

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
BENEFICIAL USE FIELD REPORT

A. GENERAL INFORMATION

Permit No: 36-8797

Exam Date: 4/1/2013

1. Current Owner: UNITED ELECTRIC COOP INC
1330 21ST ST
HEYBURN ID 83336
(208)679-2222
2. Accompanied by: Dan Kidd
Phone No: 208-679-2222
Address: 1330 21st Street, Heyburn, ID 83336
Relationship to Permit Holder: Maintenance Foreman

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 SW1/4SW1/4 Sec. 10, Twp 10S, Rge 23E, B.M.
MINIDOKA County

Method of Determination: Waypoints were collected with a Garmin GPSmap 60CSx receiver and downloaded into an ArcMap shapefile that corresponds with 2009 and 2011 aerial photography and verified the point of diversion is located as recorded. See attached map.

2. **PLACE OF USE:** HEATING

Twp	Rge	Sec	NE				NW				SW				SE				Totals
			NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
10S	23E	10											X						

COOLING same as HEATING

Method of Determination: On site visit and 2009 and 2011 aerial photography verified the place of use is located as recorded. See attached map.

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>
		7.5 Hp			

D. FLOW MEASUREMENTS

1.

<u>Measurement</u> <u>Equipment</u>	<u>Type</u>	<u>Make</u>	<u>Model No.</u>	<u>Serial No.</u>	<u>Size</u>	<u>Calib. Date</u>
Flow Meter	Sonic	Fuji	Portaflow	7K0085TB		March 2013

2. Measurements: Flow meter measured a rate 92.7 gpm or 0.21 cfs from the well.

E. FLOW CALCULATIONS

_____ Additional Computation Sheets Attached

Measured Method:

Theoretical Yield:

$$Q = \frac{8.8 \times (Hp) \times (Eff)}{H}$$

Where: Hp = 7.5 Hp (according to application for permit)

Eff = efficiency = 70% assumed

H = total head = pumping level = (2.31 x system pressure)

assume pumping level of 17.5 feet (based on Well Drillers Report)

assume system pressure = 40 psi

$$H = 17.5 + (40 \times 2.31) = 109.9$$

$$Q = \frac{8.8 \times 7.5 \times .70}{109.9} = 0.42 \text{ cfs}$$

F. VOLUME CALCULATIONS**1. Volume Calculations for Other Uses:**

Heating/Cooling: System is in use 24/7 and is thermostatically controlled; Mr. Kidd estimates the system is actually in operation and actively pumping water 35-40% of the time:

$$0.21 \text{ cfs} \times 723.94 \text{ afa} \times 0.40 = \underline{\underline{60.81 \text{ AFA}}}$$

Volume per use:

Heating season 10/1 – 4/30 or 212 days (approximate):

$$0.21 \text{ cfs} \times 212 \text{ days} \times 1.9835 \times 0.40 = 35.32 \text{ AF}$$

Cooling season 5/1 – 9/30 or 153 days (approximate):

$$0.21 \text{ cfs} \times 153 \times 1.9835 \times 0.40 = 25.49 \text{ AF}$$

G. NARRATIVE/REMARKS/COMMENTS

Permit 36-8797 was permitted for 0.27 cfs heating and cooling.

Application for permit 36-8797 was submitted by United Electric Co-op, Inc. on 11/05/1999 and proof of beneficial use was submitted 11/14/2000.

The system consists of a well with a 7.5 Hp pump that pumps water to two separate buildings and supplies water to a total of 10 heat pumps and then the water is returned to the ground water source using an injection well. The front office building is approximately 12,800 square feet and has 8 of the 10 heat pumps providing heat to that facility. The other two heat pumps are in an insulated 2 story office space of approximately 3520 square feet per level contained within a large warehouse.

Pump data indicates that the pumps operate at a nominal rating of 67,000 BTU/HR for both heating and cooling.

Apply the Department's equation for design heat load:

$$E = [e \times T] \times \text{Area}$$

e for the building = 0.44 (better energy efficiency) as the warehouse portion has 6" insulated walls and the office building also has 6" walls and brick exterior but windows and doors don't appear to be rated for energy efficiency.

$$\Delta T = (t_1 - t_0) = (70^\circ - (-3^\circ)) = 73^\circ \text{ Fahrenheit } (-3^\circ \text{ is suggested outside design temperature for Burley})$$

$$E = [0.44 \times 73] \times 19,840 \text{ ft}^2 = 637,261 \text{ BTU/HR}$$

With 10 pumps nominally rated at 67,000 BTU/HR, the system design appears to be about 5% higher than the calculated design heat load BTU/HR rating.

