FACSIMILE TRANSMITTAL PAGE

Please deliver the following pages to:

Name: Yukio Kitagawa
Company: DOA
From: Ed Sakoda
Date: 5/24/93 Time: 10:46am

Message:

1 1/2 Waipio side  6474-01 (Honokowai)
Drilled, Undrilled

Total number of pages (including Transmittal Page): 2

* * * * * * * *

If you do not receive all of the pages legibly, please call back: (808) 587-0221

Sending Facsimile Number: (808) 587-0219
Receiving Facsimile Number: ( ) 973-9613
Mr. William W. Paty  
Chairman of the Board  
Dept. of Land and Natural Resources  
1151 Punchbowl Street  
Honolulu, Hawaii 96813

Dear Mr. Paty:

SUBJECT: Preliminary Engineering Report for the Hamakua Sugar Company  
Slaughter House Well No. 6323-01

Transmitted herewith for your review and comments is a copy of the preliminary engineering report for the Hamakua Sugar Company Slaughter House Well No. 6323-01. This report has been prepared pursuant to Section 11-20-29, Chapter 20, Title 11, Administrative Rules, Potable Water Systems.

Your review and comments are solicited as your concerns, knowledge and expertise in this area may assist us in determining potential impacts which may result by the proposed project.

Your early attention and reply to this matter will be greatly appreciated. Please respond by November 16, 1987.

Please return the preliminary engineering report with your comments.

Sincerely,

BRUCE S. ANDERSON, PH.D.  
Deputy Director for  
Environmental Health

Enclosure
ENGINEERING REPORT

HAMAKUA SUGAR COMPANY SLAUGHTER HOUSE WELL

September, 1987

Prepared by
Mink and Yuen, Inc.
100 N. Beretania St. Suite 303
Honolulu, HI 96817

REGISTRATION PROFESSIONAL ENGINEERS
No. 532
HAWAI'I, U.S.A.

THIS WORK WAS PREPARED BY
ME OR UNDER MY SUPERVISION.

Signature
General Information

A well was drilled and tested for Hamakua Sugar Company by Fred Page Drilling Company in early 1987. Testing was completed in April, 1987, and since then the well has been pumped occasionally but has not yet been connected to a distribution system. Hamakua Sugar Co. intends to use the water for its slaughterhouse complex for both potable and sanitary purposes. Water quality meets Department of Health and EPA standards.

The well is located in Field 43280 of Hamakua Sugar Co. at an elevation of 509 feet, somewhat more than 200 feet mauka of the feed lot associated with the slaughterhouse (see location map in the Appendix). It is 575 feet deep and outfitted with 14 inch diameter casing. Drilling was done with a cable tool rig. A line shaft deep well turbine pump capable of yielding 900 -1000 gpm will be installed. Water from the well will be pumped into three holding tanks, from which it will flow by gravity to the slaughterhouse. The water system is owned and will be operated by Hamakua Sugar Company.

Physical and Hydrogeological Characteristics of the Area

a. Location: The well is in Hamakua Sugar Company land on the Hamakua coast of the island of Hawaii approximately midway between the coast and the highway and between Paauilo and Paaenhau. It was drilled on the interfluve separating Pohakuhaku Gulch on the south from Kaumoali Gulch on the north.

b. Climate: Mean annual temperature at the site is 72 F, and mean annual rainfall is approximately 75 inches. Inland, rainfall increases to about 150 inches per year before decreasing on the mid slopes of Mauna Kea.

c. Topography: The well site is at elevation 509 feet on a broad interfluve midway between two gulches. Sugar cane surrounds it on three sides, and the feed lot lies between it and the ocean. Topography at the site is flat while both mauka and makai the surface slopes 10 to 15 percent.

d. Geology and foundation conditions: The Laupahoehoe formation of the Mauna Kea volcanic series composes the land surface at the site and extends about 200 feet below. This formation consists of light gray andesitic lavas which usually are massive and dense. Individual flow units may be as much as 100 feet thick. Beneath the Laupahoehoe formation is the principal island-building volcanic rock, the Hamakua formation, consisting of basalts and olivine basalts. This formation constitutes the aquifer in the region. A thin intermittent layer of Pahala ash occurs at the surface over
much of the area.

e. Earthquake considerations: The entire island of Hawaii is in seismic zone 3, the most severe in the State. However, structures at Hamakua are inherently earthquake resistant and should withstand gravity and sidesway loads.

