A. **STATE WELL NO.** 4555-01  
**WELL NAME** Lanai Well #10  
**ISLAND** Lanai

B. **LOCATION** Map Attached

C. **WELL OWNER** Lanai Company, Inc.  
**P.O. BOX** L  
**LANAI** 96763

D. **TYPE OF RIQ** 36L cable tool

E. **DATE OF WELL COMPLETION** 07/13/93  
**DATE OF PUMP INSTALLATION**

F. **GROUND ELEVATION (measured)**

G. **TOTAL DEPTH OF WELL BELOW GROUND** 1455

H. **HOLE SIZE:**

I. **CASING INSTALLED:**

J. **ANNULUS:**

K. **PERMANENT PUMP INSTALLATION:**

L. **PROPOSED USE**

M. **INITIAL WATER LEVEL** 1020 ft. below ground.  
**Date and time of measurement:** 06/01/93, 1:00PM

N. **INITIAL CHLORIDE**

O. **PUMPING TESTS:** Reference point (R.P.) used: which elevation is ft.

Q. **DRILLER’S LOG:**

R. **REMARKS:** Well was only deepened by Roscoe Moss Hawaii, Inc.

**NOTE:** Drilled Cased Pump tested by others.

Submitted by (print) Tracy Runnels

Title Field Superintendent

FOR DRILLER’S USE:

Job Name

Job No.
DATE: 21 August, 1992

TO: Mitchell Ohye / DLNR Commission on Water Resource Management

FROM: RICHARD WOOLVERTON
Phone #: (808) 565-8241

SUBJECT: Well 10 Information

Mitchell,

I ran across the following drawdown test report on Well #10. Until Frandsen can get drilling logs and completion reports to me, I'm at a loss. I also discovered that the test wells where #12 and #13 are were originally designated B-2 and B-1, respectively. These also are in limbo with the Frandsen Bankruptcy.

As more develops, I'll forward info to you.

Thanks for your patience,
3) Gravel packing the screened portion of the well, backfilling the cased portion with crushed rock, and grouting the top 200 feet, and 4) installation and testing for a 100 gpm deep well pump and motor.

2. Request the driller move from this well immediately to the Kaluakapo Crater well sites and proceed with that exploration.

The decision to complete this well can be postponed until the crater exploration determines the yield and quality of the other two sites. If those wells prove more promising, then abandon Well 10. However, if comparable yields are encountered, then Well 10 would be significant in the future scheme for Manele irrigation. In the latter event, the cost to complete Well 10 will be needed to assist decision-making; obtaining the cost data now will expedite that process and should be of no cost to Lanai Co.

JAMES S. KUMAGAI, Ph.D.
Vice President

JSK/JRD/It

cc: Mr. Jim Pierce
May 14, 1990

Mr. John Walker
LANAI ROCK AND CONCRETE
P.O. Box L
Lanai City, Hawaii 96763

DRAWDOWN PUMP TEST FOR WELL 10

This summarizes the findings of the step-drawdown pump test conducted on May 10, 1990 by Paul Frandsen and Associates and Jim Dexter at Well 10 on the 1388 road and the conclusions we reached.

The purpose of the test was to estimate the drawdown-well yield relationship for Well 10 which was unknown previously since WRI was unable to conduct the test due to pump failure. This provides a baseline condition to determine the effectiveness of fracturing the well, e.g., with the use of explosives. A step-drawdown test was made to extrapolate the drawdown at greater pumping rates using a standard mathematical relationship discussed in several technical references.

The submersible pump was placed in the well approximately 15 feet from the deepest point in the hole that the driller could set it. The hole has either collapsed or a large rock has fallen blocking about 110 feet of the bottom of the hole. The static water table elevation was measured at 211 feet, msl, at the beginning of the test. The water table elevation was restored to within one inch of initial elevation nine minutes after the pump was shut off at the conclusion of the test.

Summarizing, the pump test results were as follows:

<table>
<thead>
<tr>
<th>Average Flow (GPM)</th>
<th>Average Drawdown (FT)</th>
<th>Time Pumped (MIN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>1.3</td>
<td>114</td>
</tr>
<tr>
<td>32</td>
<td>3.7</td>
<td>130</td>
</tr>
<tr>
<td>46</td>
<td>6.4</td>
<td>163</td>
</tr>
</tbody>
</table>
Mr. John Walker  
Drawdown Pump Test for Well 10  
May 14, 1990  
Page 2

As the above data show, increasing the pumping rate leads to an increase in drawdown that is more than proportionate to the flow rate. For example, a 50% increase in pumping (from 32 to 46 gpm) resulted in a 100% increase in drawdown.

In comparison to the above results, the total drawdown at Well 9 was 11 feet at 135 gpm, and 14 feet at 116 gpm at Well 8.

Based on the test data, the predicted drawdown in Well 10 at 100 gpm pumping rate is 25 feet, and at 150 gpm, the drawdown would exceed 52 feet. These estimates assume that extrapolation of the observed relationship remains valid over the entire range.

Two water samples taken during the test were analyzed for salinity. The measured range was 2800 to 3400 ppm total dissolved solids (TDS). Based on a ratio of chlorides to TDS of 50 percent, which was shown from Well 9 sample analysis, the chlorides in Well 10 are in the 1400 to 1700 ppm range. This is borderline from a turf irrigation standpoint. The water temperature measured 102 degrees F. In comparison, a sample of water taken five feet below the static water table by the State during our logging of this well measured 350 ppm chlorides during a non-pumping state. This supports the driller’s suspicion that a freshwater stream is discharging into the well at a high elevation; the freshwater would tend to sit on top of the brackish water.

The following conclusions are drawn:

1. The well is marginal from a yield and water quality standpoint;
2. Reaming the well diameter to a greater size would not materially improve sustainable yield;
3. Since there is already evidence of caving, fracturing the well with explosives might cause further damage, which the driller’s foreman also advised.

The recommendations are as follows:

1. Request a price quotation for completing the well: 1) re-drilling the bottom of the hole to sea level, 2) casing the well with 7-inch ID steel casing assuming 1050 feet of blank casing and 175 feet of well screen,