

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
BENEFICIAL USE FIELD REPORT

A. GENERAL INFORMATION

Permit No: 47-17463

Exam Date: 1/26/2012

1. Current Owner: MICHAEL J DEVANEY
19159 HWY 30
BUHL ID 83316
(208) 320-2519
2. Accompanied by: Michael Devaney
Phone No: (208) 320-2519
Address: same

3. **SOURCE**
GROUND WATER

B. OVERLAP REVIEW

1. Other water rights with the same place of use: None
2. Other water rights with the same point of diversion: None

C. DIVERSION AND DELIVERY SYSTEM**1. LOCATION OF POINT(S) OF DIVERSION:**

GROUND WATER L1 NE1/4NE1/4 Sec. 6, Twp 09S, Rge 14E, B.M.
TWIN FALLS County

Method of Determination: GPS 42 40.755/114 51.284

2.

PLACE OF USE: DOMESTIC

Twp	Rge	Sec	NE				NW				SW				SE				Totals
09S	14E	6	<u>NE</u>	<u>NW</u>	<u>SW</u>	<u>SE</u>	<u>NE</u>	<u>NW</u>	<u>SW</u>	<u>SE</u>	<u>NE</u>	<u>NW</u>	<u>SW</u>	<u>SE</u>	<u>NE</u>	<u>NW</u>	<u>SW</u>	<u>SE</u>	
			X																
			L 1																

Method of Determination:

3. ☒ Delivery System Diagram Attached (required). Indicate all major components and distances between components. Indicate weir size/pipe as applicable.
- ☒ Map Attached Showing Location(s) of point(s) of diversion and place(s) of use (required). Scale must be 1:24,000 or greater.
- ☒ Aerial Photo Attached (required for irrigation of 10+ acres).
- ☒ Photo of Diversion and System Attached

4.

<u>Well or Diversion</u> <u>ID No.*</u>	<u>Motor Make</u>	<u>Hp</u>	<u>Motor Serial No.</u>	<u>Pump Make</u>	<u>Pump Serial No. or Discharge</u> <u>Size</u>
D0050188		3Hp	45FA1554	Franklin	

*Code to correspond with No. on map and aerial photo

D. FLOW MEASUREMENTS

1. Measurements:

5 Gallon Bucket – Measurement was taken with 5 gallon bucket and stopwatch. Approximately 5 measurements were taken, ranging from 28.4 seconds to 29.75 seconds to fill the bucket. The average time was 28.8 seconds, which calculates to 10.4 gpm. There was one other location where water flowed out of the system, it was not able to be measured but was estimated to be the same.

E. FLOW CALCULATIONS

 X Additional Computation Sheets Attached

$$10.4 \text{ gpm} \times 2 \text{ (discharge points)} = 20.8 \text{ gpm} / 448.83 \text{ gpm/cfs} = 0.046 \text{ cfs}$$

Permit was for **0.04 cfs**

F. VOLUME CALCULATIONS

1. Volume Calculation for Domestic Use: See attachment

Based on volume calculations it is recommended water right be allowed **13.9 afa**

G. NARRATIVE/REMARKS/COMMENTS

The field exam for water right 47-17463 was conducted on January 26th 2012. During the exam the owner (Michael Devaney) demonstrated that his low temperature geothermal well is used for heating his home, shop/guest house, and swimming pool. At the time of the exam the heating system was turned on to full capacity as if it were to be operated during the coldest time of winter. From the well the water line splits one line goes to the home and swimming pool and the other going to the shop/guest house. Water is piped into each of the buildings through a hydronics system that uses zones and radiant floor heat to heat the space. At the house once the water has flowed through the house it pours into the swimming pool as a secondary use before it is poured into the ditch nearby. A flow measurement was taken at one of the two discharge pipes; using a 5 gallon bucket and stop watch it showed the flow to be 10.4 gpm in addition to the other discharge pipe the flow was estimated to be at least 20.8 gpm or 0.046 cfs. The permit is for **0.04 cfs**, the permitted rate was used for the license.