f. Groundwater conditions: The main aquifer is in the Hamakua formation, which is indefinitely deep beneath the 200 feet thick Laupahoehoe formation at the surface. The principal groundwater is basal, but minor perched layers were encountered during drilling. The aquifer is highly permeable and passing through it is a large flux of groundwater which originates as recharge in the high rainfall region on the lower slopes of Mauna Kea. Head at the site is 4 ft.+

Salinity of the water during a lengthy pump test stabilized at 191 mg/l chloride.

g. Flood problems: The site lies far above the tsunami inundation zone. Being on the axis of an interfluve, it is subject to only minimum overland sheet runoff during unusually high rainfalls.

h. Land use planning: The well is in land zoned for agriculture. Its location conforms with zoning and planning regulations.

i. Water rights: The entire area for thousands of feet in all directions is owned by Hamakua Sugar Co. A well (6223-01) was drilled by the State 3500 feet upgradient of the site within the last two years. It is not being used but eventually will be connected to the County system. The Hamakua well will neither affect nor be affected by the State well. No other owners have wells nearby. The groundwater resources of the region are very large and could be successfully exploited by numerous non-interfering wells.

Extent of Waterworks System

a. Areas to be served: Primary use of the water will be at the slaughterhouse for human and cleaning purposes. If a surplus exists, some water may be used for irrigation.

b. Population served and demand: Less than 50 people will depend on the well during normal operations. All will be employees of Hamakua Sugar Co. No other domestic usage is anticipated.

c. Future requirements: The only expected uses of the water are domestic and sanitary at the slaughterhouse, and for irrigation if a surplus exists.

d. Extension of system: All usage of the water will be
within the land boundaries of Hamakua Sugar Co.

e. Capacity, fire requirements, pressure: The well will have a capacity of 1000 gpm, which is more than adequate for slaughterhouse needs, including fire requirements. Elevation drop between the storage tanks and the slaughterhouse is 158 feet.

f. Alternate solution: The slaughterhouse currently is being supplied with water from Paauilo Shaft, the source of domestic supply in the area. After the new well is put on stream, the Shaft will be an alternate source of water.

g. Environmental and economic impact: Construction of the well and water system has had no measurable effect on the local environment. The area has been devoted to sugar cane for 80 years, and recently a portion was transformed into a feed lot. No other activities are anticipated. The feed lot with its slaughterhouse is considered essential to the economic survival of Hamakua Sugar Co.

Potential Sources of Contamination

a. Description of well site:
1. Coordinates are: 155 23 35 W, 20 03 37 N.
2. Elevation: Top of the well is 509 feet above sea level (map in Appendix).
3. Catchment area and slope: The well is on the axis of a broad ridge and therefore has a small catchment area up gradient, no more than a few acres. The ground at the site is level; above and below the gradient is 10-15 percent.
4. Soil and subsoil: Soil in the area is classified as Ookala silty clay loam, 12 to 20 percent slopes. It normally consists of 12 inches of soil overlying about 40 inches of subsoil grading into fragmental aa. Permeability is moderately rapid, runoff is moderate, and erosional hazard is also moderate. Beneath the soil-subsoil is massive and dense andesitic aa of the Laupahoehoe formation.
5. Well depth, depth to water: The well is 575 feet deep (66 feet below sea level). The basal water table lies about 4 feet above sea level. Blank casing reaches to 8 feet below sea level, followed by 21 feet of perforated casing and open hole of 37 feet.

b. Design well draft: The well will be fitted with a pump having a capacity of 900 to 1000 gpm at maximum efficiency.

c. Water quality at nearby wells: The nearest well,
State no. 6223-01 lying 3500 feet inland of the site, reaches to 95 feet below sea level. It was drilled by the State in 1985. Its chemical quality is as follows (values in mg/l unless stated otherwise):

N .96, Hardness 43, Ca 9.0, Mg 5.0, Na 9.0, K 2.3, Cl 8.0, SO(4) 3.8, F <.10, SiO(2) 36, Temp. 19.5 C.

d. Land use classification: The region around the well is zoned for agriculture.

e. Existing or potential sources of contamination:
   1. Recharge area: The recharge area reaches up the slopes of Mauna Kea where the maximum annual average rainfall is 150 inches. Sugar cultivation, ranching and forests dominate land use.
   2. Type of contaminants: The chief potential source of contamination in the recharge area is agriculture, in particular residual biocides and unconsumed fertilizer. However, neither has been detected in recognizable quantities (see analysis of water in Appendix). Ranching poses little potential for contamination, and the scattered dwellings are too few to be endangering.
   3. Distance to proposed well: Sugar cane is grown near the well and ranching takes place several miles away. The cattle pen inland boundary is 217 feet down the topographic and groundwater from the well, while the seaward boundary is another 1200 feet down gradient. The well is directly above the southwest corner of the feed lot.