The heat pumps are operated at approximately 9 gpm which is the manufacturers recommended flow rate for this model (GV670-3-TRSO Econar Heat Pump) in an open loop system for both heating and cooling to maximize heating/cooling extraction from the water.

Flow rates were measured separately in each building using a Fuji Portaflow sonic flow meter under identical conditions at the standard flow rate. A single measurement was not possible as the piping from the well to the buildings is buried. In the warehouse, where there are two heat pumps the flow rate was measured at 17.8 gpm and in the main office building with 8 heat pumps the flow rate was measured at 74.9 gpm for a total of 92.7 gpm or 0.21 cfs.

Recommend permitting 0.21 cfs for Heating /Cooling with an annual volume of 60.8 AFA (35.3 AF Heating; 25.5 AF Cooling).

Have conditions of permit approval been met? ☒ Yes ☐ No

H. RECOMMENDATIONS**1. Recommended Amounts**

<u>BENEFICIAL USE</u>	<u>PERIOD OF USE</u>	<u>DIVERSION RATE</u>	<u>ANNUAL VOLUME</u>
HEATING	1/01 to 12/31	0.210 CFS	35.3 AF
COOLING	1/01 to 12/31	0.210 CFS	25.5 AF
<u>Totals:</u>		0.210 CFS	60.8 AF