The volume of water required for heating was calculated based on Administrative Memos (see attachment). The calculations used empirical formulas to calculate the design heat load and temperature drop across the system to then calculate the volume. The combined area of the home and shop/guest house was determined to be around 12,700 ft² with best energy efficiency. The temperature of the water from the well was 97 °F with an expected 8.1 °F temperature drop across the system. Using the annual heating degree-days and other variables it was found that the volume required for this system is **13.9 afa**.

Water from the low temperature geothermal well is only used to heat the home/pool and shop/guest house. There is a cold water well in use on the property for in-house domestic use. The lawn and garden are irrigated using canal shares.

Have conditions of permit approval been met? X Yes No

H. RECOMMENDATIONS**1. Recommended Amounts**

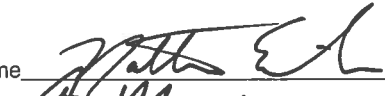
<u>BENEFICIAL USE</u>	<u>PERIOD OF USE</u>	<u>DIVERSION RATE</u>	<u>ANNUAL VOLUME</u>
DOMESTIC	01/01 to 12/31	0.040 CFS	13.9 afa
	<u>Totals:</u>	0.040 CFS	13.9 afa

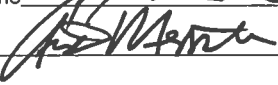
2. Recommended Amendments

☐ Change P.D. as reflected above ☐ Add P.D. as reflected above ☒ None

☐ Change P.U. as reflected above ☐ Add P.U. as reflected above ☐ Other

I. AUTHENTICATION

Field Examiner's Name  Date 2/27/12

Reviewer  Date 2/27/12

Flow calculation WR 47-17463

System has one low temperature geothermal well that has a variable speed Franklin 3 hp 240 volt 3 phase pump. The pump is currently set at 337 feet with a maximum pumping capacity of 60 gpm. During the field exam the two outlets of the system were observed, the first outlet from the shop/guest house is through a 2 inch pipe that runs into the coulee by the well. Flow was measured with a 5 gallon bucket and was 10.4 gpm. The second outlet from the house goes into the swimming pool and then flows into a ditch; the system from the house is all covered and was not accessible to be measured. However the flow in the ditch was observed and was estimated to be similar to the shop at around 10 gpm.

The heating system was designed using 12 zones, 4 in the shop/guest house, 6 in the house and 2 in the garage. It is expected that water requirement for each zone is approximately 5 gpm, it would be expected that if all 12 zones were in use the maximum flow would be 60 gpm. However per the owner, the system is typically not running at full capacity. It is expected that usually 3-4 zones are in use at a time depending on the heat demand and the temperature outside. Based on the expected normal use of flow for the system it is recommended that the right be given the 0.04 cfs requested on the permit.

Volume calculation WR 47-17463

The annual volume requirement for water right 47-17463 was calculated using a Memorandum from Rick Sterling to Terry Blau dated March 25, 1988 and Administrative Memorandum from Norm Young dated September 28, 1992 titled Rate of flow for heating use. The memorandums contain equations for calculating the annual water requirements for geothermal heating. The equations are listed below with an explanation of the variables; data was taken from the field exam and the National Oceanic and Atmospheric Administration (NOAA).

Design Heat Load Calculation:

$$E = [e \times \Delta t_1] 0.8 \times A$$

Where:

E = BTU/hr required

e = House efficiency factor

Δt_1 = Design temperature difference

0.8 = Adjustment factor for two story homes

A = Area of heated space

Values used:

$e = 0.28$ BTU/hr ft² °F (best energy efficiency)

$\Delta t_1 = 73$ °F (Indoor temp. (70°F) minus design outdoor temp. (-3°F))

$A = 12,700$ ft² (area includes house, and shop with guest house)

Heat load required:

$$E = [0.28 \times 73] 0.8 \times 12,700 = \mathbf{207,670 \text{ BTU/hr}}$$

Temperature Drop across System Calculation:

$$\Delta T_s = 0.3(S - T)$$

Where:

