline Drawdown Chlorides Temp. Cond.</th>
<th>Flowmeter 85973°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>29 Oct 79</td>
<td>010</td>
<td>0</td>
<td>280/23.33</td>
<td></td>
</tr>
<tr>
<td></td>
<td>020</td>
<td>0</td>
<td>280</td>
<td></td>
</tr>
<tr>
<td></td>
<td>045</td>
<td>0</td>
<td>280</td>
<td></td>
</tr>
<tr>
<td></td>
<td>059</td>
<td>0</td>
<td>280</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1100</td>
<td><strong>STAND</strong> PUMPING</td>
<td><strong>STOP PUMP -- OIL WAS BROKEN</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1104</td>
<td>268</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1105</td>
<td>268</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1118</td>
<td>PUMP ON  -- CHECKING</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1114</td>
<td>PUMP ON  -- CHECKING</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1117</td>
<td>281</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1116</td>
<td>280.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1120</td>
<td>280.05</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1125</td>
<td>0</td>
<td>280</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1200</td>
<td>0</td>
<td>280.22</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1205</td>
<td>0</td>
<td>280.22</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1207</td>
<td>PUMP ON  -- CHECKING</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1208</td>
<td>0</td>
<td>285</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1209</td>
<td>0</td>
<td>285</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1210</td>
<td>0</td>
<td>285</td>
<td></td>
</tr>
</tbody>
</table>

---

**Notes:**

- Chlorides Temp. Cond. measured with flowmeter.
<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. (mmhos 25°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10/29/79</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12:27</td>
<td></td>
<td>123/01.05</td>
<td>13.08</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12:59</td>
<td></td>
<td>165/07.71</td>
<td>13.62</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13:32</td>
<td></td>
<td>115/07.73</td>
<td>14.93</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13:36</td>
<td></td>
<td>PUMP OFF</td>
<td></td>
<td></td>
<td>PUMP TEST OFF - OVERHEATING</td>
<td></td>
<td></td>
</tr>
<tr>
<td>22/10/79</td>
<td>5</td>
<td>255/21.25</td>
<td>2.08</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23/10/79</td>
<td></td>
<td>271/22.63</td>
<td>0.71</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24/10/79</td>
<td></td>
<td>278/22.26</td>
<td>0.96</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25/10/79</td>
<td></td>
<td>272/21</td>
<td>0.33</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26/10/79</td>
<td></td>
<td>274/23.49</td>
<td>0.29</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27/10/79</td>
<td></td>
<td>277/06.21</td>
<td>0.21</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28/10/79</td>
<td>10</td>
<td>278/24.17</td>
<td>0.16</td>
<td></td>
<td>EQUATION 2622 20°</td>
<td></td>
<td></td>
</tr>
<tr>
<td>29/10/79</td>
<td></td>
<td>277/34.11</td>
<td>0.12</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30/10/79</td>
<td></td>
<td>278/5</td>
<td>0.12</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
ANAHOLA WELD 0013-03
DRILLER'S ROCK DESCRIPTION

0'-58'
CLAY & RED CLAY W/SOME BOULDERS

58'-68'
FINE SAND, DARK GREY

68'-124'
GREY LAVA ROCK

124'-126'
HARD LAVA ROCK IN LEDGE

126'-176'
MEDIUM HARD LAVA ROCK

176'-179'
HARD BLUE LAVA ROCK

179'-189'
MEDIUM HARD LAVA ROCK

189'-194'
HARD BLUE

194'-223'
MEDIUM HARD LAVA ROCK

285'-288'
RED CINDERS, LOOSE LAVA STONES, ETC.