   The feed lot is the most obvious potential source of contaminants. But for contaminants to reach the well they must survive vertical travel of 500 feet in the unsaturated zone and 217 feet of up gradient movement in the saturated aquifer. Microbiological species are not likely to survive this long pathway, but dissolved nitrogen from cattle wastes will infiltrate to the aquifer. Whether or not sufficient nitrogen will mix with groundwater to significantly affect the quality of pumpage from the well is conjectural, but a theoretical analysis suggests that the effect will be small. The analysis is given in the Appendix.

   The analysis shows that the envelope of flow lines drawn to the well will barely encounter the corner of the feed lot. Aquifer parameters employed in the model are typical of basaltic aquifers in Hawaii. The well water will be periodically monitored by Hamakua Sugar Co. for nitrogen. If nitrogen increases to the upper limit of acceptance for potable water (10 mg/l N), the alternative supply from Pauuilo Shaft will be used in the slaughterhouse.
4. Method of disposal: All potential contaminants will originate on the ground surface, 500 feet above the water table.

5. Depth to water: The boundary of the nearest potential source of contamination, the feed lot, is about 500 feet above the water table. Between the ground surface and the saturated aquifer is 200 feet of poorly permeable andesitic lavas of the Laupahoehoe formation, a weathered unconformity on the surface of the Hamakua basalt, and finally about 300 feet of unaltered Hamakua basalt. Several ash beds were encountered during drilling.

f. Groundwater contours: At the well site the head was measured as 4 feet; directly up gradient, 3500 feet away, the head in State well 6223-01 is given as 10 feet, suggesting a groundwater gradient of about 1/600. If this is true, the groundwater flux must be very high. Such a high gradient is unlikely, however. If head at the State well is correct, then head at the Hamakua well is probably higher than 4 feet. The Laupahoehoe formation may serve as a caprock, thus causing buildup in head so close to the coast. The groundwater contours are parallel to the coast.

Sources of Water Supply

a. Nature of soil and stratum: The surface soil is a moderately permeable silty clay loam. The stratum on which it developed is andesitic lava of the Laupahoehoe formation. This lava has greater thickness per unit than do ordinary basalts. Between the aa layers, rubbly clinker occurs. The sequence of soil, subsoil, andesite and basalt is likely to be an effective purifier of infiltration.

b. Surface drainage as a source of contaminants: Local surface drainage tributary to the well is small. The well is grouted from the ground surface to a depth of 100 feet.

c. Depth to water table at nearby wells: The nearest well (6223-01) is 3500 feet distant at an elevation of 1055 feet. Depth to water at this well is 1045 feet. Paauilo Shaft is 1.5 miles to the east; here the head is 3.5 feet. Groundwater in the region is virtually unexploited.

d. Water table slope: Head at 6223-01 is reported as 10 feet while that of the Hamakua Sugar well is 4 feet. A difference of 6 feet over a distance of 3500 feet gives a gradient of about 1/600, which is unusually high for a basal aquifer in Hawaii. If the head values are correct, then a very large flux of groundwater must be moving through the aquifer.

e. Flooding and earthquake risk: Neither overland floods
nor tsunamis pose a risk to the station. All of the island of Hawaii is seismically active, but serious earthquakes are unusual.

f. Quality and quantity of groundwater: Because few wells have been drilled in the region, a data base showing aquifer behavior under stress does not exist. Every environmental indicator suggests that even severe droughts would not seriously affect the water resource. Average rainfall in the recharge area exceeds 100 inches per year, and the aquifer is continuous for many miles toward Mauna Kea and parallel to the coast. The nearest active wells with records, Pauuilo Shaft and Ookala Shaft, appear not to be stressed by drought. Quality of the groundwater is excellent and meets requirements of the Safe Drinking Water regulations.