ΔT_s = Temperature drop across system

S = Geothermal source temperature

T = Temperature required by system

Values used:

$S = 97^\circ\text{F}$

$T = 70^\circ\text{F}$

Temperature drop across system:

$$\Delta T_s = 0.3(97 - 70) = \mathbf{8.1^\circ\text{F}}$$

Volume Calculation:

$$V = \frac{HL \times DD \times 24 \times C_D}{\Delta t_1 \times k \times C \times \Delta t_2}$$

Where

V = Annual volume of geothermal water required

HL = Peak heating load in BTU/hr

DD = Annual heating degree-days

24 = 24 hrs/day

C_D = Empirical correction factor for heating effect vs. 65°F degree-days

Δt_1 = Design temperature difference

k = Correction factor to account for losses in, use 0.90

C = Constant to correct for desired units, $2.72 \times 10^6 \text{ BTU/AF-}^\circ\text{F}$

$\Delta t_2 = \Delta T_s$ (Calculated above)

Values used:

$HL = 207,670 \text{ BTU/hr}$ (calculated above)

$DD = 6,715$ (NOAA, Average number of degree days 1971-2000)

$24 = 24 \text{ hrs/day}$

$C_D = .6$ (Taken from table based on degree days)

$\Delta t_1 = 73^\circ\text{F}$ (Indoor temp. (70°F) minus design outdoor temp. (-3°F))