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

4/15/2013

Reviewer

Date

5/7/2013

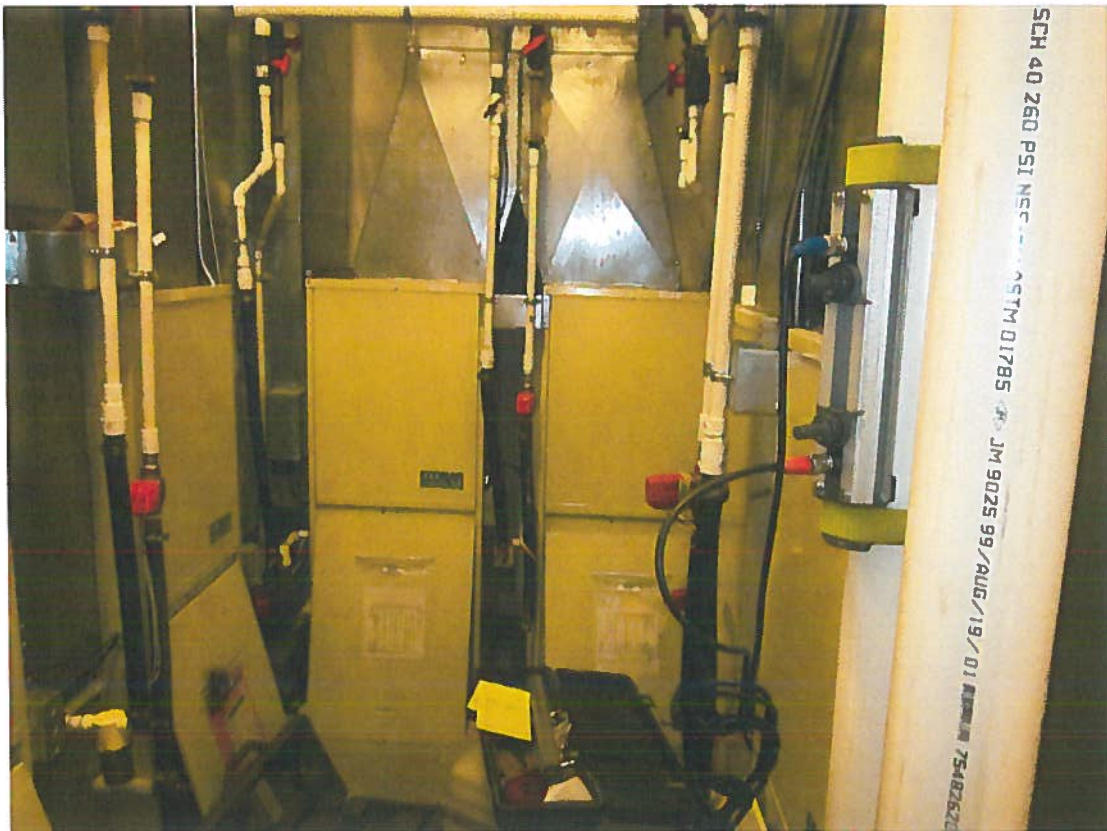


Figure 1: Heat pumps in office building

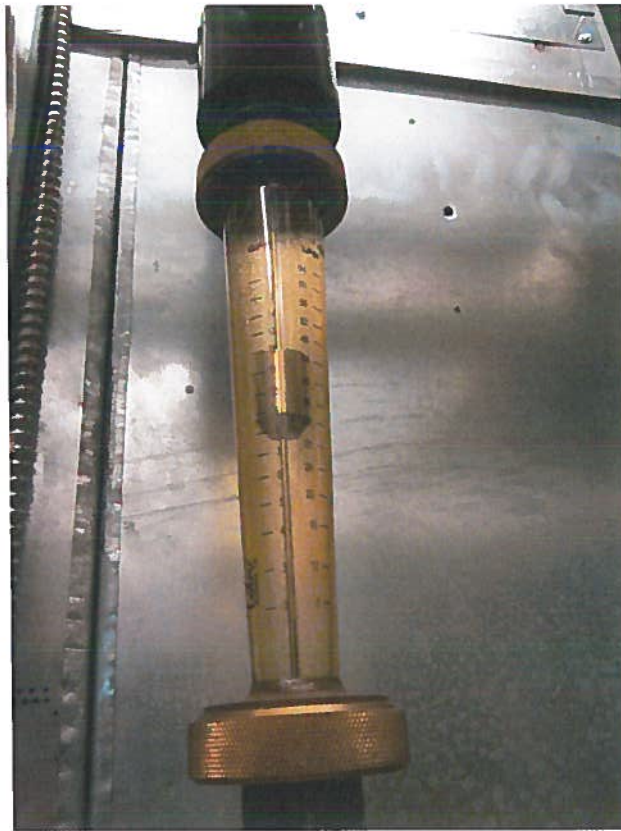


Figure 2: Flow meter on a heat pump assembly



Figure 3: Injection well

United Electric8HeatPump.TXT

LD02
No. 02
LOG NAME:office
START :04-01 10:46
END :04-01 10:56
INTERVAL:00:01:00

04-01 10:46:00
+3.305E+0 ft/s
+7.379E+1 gal/m
+TOTAL 0000000 gal
NORMAL

04-01 10:47:00
+3.361E+0 ft/s
+7.505E+1 gal/m
+TOTAL 0000073 gal
NORMAL

04-01 10:48:00
+3.336E+0 ft/s
+7.449E+1 gal/m
+TOTAL 0000148 gal
NORMAL

04-01 10:49:00
+3.326E+0 ft/s
+7.426E+1 gal/m
+TOTAL 0000223 gal
NORMAL

04-01 10:50:00
+3.352E+0 ft/s
+7.485E+1 gal/m
+TOTAL 0000298 gal
NORMAL

04-01 10:51:00
+3.379E+0 ft/s
+7.544E+1 gal/m
+TOTAL 0000374 gal
NORMAL

04-01 10:52:00
+3.371E+0 ft/s
+7.526E+1 gal/m
+TOTAL 0000449 gal
NORMAL

04-01 10:53:00
+3.367E+0 ft/s
+7.518E+1 gal/m
+TOTAL 0000524 gal
NORMAL

04-01 10:54:00
+3.367E+0 ft/s
+7.518E+1 gal/m
+TOTAL 0000599 gal
NORMAL

04-01 10:55:00
+3.336E+0 ft/s

United Electric8HeatPump.TXT

+7.449E+1 gal/m
+TOTAL 0000674 gal
NORMAL

04-01 10:56:00
+3.366E+0 ft/s
+7.517E+1 gal/m
+TOTAL 0000749 gal
NORMAL

United Electric2HeatPump.TXT

LD01
No. 01
LOG NAME:warehouse
START :04-01 10:15
END :04-01 10:25
INTERVAL:00:01:00