288'-306'
HARD GREY LAVA ROCK

306'-326'
RED SAND-TYPE FORMATION

326'-338'
MEDIUM HARD GREY ROCK

338'-349'
LOOSE LAVA STONES & GRAVEL

349'-361'
HARD BLUE LAVA ROCK

361'-421'
Alternate layers of HARD BLUE ROCK and CINDERS, GRAVEL, CLEAVAGE

421'-453'
LOOSE LAVA BUCKLE, GRAVEL, CINDERS, & CLAYFLATS

MISSING 453'-500'

MUL = 11.5 ft MSL
10/22/79, 11/11/...
<table>
<thead>
<tr>
<th>To</th>
<th>Initial</th>
<th>Please</th>
<th>Action</th>
<th>Approval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manabu Tagomori</td>
<td></td>
<td>See me</td>
<td></td>
<td>Signature</td>
</tr>
<tr>
<td>Albert Ching</td>
<td></td>
<td>Call</td>
<td></td>
<td>Information</td>
</tr>
<tr>
<td>Daniel Lum</td>
<td></td>
<td>Take action by</td>
<td></td>
<td></td>
</tr>
<tr>
<td>George Matsumoto</td>
<td></td>
<td>Review &amp; comment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nobu Kaneshiro</td>
<td></td>
<td>Draft reply by</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tom Nakama</td>
<td></td>
<td>Type draft</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paul Matsuo</td>
<td></td>
<td>Type final</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Edwin Sakoda</td>
<td></td>
<td>Xerox ___ copies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mitchell Ohye</td>
<td></td>
<td>Mail</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doris Hamada</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alyce Konishi</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Robert Chuck</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Takeo Fujii</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>James Yoshimoto</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jane Sakai</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elsie Yonamine</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bill Koyanagi</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Richard Jinnai</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yoshi Shibuya</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Anahola Well, Kauai
Paging test in progress this week. Testing at 7:00 pm.
Dan, Mitch called around 9:00 am, 10/23/79 (he will call this afternoon)

<table>
<thead>
<tr>
<th>Ground Elev.</th>
<th>Total Depth of Well</th>
<th>Solid Casing</th>
<th>Perforated to</th>
<th>Open Hole</th>
<th>Static Water Level (manometer)</th>
<th>Depth of Airline</th>
</tr>
</thead>
<tbody>
<tr>
<td>345.5</td>
<td>500'</td>
<td>328'</td>
<td>451'</td>
<td>50'</td>
<td>11.5'</td>
<td>-12.5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Elapsed Time in minutes</th>
<th>Pumping Rate</th>
<th>Drawdown</th>
<th>Chloride</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start - xxx 11:00 am</td>
<td>700 gpm</td>
<td>8.3'</td>
<td>Sample #1 - 60 ppm</td>
</tr>
<tr>
<td>60 min.</td>
<td>700 gpm</td>
<td>8.3'</td>
<td>Sample #2 - 57</td>
</tr>
<tr>
<td>180</td>
<td>730</td>
<td>9.1</td>
<td>Sample #4 - 54</td>
</tr>
<tr>
<td>300</td>
<td>760</td>
<td>9.8</td>
<td></td>
</tr>
<tr>
<td>420</td>
<td>700</td>
<td>9.3</td>
<td></td>
</tr>
<tr>
<td>540</td>
<td>700</td>
<td>9.3</td>
<td></td>
</tr>
<tr>
<td>600</td>
<td>700</td>
<td>9.6</td>
<td>Sample #6 - 56</td>
</tr>
<tr>
<td>840</td>
<td>700</td>
<td>9.5</td>
<td></td>
</tr>
<tr>
<td>1,080</td>
<td>700</td>
<td>9.5</td>
<td></td>
</tr>
<tr>
<td>1260</td>
<td>670</td>
<td>9.5</td>
<td>Sample #9 - 58</td>
</tr>
<tr>
<td>1:00 am 1,320</td>
<td>700</td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

/23
## PUMPING TEST RECORD

**Name:** ANAHOLA  
**Well No.:** 0919-03

**Island:** S1-KW-21  
**Project or Job No.:** 19

### Description of Well
1. **Elevation:** ground surface 345.5 ft., top of casing ___ ft., rotary table ___ ft., referenced to benchmark.
2. **Total depth of well:** 500 ft.; or ___ ft. elevation, msl
3. **In. solid casing to:** 32 ft. depth, perforated to ___ ft. depth
4. **Static water level on:** Oct. 22, 1979: ___ ft. below ground surface, top of casing; or ___ ft. elevation msl