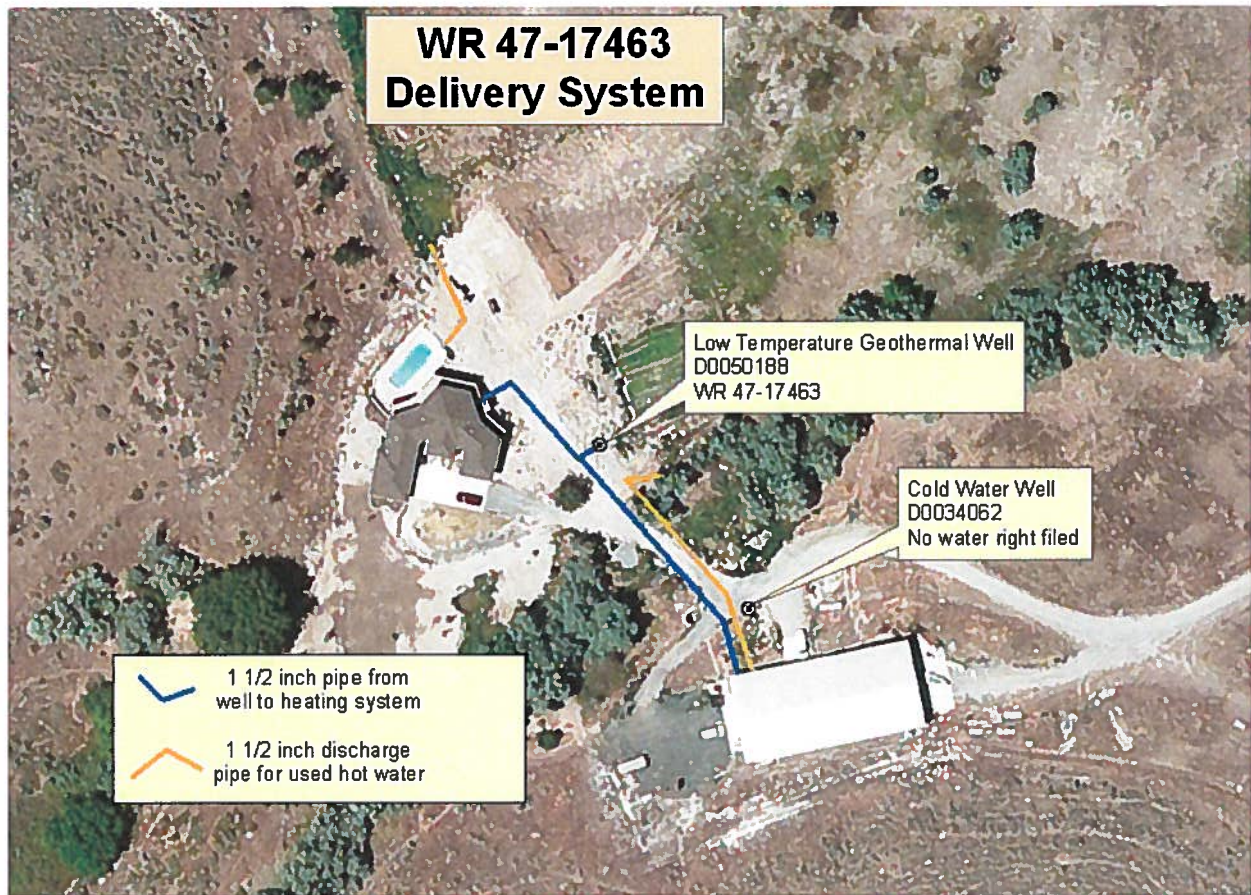
$k = 0.90$

$C = 2.72 \times 10^6 \text{ BTU/AF-}^\circ\text{F}$

$\Delta t_2 = 8.1^\circ\text{F}$ (calculated above)

Volume of water required for heating:

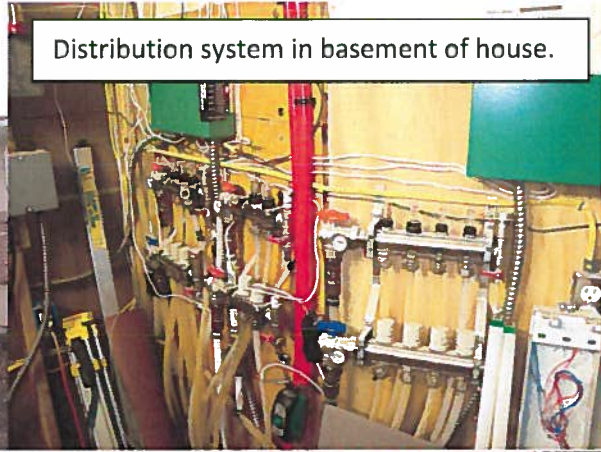
$$V = \frac{207,670 \times 6,715 \times 24 \times .6}{73 \times 0.90 \times 2,720,000 \times 8.1} = \mathbf{13.9 \text{ af}}$$



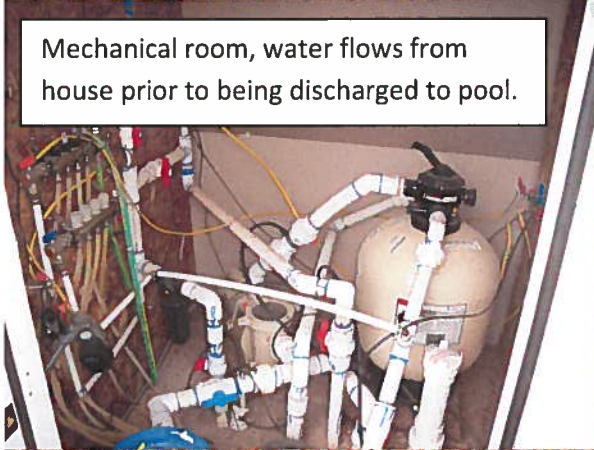
Main house



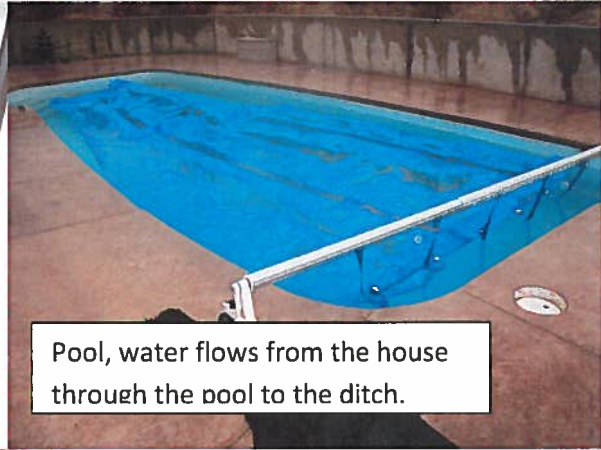
Distribution system in basement of house.