g. Significant factors regarding potential contamination: Of the possible contaminant sources (i.e., agriculture, ranching and the feed lot), only the feed lot poses a risk of contamination, chiefly by generating infiltration high in nitrogen. This concern is evaluated in the Appendix. The analysis indicates that the nitrogen contribution will not increase concentration in the pumpage to an unacceptable level.

h. Control measures to prevent contamination: Control measures are not required at this time to prevent contamination. There is little likelihood of significant up gradient flow of infiltrate from beneath the feed lot. Nevertheless, the well will be monitored periodically to track any quality changes in the groundwater. Should nitrogen approach 10 mg/l, or should any microbiological contaminants appear, the alternative source at Pauuilo Shaft will replace the well.

i. Summary: Potential contaminants are not expected to affect quality of the water pumped unless the unsaturated zone and the aquifer behave strangely. An alternative source of domestic water, Pauuilo Shaft, will be available in the event the unexpected happens.

Proposed Treatment Works

No treatment works are necessary. The water as pumped from the ground is expected to be free of contamination.

Pumping Facilities
a. Purpose of service: Potable and cleaning water for the slaughterhouse operation.

b. Pumping layout, main size: The deep well pump will discharge water into three interconnected cylindrical fiber glass tanks, each of 6000 gallons capacity. The connection is at the base of each tank. Pumpage will discharge into the top of the first tank. Clearance will be adequate to prevent back-siphoning into the well when the pump shuts down. Each tank is equipped with an overflow pipe draining to an open ditch. A 4 inch PVC line connects storage with a service connection pit about 200 feet from the slaughterhouse. The pit is equipped with appropriate valves and meters for both the well supply and the alternative supply from Pauuilo Shaft.

c. Design flow: Demand will be modest, generated by domestic requirements of less than 50 employees and the need for sanitation in the slaughter operation. Average daily demand will be less than 100,000 gallons. Storage will be 18,000 gallons.

d. Liquid characteristics: Water from the well will be clear and potable. Its quality should not deteriorate in the storage-transmission system.

e. Electric power available: Electric power will be provided by Hamakua Sugar Co. from its generators as well as from Hilo Electric when needed.

f. Pumping arrangement: A 900-1000 gpm deep well turbine pump will be placed in the well. Suction will be at 24 feet below sea level.

g. Pump selection: The pump will be maximally efficient at 900 to 1000 gpm against a TDH of about 525 feet.

h. Buildings and structural improvements: The well will be protected from accidents or unauthorized entry by a fence. The pump panel will be in a weather proof shelter. All of the land around the well is owned by Hamakua Sugar Co.

i. Water hammer considerations: Not considered a problem.

j. Construction and operation: The well bore is 18 inches in diameter and the casing is 14 inches diameter. Blank casing extends to 8 feet below sea level, followed by 21 feet of perforated casing and 37 feet of open hole. The well is completed and ready to be fitted with a pump.

h. Electrical system: Hamakua Sugar Co. generates its
own power and is also interconnected with Hilo Electric Co. Pump controls are standard.

**Finished Water Storage**

Storage consists of 3 x 6000 gallons fiber glass tanks sited about 15 feet higher than the well pad and about 25 feet away. An important role of the tanks is hydraulic control. The tanks will freely overflow if the pump controls fail to shut down the pump.

**Water Distribution System**

a. Layout: General layout of the system is illustrated in the Appendix.

b. Materials: The storage tanks are made of fiber glass and the transmission pipes of PVC. The principal valve controlling flow to the slaughterhouse is an Asahi butterfly valve. No hydrants are connected.

c. Other utilities: The alternative supply source is Paauilo Shaft.

d. Future construction: The well is designated for use by the slaughterhouse and, secondarily, for irrigation. No further demands are planned.

e. Pipes: The transmission pipe from the storage tanks to the slaughterhouse is along a road beneath 5 feet of cover. The road is private, owned by Hamakua Sugar Co.