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

### Test conducted by ______________

<table>
<thead>
<tr>
<th>Date &amp; Time</th>
<th>Sample No.</th>
<th>Pumping rate (gpm)</th>
<th>Airline in. ft.</th>
<th>Drawdown (feet)</th>
<th>Chlorides (ppm)</th>
<th>Temp. (°F)</th>
<th>Cond.</th>
</tr>
</thead>
<tbody>
<tr>
<td>10/22/79</td>
<td>1030</td>
<td>- 0 -</td>
<td>800</td>
<td>16-15.5</td>
<td>2.5</td>
<td>60</td>
<td>dirty</td>
</tr>
<tr>
<td>1100</td>
<td></td>
<td></td>
<td>700</td>
<td>19-16.1</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1105</td>
<td></td>
<td></td>
<td>193-14.1</td>
<td>7.9</td>
<td>23.9 - 73.4 F*</td>
<td>water clean</td>
<td></td>
</tr>
<tr>
<td>1110</td>
<td></td>
<td></td>
<td>193-16.1</td>
<td>7.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1115</td>
<td></td>
<td></td>
<td>191-15.9</td>
<td>6.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1130</td>
<td></td>
<td></td>
<td>192-16</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1435</td>
<td></td>
<td></td>
<td>8</td>
<td>625</td>
<td>57</td>
<td>23.0°</td>
<td></td>
</tr>
<tr>
<td>1200</td>
<td>2</td>
<td></td>
<td>189-15.75</td>
<td>8.25</td>
<td>55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1500</td>
<td>3</td>
<td></td>
<td>16-15.5</td>
<td>6.5</td>
<td>55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1400</td>
<td>4</td>
<td>730</td>
<td>179-14.9</td>
<td>9.1</td>
<td>54</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1500</td>
<td>5</td>
<td>730</td>
<td>178.5-14.9</td>
<td>9.1</td>
<td>54</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1600</td>
<td>6</td>
<td>760</td>
<td>171-14.3</td>
<td>9.8</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:** 4735200
<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. (mmhos 25°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10/11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2:00</td>
<td>6</td>
<td>100</td>
<td>12.0-14.4</td>
<td>9.5</td>
<td>5.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2:00</td>
<td>6</td>
<td>100</td>
<td>12.0-13.5</td>
<td>9.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10/14</td>
<td>1</td>
<td>700</td>
<td></td>
<td>9.5</td>
<td>5.9</td>
<td>23</td>
<td></td>
</tr>
<tr>
<td>10/15</td>
<td>2</td>
<td>700</td>
<td>17.0-14.1</td>
<td>9.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10/16</td>
<td>700</td>
<td>170</td>
<td>18-14</td>
<td>10.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10/17</td>
<td>100</td>
<td>170</td>
<td>171</td>
<td>9.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10/18</td>
<td>100</td>
<td>170</td>
<td>171</td>
<td>9.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10/19</td>
<td>100</td>
<td>170</td>
<td>170</td>
<td>9.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10/20</td>
<td>100</td>
<td>170</td>
<td>170</td>
<td>9.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10/21</td>
<td>100</td>
<td>170</td>
<td>170</td>
<td>9.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10/22</td>
<td>100</td>
<td>170</td>
<td>170</td>
<td>9.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10/23</td>
<td>100</td>
<td>170</td>
<td>170</td>
<td>9.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10/24</td>
<td>100</td>
<td>170</td>
<td>170</td>
<td>9.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10/25</td>
<td>100</td>
<td>170</td>
<td>170</td>
<td>9.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10/26</td>
<td>100</td>
<td>170</td>
<td>170</td>
<td>9.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10/27</td>
<td>100</td>
<td>170</td>
<td>170</td>
<td>9.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10/28</td>
<td>100</td>
<td>170</td>
<td>170</td>
<td>9.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10/29</td>
<td>100</td>
<td>170</td>
<td>170</td>
<td>9.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10/30</td>
<td>100</td>
<td>170</td>
<td>170</td>
<td>9.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10/31</td>
<td>100</td>
<td>170</td>
<td>170</td>
<td>9.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Date &amp; Time</td>
<td>Sample No.</td>
<td>Pumping rate (qpm)</td>
<td>Airline (feet)</td>
<td>Drawdown (feet)</td>
<td>Chlorides (ppm)</td>