04-01 10:15:00
+2.501E+0 ft/s
+1.790E+1 gal/m
+TOTAL 0000000 gal
NORMAL

04-01 10:16:00
+2.529E+0 ft/s
+1.810E+1 gal/m
+TOTAL 0000016 gal
NORMAL

04-01 10:17:00
+2.499E+0 ft/s
+1.789E+1 gal/m
+TOTAL 0000034 gal
NORMAL

04-01 10:18:00
+2.488E+0 ft/s
+1.781E+1 gal/m
+TOTAL 0000052 gal
NORMAL

04-01 10:19:00
+2.483E+0 ft/s
+1.777E+1 gal/m
+TOTAL 0000070 gal
NORMAL

04-01 10:20:00
+2.498E+0 ft/s
+1.788E+1 gal/m
+TOTAL 0000088 gal
NORMAL

04-01 10:21:00
+2.512E+0 ft/s
+1.798E+1 gal/m
+TOTAL 0000106 gal
NORMAL

04-01 10:22:00
+2.494E+0 ft/s
+1.785E+1 gal/m
+TOTAL 0000124 gal
NORMAL

04-01 10:23:00
+2.536E+0 ft/s
+1.815E+1 gal/m
+TOTAL 0000142 gal
NORMAL

04-01 10:24:00
+2.521E+0 ft/s

United Electric2HeatPump.TXT

+1.805E+1 gal/m
+TOTAL 0000160 gal
NORMAL

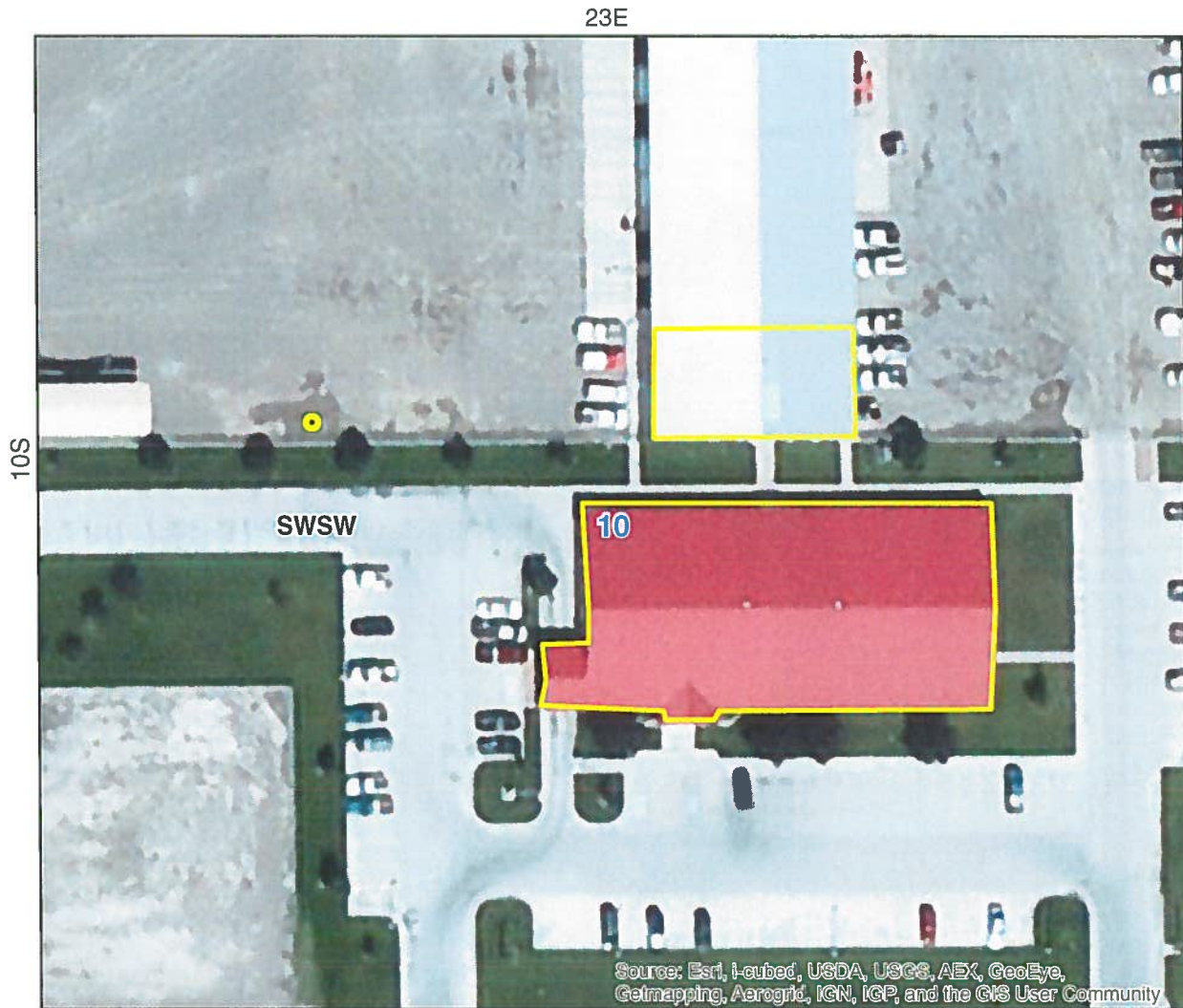
04-01 10:25:00
+2.507E+0 ft/s
+1.795E+1 gal/m
+TOTAL 0000178 gal
NORMAL

System Diagram



State of Idaho
Department of Water Resources
Attachment To Water Right License
36-8797

This map depicts the HEATING place of use boundary for this water right at the time of this approval and is attached to the approval document solely for illustrative purposes.



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

0 0.0075 0.015 0.03 Miles