Mechanical room, water flows from house prior to being discharged to pool.



Pool, water flows from the house through the pool to the ditch.



Discharge from house, water daylights through culvert into ditch.





Shop/guest house



Distribution system in
shop/guest house.



Discharge point from
shop/guest house.

State of Idaho
Department of Water Resources
Water Right License
47-17463

Water Service Area Boundary for Michael J Devaney

R14E

T09S



0 0.0275 0.055 0.11 Miles

-  Point of Diversion
-  Place Of Use Boundary
-  Townships
-  PLS Sections
-  Quarter Quarters



DRAFT

State of Idaho
Department of Water Resources
Water Right License

WATER RIGHT NO. 47-17463

Priority: December 12, 2007

Maximum Diversion Rate: 0.04 CFS
Maximum Diversion Volume: 13.9 AF

It is hereby certified that MICHAEL J DEVANEY
19159 HWY 30
BUHL ID 83316 has complied with the terms and
conditions of the permit, issued pursuant to Application for Permit dated December 12, 2007; and has
submitted Proof of Beneficial Use on March 12, 2009. An examination indicates that the water has been
diverted from:

SOURCE

GROUND WATER

and a water right has been established as follows:

<u>BENEFICIAL USE</u>	<u>PERIOD OF USE</u>	<u>DIVERSION RATE</u>	<u>ANNUAL DIVERSION VOLUME</u>
DOMESTIC	01/01 to 12/31	0.04 CFS	13.9 AF

LOCATION OF POINT(S) OF DIVERSION:

GROUND WATER L1 (NE1/4NE1/4) Sec. 6, Twp 09S, Rge 14E, B.M.
TWIN FALLS County

PLACE OF USE: DOMESTIC

Twp Rge Sec	NE	NW	SW	SE	Totals
09S 14E 6	NE NW SW SE X L 1				

CONDITIONS OF APPROVAL

1. Low temperature geothermal water diverted under this right shall not be used for lawn irrigation or any other component of domestic use unless it is first used for heating purposes.
2. Domestic use is for one home and shop/guest house, including irrigation of up to 1/2 acre. When combined with all other domestic water rights for the home, the total use shall not exceed 13,000 gallons per day and irrigation of 1/2 acre.
3. Any license issued by IDWR pursuant to the right or portion thereof for the use of trust water is subject to a term review of 20 years after the date of this approval to determine availability of water for the use and to re-evaluate the public interest at the end of the term.

This license is issued pursuant to the provisions of Section 42-219, Idaho Code. The water right confirmed by this license is subject to all prior water rights and shall be used in accordance with Idaho law and applicable rules of the Department of Water Resources.

Signed and sealed this _____ day of _____, 2012.

GARY SPACKMAN
Interim Director

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

Office Use Only			
Well ID No. _____			
Inspected by _____			
Twp _____	Rge _____	Sec _____	
1/4	1/4	1/4	
Lat: _____	Long: _____		

1. WELL TAG NO. D 0050188

RECEIVED

DRILLING PERMIT NO. 851416 App 904424

Water Right or Injection Well No. 47-17463

AUG 06 2008

2. OWNER Appr.

Name Mike Devaney

Address 19159 Hwy 30

City Buhl

State ID

Zip 83316

3. LOCATION OF WELL by legal description:

You must provide address or Lot, Blk, Sub. or Directions to well.