<td>Temp. (°F)</td>
<td>Cond. (mmhos 25°C)</td>
</tr>
<tr>
<td>------------</td>
<td>------------</td>
<td>--------------------</td>
<td>---------------</td>
<td>----------------</td>
<td>-----------------</td>
<td>------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>10/22/79</td>
<td>2/400</td>
<td>700</td>
<td>160</td>
<td>16.7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10/24/79</td>
<td>2/720</td>
<td>700</td>
<td>159</td>
<td>16.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10/26/79</td>
<td>3/720</td>
<td>700</td>
<td>159</td>
<td>16.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10/28/79</td>
<td>4/100</td>
<td>700</td>
<td>159</td>
<td>16.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10/30/79</td>
<td>5/150</td>
<td>700</td>
<td>159.5</td>
<td>16.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11/01/79</td>
<td>6/150</td>
<td>700</td>
<td>159.5</td>
<td>16.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11/03/79</td>
<td>7/150</td>
<td>700</td>
<td>159.5</td>
<td>16.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11/05/79</td>
<td>8/150</td>
<td>700</td>
<td>159.5</td>
<td>16.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11/07/79</td>
<td>9/150</td>
<td>700</td>
<td>159.5</td>
<td>16.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11/09/79</td>
<td>10/150</td>
<td>700</td>
<td>159.5</td>
<td>16.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11/11/79</td>
<td>11/150</td>
<td>700</td>
<td>159.5</td>
<td>16.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11/13/79</td>
<td>12/150</td>
<td>700</td>
<td>159.5</td>
<td>16.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11/15/79</td>
<td>13/150</td>
<td>700</td>
<td>159.5</td>
<td>16.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11/17/79</td>
<td>14/150</td>
<td>700</td>
<td>159.5</td>
<td>16.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11/19/79</td>
<td>15/150</td>
<td>700</td>
<td>159.5</td>
<td>16.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11/21/79</td>
<td>16/150</td>
<td>700</td>
<td>159.5</td>
<td>16.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11/23/79</td>
<td>17/150</td>
<td>700</td>
<td>159.5</td>
<td>16.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11/25/79</td>
<td>18/150</td>
<td>700</td>
<td>159.5</td>
<td>16.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11/27/79</td>
<td>19/150</td>
<td>700</td>
<td>159.5</td>
<td>16.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11/29/79</td>
<td>20/150</td>
<td>700</td>
<td>159.5</td>
<td>16.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/01/79</td>
<td>21/150</td>
<td>700</td>
<td>159.5</td>
<td>16.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/03/79</td>
<td>22/150</td>
<td>700</td>
<td>159.5</td>
<td>16.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/05/79</td>
<td>23/150</td>
<td>700</td>
<td>159.5</td>
<td>16.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/07/79</td>
<td>24/150</td>
<td>700</td>
<td>159.5</td>
<td>16.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/09/79</td>
<td>25/150</td>
<td>700</td>
<td>159.5</td>
<td>16.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/11/79</td>
<td>26/150</td>
<td>700</td>
<td>159.5</td>
<td>16.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/13/79</td>
<td>27/150</td>
<td>700</td>
<td>159.5</td>
<td>16.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/15/79</td>
<td>28/150</td>
<td>700</td>
<td>159.5</td>
<td>16.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/17/79</td>
<td>29/150</td>
<td>700</td>
<td>159.5</td>
<td>16.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/19/79</td>
<td>30/150</td>
<td>700</td>
<td>159.5</td>
<td>16.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/21/79</td>
<td>31/150</td>
<td>700</td>
<td>159.5</td>
<td>16.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Date &amp; Time</td>
<td>Sample No.</td>
<td>Pumping Rate (gpm)</td>
<td>Airline (feet)</td>
<td>Drawdown (feet)</td>
<td>Chlorides (ppm)</td>
<td>Temp. (°F)</td>
<td>Cond. (mmhos 25°C)</td>
</tr>
<tr>
<td>------------</td>
<td>------------</td>
<td>--------------------</td>
<td>---------------</td>
<td>-----------------</td>
<td>----------------</td>