**Financing**

Well drilling, testing and equipping, and the entire distribution system was paid for by Hamakua Sugar Co., who also owns the system. The sole consumer of the water will be Hamakua Sugar Co.
Hamakua Sugar Co. Inc.
Well Cross Section
Diagram of The Hamakua Sugar Company Water Service to Their Slaughterhouse and Processing Plant Paauilo, Hawaii

June, 1987
TO: HAMAKUA SUGAR CO., INC.  
ADDRESS: P. O. BOX 250  
PAAULIO, HAWAII 96776

SAMPLES OF: Potable Water
SAMPLED BY: Buddy Pond
RECEIPT DATE: 02-25-87

DATE SAMPLE ANALYZED 02/25-03/03/87
TIME SAMPLE ANALYZED
SAMPLE TYPE GRAB
SAMPLE DESCRIPTION WELL # 1

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<tr>
<td>TOTAL COLIFORM</td>
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</table>

LABORATORY ANALYSIS REPORT

O: HAMAKUA SUGAR CO., INC. ATTN: MR. BUDDY POND
ADDRESS: P. O. BOX 250 PHONE: (808) 753-0077
PAAUILO, HAWAII 96776

SAMPLES OF: Potable Water
SAMPLED BY: Buddy Pond SAMPLING DATE: 08-25-87 TIME: 0850
RECEIPT DATE: 08-25-87 TIME: 1445

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Groundwater Flow to the Hamakua Well

The well is located up gradient of the southwestern corner of a large cattle feed lot. It lies 217 feet from the corner and is separated from it by a road. The lot parallels the road for 1000 feet east of the well, and extends toward the coast along another road for 1200 feet. The attached figure illustrates the position of the well relative to the feed lot and the calculated envelope of flow lines draining to the well during continuous pumping (steady state).

The lot contains 44 individual pens, each of which can hold a maximum of 160 head of cattle. Full loading of all of the pens at the same time is unlikely, however. Nevertheless, the lot may carry several thousand head during normal operations.

The surface of the lot consists of soil and gravel over hard rock and is bare of vegetation. The lot lies astride a gentle interfluve but slopes 10 to 15 percent toward the coast. All surface runoff is toward the coast by way of small gullies. The well is about 15 feet higher in elevation than the lot, up the topographic gradient, and thus is beyond the reach of surface contamination generated in the lot.

The concentration of cattle in the lot results in a large production of manure from which pollutants, in particular biological constituents and dissolved nitrogen, can infiltrate below the surface. Biological matter normally breaks down in the soil and near subsurface, and what escapes this mantle of chemical activity likely dies away in the rock mass above the saturated aquifer. Depth from the surface to the water table is about 500 feet. Nitrogen, on the other hand, will stay in solution, except for a portion which converts to gas and escapes to the atmosphere, and will percolate to the aquifer to mix with ambient groundwater. If the concentration of nitrogen in the percolate is very high, the mixing may increase dissolved nitrogen in the groundwater significantly. The background concentration of nitrogen in unaffected groundwater is less than 1 mg/l. The limit of acceptance for domestic water is 10 mg/l or less (equivalent to 40 mg/l nitrate).

What is the likelihood that nitrogen from the feed lot will affect the quality of the groundwater pumped by the well, and to what degree? A theoretical solution exists for determining the boundary of the groundwater flow envelope which is tributary to a pumping well. To calculate the position of the groundwater divide at steady state the following must be known or assumed: rate of pumpage (Q), depth of flow in the aquifer (B), and specific discharge (q), which in turn is a function of hydraulic conductivity (k) and gradient (dh/dx). In J. Bear (1974, Hydraulics of Groundwater
Flow, McGraw-Hill) is given a discussion of the equations and their derivations. The attached drawing illustrates the problem at the Hamakua well and shows the groundwater flow envelope based on two different assumptions of depth of flow.

At the steady state the stagnation point down gradient of the well is given by,

\[ x_{\text{stag.}} = -\frac{Q}{2gB}. \]

The stagnation point is the extreme limit of the flow envelope down gradient; from beyond it no groundwater moves to the well. Elsewhere the groundwater divide is given by,

\[ x = \frac{y}{\tan(2\pi qy/Q)}. \]

The divide is asymptotic at,

\[ y = \frac{Q}{2qB}. \]

In employing the above relationships, the following values were assigned to the variables:

- \( Q = 1000 \) gpm
- \( k = 2500 \) ft/day
- \( \frac{dh}{dx} = 2/5000 \)
- \( q = 1 \) ft/day (from \( q = k\frac{dh}{dx} \))
- \( B = 150 \) ft (case 1)
- \( B = 100 \) ft (case 2)

Values for \( B \) were based on assumed heads of 4 feet and 3 feet respectively.

The groundwater divide calculated for either scenario of depth of flow indicates that little or no groundwater from directly beneath the lot will move to the well. No matter what reasonable values for Hawaiian basal aquifers are given the variables, the groundwater divide does not reach appreciably into the feed lot zone.