Twp. 9 North ☐ or South ☒
Rge. 14 East ☒ or West ☐
Sec. 6 1/4 NE 1/4 NE 1/4 1/4
10 acres 40 acres 160 acres

Gov't Lot _____ County Twin Falls

Lat: 42: :40.755 Long: 114: :51.264

Address of Well Site 4675 N 1000 E

City Buhl

File at least three of road • Distance to Road or Landmark

Lt. _____ Blk. _____ Sub. Name _____

4. USE:

☐ Domestic ☐ Municipal ☐ Monitor ☐ Irrigation
☒ Thermal ☐ Injection ☐ Other _____

5. TYPE OF WORK check all that apply (Replacement etc.)

☒ New Well ☐ Modify ☐ Abandonment ☐ Other _____

6. DRILL METHOD:

☒ Air Rotary ☐ Cable ☐ Mud Rotary ☐ Other _____

7. SEALING PROCEDURES

Seal Material	From	To	Weight / Volume	Seal Placement Method
CEMENT	35	125	2 YDS	PUMP
CEMENT	60	575	10 YDS	PUMP

Was drive shoe used? ☒ Y ☐ N Shoe Depth(s) 575'

Was drive shoe seal tested? ☒ Y ☐ N How? _____

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
12	+1	125	.250	Steel	☒	☐	☒	☐
6 5/8	+2	575	.250	Steel	☒	☐	☒	☐

Length of Headpipe _____ Length of Tailpipe _____

Packer ☐ Y ☐ N Type _____

9. PERFORATIONS/SCREENS PACKER TYPE

Perforation Method _____

Screen Type & Method of Installation _____

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
						☐	☐
						☐	☐
						☐	☐

10. FILTER PACK

Filter Material	From	To	Weight/Volume	Placement Method

11. STATIC WATER LEVEL OR ARTESIAN PRESSURE:

70 ft. below ground Artesian pressure _____ lb.

Depth flow encountered _____ ft. Describe access port or control devices: _____

WELL CAP

12. WELL TESTS:

☐ Pump ☐ Bailor ☐ Air ☐ Flowing Artesian

Yield gal./min.	Drawdown	Pumping Level	Time

Water Temp. 100° Bottom hole temp. 114°

Water Quality test or comments: _____

Depth first Water Encounter _____

13. LITHOLOGIC LOG: (Describe repairs or abandonment) Water

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Y	N
17	0	3	TOPSOIL		X
	3	12	TOPSOIL & BOULDERS		X
	12	18	DECOMPOSED BASALT		X
	18	26	BROWN CLAY		X
	26	90	DECOMPOSED BASALT	X	
	90	96	BROWN CLAY		X
	96	106	BROWN SANDSTONE	X	
	106	125	BLACK BASALT	X	
11	125	170	BLACK BASALT	X	
	170	181	BROWN BASALT	X	
	181	225	HARD GREY BASALT		X
	225	233	BROWN CLAY & CINDERS		X
	233	254	GREY BASALT		X
	254	259	RED ASH		X
	259	281	BROWN CLAY		X
	281	296	SOFT BROWN CLAY		X
	296	353	SOFT GREY BASALT		X
	353	361	BROWN SANDSTONE	X	
	361	386	GREY RHYOLITE		X
	386	390	FRACTURED GREY RHYOLITE	X	
	390	575	GREY RHYOLITE		X
6	575	603	GREY RHYOLITE		X
	603	606	FRACTURED GREY RHYOLITE		X
	606	684	GREY RHYOLITE		X
	684	703	SOFT GREY RHYOLITE		X
	703	727	BROWN SANDSTONE		X
	727	840	DECOMPOSED GREY RHYOLITE		X
	840	884	GREY RHYOLITE		X
	884	1020	BROWN RHYOLITE	X	
			continued		

Completed Depth 1055' (Measurable)

Date: Started 4/26/08 Completed 7/17/08

14. DRILLER'S CERTIFICATION

I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Company Name Elsing Drilling & Pump Co., Inc. Firm No. 669

Principal Driller [Signature] Date 7/18/08

and Helper [Signature] Date 7/18/08

Operator I _____ Date _____

Principal Driller and Rig Operator Required.
Operator I must have signature of Driller/Operator II.