<td>------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>10/25/79</td>
<td>0500</td>
<td>20</td>
<td>150.5</td>
<td>10.7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0500</td>
<td></td>
<td></td>
<td>161</td>
<td>10.6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0700</td>
<td></td>
<td></td>
<td>106.5</td>
<td>11.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0800</td>
<td></td>
<td></td>
<td>164</td>
<td>11.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0900</td>
<td></td>
<td></td>
<td>158</td>
<td>11.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1000</td>
<td>Shut down</td>
<td>(Pump head and line)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1000</td>
<td></td>
<td></td>
<td>165 -</td>
<td>10.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1000</td>
<td></td>
<td></td>
<td>161 -</td>
<td>10.6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1000</td>
<td></td>
<td></td>
<td>162 -</td>
<td>10.7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1100</td>
<td>1100</td>
<td>710</td>
<td>155.5</td>
<td>11</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1200</td>
<td>700</td>
<td>156</td>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1300</td>
<td>700</td>
<td>155.5</td>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1400</td>
<td>700</td>
<td>155</td>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Date &amp; Time</td>
<td>Sample No.</td>
<td>Pumping rate (gpm)</td>
<td>Airline (feet)</td>
<td>Drawdown (feet)</td>
<td>Chlorides (ppm)</td>
<td>Temp. (°F)</td>
<td>Cond. (mhos 25°C)</td>
</tr>
<tr>
<td>------------</td>
<td>------------</td>
<td>---------------------</td>
<td>----------------</td>
<td>----------------</td>
<td>----------------</td>
<td>------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>10/25/79</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1500</td>
<td>700</td>
<td>158</td>
<td>10.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1600</td>
<td>700</td>
<td>157</td>
<td>10.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1700</td>
<td>23</td>
<td>700</td>
<td>157</td>
<td>10.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1800</td>
<td>700</td>
<td>157</td>
<td>10.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1900</td>
<td>700</td>
<td>157</td>
<td>10.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>700</td>
<td>157</td>
<td>10.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2100</td>
<td>24</td>
<td>700</td>
<td>154</td>
<td>11.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2200</td>
<td>700</td>
<td>155</td>
<td>11.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2300</td>
<td>700</td>
<td>156</td>
<td>11.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2400</td>
<td>700</td>
<td>157</td>
<td>10.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11/6/79</td>
<td>25</td>
<td>700</td>
<td>157.5</td>
<td>10.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1200</td>
<td>700</td>
<td>158</td>
<td>10.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1300</td>
<td>700</td>
<td>158</td>
<td>10.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1400</td>
<td>700</td>
<td>156.5</td>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1500</td>
<td>26</td>
<td>700</td>
<td>157.5</td>
<td>10.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1600</td>
<td>700</td>
<td>157.5</td>
<td>10.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1700</td>
<td></td>
<td>157.5</td>
<td>10.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1800</td>
<td>700</td>
<td>157.5</td>
<td>10.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1900</td>
<td></td>
<td>157.5</td>
<td>10.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>700</td>
<td>157.5</td>
<td>10.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2100</td>
<td>700</td>
<td>157.5</td>
<td>10.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2200</td>
<td>700</td>
<td>157.5</td>
<td>10.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2300</td>
<td>700</td>
<td>157.5</td>
<td>10.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2400</td>
<td>700</td>
<td>157.5</td>
<td>10.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## PUMPING TEST RECORD