The above conclusions are based on theoretical arguments which assume nicely defined subsurface conditions of homogeneity and isotropism and ignores dispersion. However, heterogeneities are not likely to afford passage to the well of a large volume of groundwater from below the pens relative to the ambient flow of groundwater, and dispersion in the upgradient direction would tend to be weak. Periodic monitoring for nitrogen of the pumpage will ascertain the appropriateness of the model.
WELL DRILLING PERMIT
for
Hamakua Sugar Company Well
State Well No. 6323-01
Hamakua, Hawaii

TO: Hamakua Sugar Company, Inc.
P.O. Box 250
Paauilo, Hawaii 96776

In accordance with Chapter 166 of Title 13, "Rules for the Control of Ground Water Use in the State of Hawaii", your application to drill State Well No. 6323-01 is approved subject to the following conditions:

1. A Driller's Well Completion Report (enclosed) shall be submitted to the Division of Water and Land Development within 60 days after completion of the well.

2. Pumping test data shall be submitted to the Division of Water and Land Development within 60 days after testing of the well.

3. Monthly reports of pumpage shall be submitted after the well is put into production.

4. Upon completion of the well, submit an "as-built" drawing of the well and a map showing the exact location of the well.

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

Date of Issuance

SUSUMU ONO
Chairperson of the Board

Enc: Driller's Report Form
cc: USGS w/App.
    Dept. of Health,
    Drinking Water Program w/App.
    Hawaii DWS w/App.
    Fred Page Drilling International w/App.
APPLICATION FOR (check one)

- [ ] WELD DRILLING PERMIT
- [ ] WELL MODIFICATION PERMIT

Instructions: Send completed application and attachments to Department of Land and Natural Resources, P.O. Box 373, Honolulu, Hawaii 96809.

Reference: Regulation 9, Dept. of Land & Natural Resources.

Is the well located in a Designated Ground Water Control Area:  
[ ] Yes  
[ ] No

If "yes", application must be accompanied by a Water Use and/or Water Supply Permit and a non-refundable filing fee of $100 payable to the Department of Land & Natural Resources. However, if application is for minor modification of well, filing fee may be waived. If "no", no filing fee is required. Filing fee is waived for federal, state, and county government agencies.

1. WELL LOCATION: Island Hawaii Tax Map Key: 4-3-05A. Attach a plot plan showing well location referenced to established property boundaries.

2. WATER USER: HAMAKUA SUGAR COMPANY, INC.  
Address: P.O. Box 250, Paauilo HI  
Telephone: 776-1511  
Zip Code: 96776

3. PROPOSED DRILLING COMPANY: FRED PAGE DRILLING INTERNATIONAL

4. PROPOSED WORK:  
- [ ] Drill new well  
- [ ] Deepen  
- [ ] Redrill  
- [ ] Alter  
- [ ] Seal  
- [ ] Abandon  
- [ ] Install new pump  
- [ ] Replace pump  
- [ ] Modify pump

Fill in the diagram and briefly describe the proposed work (use back of form if necessary):

This well will supply water for new works to irrigate cane.

PROPOSED SECTION OF WELL

<table>
<thead>
<tr>
<th>Elevation at top of casing ft., msl.</th>
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<tbody>
<tr>
<td>Cement Grout 100 ft.</td>
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<tr>
<td>Hole Dia. 18 in.</td>
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<tr>
<td>Total Depth 600 ft.</td>
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<tr>
<td>Rock Packing 500 ft.</td>
</tr>
</tbody>
</table>

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

5. PROPOSED USE:  
- [ ] Municipal  
- [ ] Military  
- [ ] Agriculture  
- [ ] Domestic  
- [ ] Disposal  
- [ ] Other (specify) ___________

6. PROPOSED AMOUNT OF WITHDRAWAL: Check most appropriate box and fill in amount.  
- [ ] Daily 2,000,000 gallons  
- [ ] Monthly ___________ gallons  
- [ ] Yearly ___________ gallons

7. PROPOSED PUMP OR FLOW CAPACITY: 1,500 ___________ gallons per minute

Signature: __________________________ Date: March 13, 1986  
Water User: Executive Vice President and General Manager

Signature: __________________________ Date: March 13, 1986  
Landowner of Well Site

For Official Use:  
State Well No. 6323-01  
DLNR Permit No.  
DLNR Application No.