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

1. WELL TAG NO. D 0034062
DRILLING PERMIT NO. 815985
Water Right or Injection Well No. ID 386661

2. OWNER:
Name Michael Devaney
Address 251 Aspen Hills Ct.
City Evanston State Wy Zip 82930

3. LOCATION OF WELL by legal description:

You must provide address or Lot, Blk, Sub. or Directions to well.

Twp. 9 North ☐ or South ☒
Rge. 14 East ☒ or West ☐
Sec. 6 NE 1/4 NE 1/4
Gov't Lot 10 acres County TWIN FALLS 100 acres
Lat: : : Long: : :
Address of Well Site
4675 North 1000 East City Buhl
(Give at least name of road + Distance to Road or Landmark)
Lt. Blk. Sub. Name

4. USE:

☒ Domestic ☐ Municipal ☐ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other

5. TYPE OF WORK check all that apply

(Replacement etc.)

☒ New Well ☐ Modify ☐ Abandonment ☐ Other

6. DRILL METHOD:

☒ Air Rotary ☐ Cable ☐ Mud Rotary ☐ Other

7. SEALING PROCEDURES

Seal Material	From	To	Weight / Volume	Seal Placement Method
Bentonite	5	20	4 S	Poured

Was drive shoe used? ☒ Y ☐ N Shoe Depth(s) 118 ft.

Was drive shoe seal tested? ☒ Y ☐ N How? Air pressure

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
6"	+2	118	250	Steel	☒	☐	☒	☐

Length of Headpipe _____ Length of Tailpipe _____

Packer ☐ Y ☐ N Type _____

9. PERFORATIONS/SCREENS PACKER TYPE

Perforation Method Knife

Screen Type & Method of Installation _____

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
90	110	1/8	4 R	6"	Steel	☒	☐
		x 3				☐	☐

10. FILTER PACK

Filter Material	From	To	Weight / Volume	Placement Method
-----------------	------	----	-----------------	------------------

11. STATIC WATER LEVEL OR ARTESIAN PRESSURE:

29 ft. below ground Artesian pressure _____ lb.
Depth flow encountered _____ ft. Describe access port or control devices: _____

Office Use Only
Well ID No. _____
Inspected by _____
Twp _____ Rge _____ Sec _____
1/4 1/4 1/4
Lat: : : Long: : :

12. WELL TESTS:

☐ Pump ☐ Baller ☐ Air ☐ Flowing Artesian

Yield gal./min.	Drawdown	Pumping Level	Time
-----------------	----------	---------------	------

Water Temp. _____ Bottom hole temp. _____

Water Quality test or comments: _____

Depth first Water Encounter _____

13. LITHOLOGIC LOG: (Describe repairs or abandonment)

Water

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Y	N
8"	0	4	Topsoil		x
	4	19	Decomposed brown basalt		x
	19	23	Gray basalt, fractured	x	
	23	62	Brown clay		x
	62	79	Brown sandstone		x
	79	84	Brown clay		x
	84	113	Soft brown basalt	x	
	113	118	Fractured gray basalt		x
6"	118	140	Fractured gray basalt		x
	140	143	Brown ash		x
	143	178	Gray basalt		x
	178	184	Brown basalt		x
	184	200	Fractured gray basalt	x	

Actual bore hole diameter
is 8-3/4" and 6-1/8"

RECEIVED

JUN 04 2004

Department of Water Resources
Southern Region

Completed Depth 200 ft. (Measurable)

Date: Started 5-27-04 Completed 5-27-04

14. DRILLER'S CERTIFICATION

I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Company Name Elsing Drilling Firm No. 31

Principal Driller Arnold Elsing Date 6-2-04

and Driller or Operator II CRAIG EGAN Date 6-2-04

Operator I Lloyd Hayden Date 6-2-04

Principal Driller and Rig Operator Required.
Operator I must have signature of Driller/Operator II.