for

**ANNABELLE**

(Name)

Well 0919-05

(No.)

[Island] 51- KW - [Project or Job No.] 19

<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. (mmhos 25°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0900</td>
<td>1</td>
<td>253</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0915</td>
<td>75</td>
<td>253.5</td>
<td>2.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0930</td>
<td>10</td>
<td>255</td>
<td>2.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1000</td>
<td>120</td>
<td>256</td>
<td>2.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1015</td>
<td>150</td>
<td>258</td>
<td>2.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1045</td>
<td>180</td>
<td>258.5</td>
<td>2.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1100</td>
<td>210</td>
<td>259.5</td>
<td>2.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1130</td>
<td>240</td>
<td>260.5</td>
<td>2.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1200</td>
<td>270</td>
<td>261.5</td>
<td>2.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1230</td>
<td>300</td>
<td>262.5</td>
<td>2.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sample No.</td>
<td>Date Taken</td>
<td>Sample Taken (ml)</td>
<td>Burette Rdg Before</td>
<td>Burette Rdg After</td>
<td>AgNO₃ (ml)</td>
<td>AgNO₃ - .2 ml</td>
<td>Multi. Factor</td>
</tr>
<tr>
<td>------------</td>
<td>------------</td>
<td>-------------------</td>
<td>--------------------</td>
<td>------------------</td>
<td>------------</td>
<td>---------------</td>
<td>---------------</td>
</tr>
<tr>
<td>1</td>
<td>10/23/79</td>
<td>50</td>
<td>9.7</td>
<td>15.9</td>
<td>0.2</td>
<td>6.0</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td>16.4</td>
<td>27.6</td>
<td>0.9</td>
<td>5.7</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td>16.2</td>
<td>21.9</td>
<td>0.7</td>
<td>5.5</td>
<td>10</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td>11.2</td>
<td>16.8</td>
<td>0.6</td>
<td>5.4</td>
<td>10</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td>16.8</td>
<td>22.4</td>
<td>0.6</td>
<td>5.4</td>
<td>10</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td>17.7</td>
<td>23.3</td>
<td>0.8</td>
<td>5.6</td>
<td>10</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td>11.6</td>
<td>17.6</td>
<td>0.6</td>
<td>5.8</td>
<td>10</td>
</tr>
<tr>
<td>8</td>
<td>10/23/79</td>
<td>10.0</td>
<td>13.3</td>
<td>19.0</td>
<td>0.7</td>
<td>5.5</td>
<td>10</td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
<td>19.0</td>
<td>24.5</td>
<td>0.5</td>
<td>5.3</td>
<td>10</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td>17.4</td>
<td>23.8</td>
<td>0.4</td>
<td>5.2</td>
<td>10</td>
</tr>
<tr>
<td>11</td>
<td></td>
<td></td>
<td>10.5</td>
<td>15.9</td>
<td>0.4</td>
<td>5.2</td>
<td>10</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
<td>16.8</td>
<td>21.3</td>
<td>0.3</td>
<td>5.1</td>
<td>10</td>
</tr>
<tr>
<td>13</td>
<td></td>
<td></td>
<td>18.4</td>
<td>23.7</td>
<td>0.3</td>
<td>5.1</td>
<td>10</td>
</tr>
<tr>
<td>14</td>
<td>10/24/79</td>
<td></td>
<td>14.9</td>
<td>20.1</td>
<td>0.5</td>
<td>5.0</td>
<td>10</td>
</tr>
</tbody>
</table>

Titrations conducted by

Kauai Island 51-KW-21 Project or Job No. October 22-1979

ANAHOLA Well 0919-03

(No.)
Water Resources & Flood Control Branch

From: Initial

Walter Watson
Albert Ching
Daniel Lum
Manabu Tagomori
Nobu Kaneshiro
Paul Matsuo
Tom Nakama
Ed Sakoda
Richard Jinnai
Yoshi Shibuya
Mitchel Ohye
Saul Price
Nancy Brown
Doris
Elsie
Alyce
Robert Chuck
Takeo Fujii
Jimmy Yoshimoto
Jane Sakai
Bill Koyanagi

To: Initial

Please:

- See me
- Take action
- Review & comment
- Draft reply
- Type draft
- Type final
- Xerox copies

For: Approval

Signature
Information

[Signatures]

[Handwritten notes]
1 copy - FYI
1 copy - T.T.
1 copy - Well records
<table>
<thead>
<tr>
<th>To</th>
<th>Initial</th>
<th>Robert T. Chuck</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Takeo Fujii</td>
</tr>
<tr>
<td></td>
<td></td>
<td>James Yoshimoto</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Manabu Tagomori</td>
</tr>
<tr>
<td></td>
<td></td>
<td>George Morimoto</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hong Fong Chang</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Herbert Morimatsu</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Harold Sakai</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Leslie Asari</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Albert Ching</td>
</tr>
<tr>
<td></td>
<td></td>
<td>George Matsumoto</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Daniel Lum</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Paul Matsuo</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Noboru Kaneshiro</td>
</tr>
</tbody>
</table>

See Me
Take action by
Route to your branch
Review & comment
Draft reply by
For information
Xerox copies
Acknowledge receipt

Jane Sakai
Doris Hamada
Lorraine Nanbu
Jean Starot
Elsie Yonamine
Alyce Konishi

Get new folder set up on this project. Have you seen these for 0-136?
**Route Slip**

WATER RESOURCES & FLOOD CONTROL BRANCH

<table>
<thead>
<tr>
<th>To</th>
<th>Initial</th>
<th>Please</th>
<th>From</th>
<th>Date</th>
<th>File in:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manabu Tagomori</td>
<td></td>
<td>See me</td>
<td>9/7/79</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Albert Ching</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Daniel Lum</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>George Matsumoto</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nobu Kaneshiro</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tom Nakama</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paul Matsuo</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Edwin Sakoda</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mitchell Ohye</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doris Hamada</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alyce Konishi</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Robert Chuck</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Takeo Fujii</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>James Yoshimoto</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**For Review**

- Bill Koyanagi
- Richard Jinnai
- Yoshi Shibuya

---

**Anahola Well**

*97 ele. 344.2*

*SWL = +12`

*chloride = 40 ppb*

*T.D. to -65' & pump

*Preliminary*
DRILLING EXPLORATORY WELL NO. 0919-03
ANAHOLA, KAUAI, HAWAII

NOTICE OF DETERMINATION
NEGATIVE DECLARATION

To

Environmental Quality Commission
State of Hawaii

Submitted by:
Department of Land and Natural Resources
Division of Water and Land Development

November 1978
NOTICE OF DETERMINATION
NEGATIVE DECLARATION

Drilling Exploratory Well No. 0919-03
Anahola, Kauai, Hawaii

I. Proposing Agency:

Division of Water and Land Development (DOWALD)
Department of Land and Natural Resources (DLNR)
State of Hawaii
P. O. Box 373
Honolulu, Hawaii 96809

II. Agencies and Parties Consulted:

Department of Hawaiian Home Lands
Division of State Parks, DLNR

III. General Description of Action:

The project consists of drilling and testing an exploratory well in North Anahola, Kawaihau District, Kauai. Appurtenant work will include clearing and grading of the well site.

Data on proposed Well No. 0919-03

Ground elevation: 360 ft.+
Casing size: 14 inches
Length of solid casing: 320 ft.
Length of perforated casing: 80 ft.
Size of open hole: 12 inches
Length of open hole: 260 ft.+
Total depth of well: 660 ft.±
Duration of pump test: 72-150 hrs.
Proposed pump test range: 300-1400 gpm
Length of project: 5 months

The well is being drilled to explore for a reliable source of ground water for a proposed agricultural park being planned by the Department of Hawaiian Home Lands in North Anahola, Kauai. Also, the drilling of the well will provide valuable geologic and hydrologic data and information for future ground water exploration in the area.

IV. Description of the Environment:

A. Location of the Project: Kawaihau District, Kauai. On the northeastern slope of the Puu Ehu Ridge above Anahola Bay at approximately elevation 360 feet, approximately 0.7 miles northwesterly of the community of Anahola.
B. Boundaries or Jurisdiction:

Ownership: Department of Hawaiian Home Lands
Tax Map Key: 4-8-03
State Land Use Designation: A (Agricultural)

The proposed well site is adjacent to the Resource(R) subzone within the Conservation(C) district encompassing the Anahola Forest Reserve.

C. Physical Features and Climate: The proposed well will be located on land which is presently idle and predominantly covered with guava trees, Christmas berries, lantana, koa haole and java plum. The slope of the land is steep (20 to 25%) and the well will be located at approximately the 360-foot elevation. Median annual rainfall is 70 inches.

The USDA-Soil Conservation Service describes the soil cover as Lihue Silty Clay, 15 to 25 percent slopes (LhD). "On this soil, runoff is medium and the erosion hazard is moderate."

"This soil is used for sugarcane, pineapple, pasture, wildlife habitat, and woodland."

D. Biological Features: Vegetation cover consists of lantana, guava, koa haole, joee, kikuyu grass, Christmas berries, molasses grass, bermuda grass and Java plum. Birds in the project area are those typically found throughout the islands such as doves, sparrows, mynahs, cardinals and mejiros.

E. Archaeological and Historic Site: Based on information obtained from the Historic Sites Section of the Department of Land and Natural Resources, the site of the proposed well is not listed in the Hawaii Register of Historic Places, and does not appear to be of historic or archaeological significance. However, should any evidence of historic or archaeological remains be encountered during construction, the Historic Sites Section will be notified.

F. Geology and Hydrology: The proposed well will be located on older noncalcareous sediments which are underlain by lava flows of the Napili formation of the Waimea Canyon volcanic series.

Wells drilled in the Waimea Canyon Volcano Series have resulted in good yields due to the highly permeable characteristic of the formation. The Aliomanu Well which was drilled in 1974 by the Department of Land and Natural Resources yielded water of good quality at a rate of
approximately 1.5 million gallons a day. The well, located approximately 1½ mile northeast of the proposed well site and situated at ground elevation of approximately 300 feet, has a depth of 600 feet. The ground water in the well stands approximately 40 feet above mean sea level. Geologists theorize that "the relatively high head is attributed to the confining or impounding effect of the lava flows of the Koloa volcanic series, which were deposited against the steep, northward sloping, eroded and weathered surface of the Napali lavas and by the dikes that intruded into the Napili formation and forming compartments." 2

Based on the test results of the Aliomanu Well, the possibility of locating a good source of water at the proposed site seems encouraging.

V. The Assessment Process:

Geologic and hydrologic data soil classification and general information were gathered from the following:


Consulted with Historic Sites Section of Division of State Parks to inquire whether the proposed well site is included in the Hawaii Register of Historic Places.

Staff members conducted an on-site inspection of the proposed well site.

Consulted with staff members of the Department of Hawaiian Home Lands. Other affected agencies and interested parties will be consulted.

VI. Evaluation of Potential Impacts:

Since there are no homes within at least a mile from the project area, noise and dust generated by construction activities will have minimal effect on the residents of the area.
Vegetation and trees will be cut and removed for the well site. Access to the well site will be over former pineapple field roads. Some grading work will be done to provide a level platform for the drill rig. Provisions will be made to minimize erosion.

During testing of the well which will be conducted continuously over a three to five day period, ground water will be withdrawn from the basal aquifer to determine the capacity, and the amount of drawdown and chloride of the water. Withdrawal of water from the aquifer will have minimal impact on the basal reservoir since it is being continuously replenished by rainfall trickling down through the soil and rock and collecting in the vast underground reservoir.

Valuable geologic and hydrologic data will be gained from the exploratory drilling and subsequent testing of the well which can be used for future exploration of ground water in the area. Should the test result prove successful, the well will provide the irrigation needs of the proposed agricultural development in Anahola.

VII. Alternatives:

Surface water of the Anahola Stream is a possible alternate source for the proposed agricultural development. However, in order to develop the amount of water needed to support the project, the stream water must be impounded and pumped to a storage reservoir at a high elevation so it could flow by gravity to the service areas. Further, if drip method of irrigation were to be used, the water must be filtered to prevent clogging of the holes in the distribution hose.

Another alternative is to utilize the existing Aliomanu Well which was drilled by the State in 1974. The development of this source will involve the installation of pump, controls and approximately 7,500 feet of pipeline, whose estimated cost will be in excess of the cost to drill and develop a new well at Anahola.

The "no-action" alternative would deter plans to place idle but fertile lands into productive use and deny native Hawaiians in Anahola the opportunity to engage in farming.

VIII. Determination:

Since the proposed action will involve only the drilling and testing of an exploratory well and will not result in any adverse impact to the environment or inconvenience to anyone, this Notice of Determination is therefore a Negative Declaration, and an Environmental Impact Statement will not be filed.
REFERENCES

