

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
BENEFICIAL USE FIELD REPORT

A. GENERAL INFORMATION

Permit No: 72-7555
Exam Date: 02/23/2015

1. Current Owner:
ANNE M GILHULY HC 67 BOX 725 CLAYTON ID 83227-9703
2. Accompanied by: IDWR Employees
Phone No: 208 736-3033
Address: 650 Addison Ave W. Twin Falls, ID 83301
Relationship to permit Holder:

3. SOURCE:
GROUND WATER

Method of Determination: ArcMap and Field Exam

B. OVERLAP REVIEW

1. Other water rights with the same place of use: YES Overlap

Water Right No.	Source	Purpose of Use	Basis
72-2088 F	Burnt Creek	Domestic	Decreed
72-4183	Salmon River	Irrigation	Decreed
72-10415	Ground Water	Domestic	Decreed

Comments: These three water rights don't affect the heating component of 72-7555

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 SW¼ NE¼, Sec. 29, Twp 11N, Rge 16E, B.M. CUSTER County

Method of Determination: On-site inspection

PLACE OF USE: HEATING

Twp	Rng	Sec	NE				NW				SW				SE				Totals
			NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
11N	16E	29			X														

2.
 - ☒ 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

3.

Well or Diversion ID No.*	Motor Make	Hp	Motor Serial No.	Pump Make	Pump Serial No. or Discharge Size
N/A	N/A	N/A	N/A	N/A	N/A

D. FLOW CALCULATIONS X Additional Computation Sheets AttachedMeasured Method: **See Attachment****E. VOLUME CALCULATIONS**1. Volume Calculations for irrigation: **N/A** (heating use only)2. **Volume Calculations for Other Uses:**Heating: **16.0 AF****F. NARRATIVE/REMARKS/COMMENTS**

The permit 72-7555 was issued to William A. Knight on January 05, 1998 for the diversion of 0.20 cfs of ground water for recreation, heating, commercial, and 5 acres of irrigation. In March of 1999 a divorce settlement resulted in the permit being assigned to Anne Gilhuly. On January 12, 2007 the Department received proof of beneficial use. On February 23, 2015 Jana Reeder and Benny Walker (IDWR employees) performed a field exam for Water Permit 72-7555. The Place of Use (POU) and Point of Diversion (POD) are located on property at 21022 Highway 75 approximately 15.5 miles east of Stanley.

The Field Exam conducted by the above-mentioned IDWR employees indicated that the irrigation use and the heating use occur at two different times of the year and are diverted independently of each other as two separate systems from the same POD. Heating use for the home occurs from October to May when it is too cold for crops to grow. From June through September the heating water line to the house is disconnected and the irrigation water line is connected and water is pumped directly to the 5 acre POU during the growing season. The developed system does not comply with the condition of the permit that states *"Low temperature geothermal water diverted under this right shall not be used for irrigation purposes unless it is first used for heating purposes"*. Additionally, Idaho Statute 42-233 does not allow low temperature geothermal water to be used directly for irrigation without first having used the heat value first. The Statute states that the use of low temperature geothermal water *"shall be utilized primarily for heat value and secondarily for the value as water"*. The

statute also states that using low temperature geothermal water for uses other than heat value is not recognized as a beneficial use.

The application was originally filed in a manner that complied with 42-233 by proposing to beneficially use the heat value first and then use the water for irrigation. Since the developed system directly diverts the LTG water for irrigation without first using the heat value the irrigation component cannot be licensed. The commercial and recreation components of Permit 72-7555 were not developed and will not be licensed. The heating component of this permit was developed and does comply with the statute and can be licensed. The home is the POU for the heating component of the permit. The home was built in 1970 (information from Custer County Assessor website) and is located between Yankee Fork and Stanley. This part of Idaho has an extended heating season and often experiences sub-zero temperatures during the winter. Calculations using heating degree days and a design temperature associated with this part of Idaho indicate a flow rate of 0.12 cfs (note that this is very close to the 50 gpm indicated on the well log) and an annual volume of 16.0 Acre Feet (AF) for the heating component.

I recommend licensing permit 72-7555 for heating use with a diversion rate of 0.12 cfs and a volume of 16.0 AF.

Have conditions of permit approval been met? X Yes ^{*} No ^{*except for heat value use before irrigation.}
(see narrative above)

H. RECOMMENDATIONS

1. Recommended Amounts

<u>Beneficial Use</u>	<u>Period of Use</u>	<u>Rate of Diversion</u>	<u>Annual Volume</u>
HEATING	01/01 to 12/31	0.12 CFS	16.0 AF

Totals: **0.12 CFS**

2. Recommended Amendments

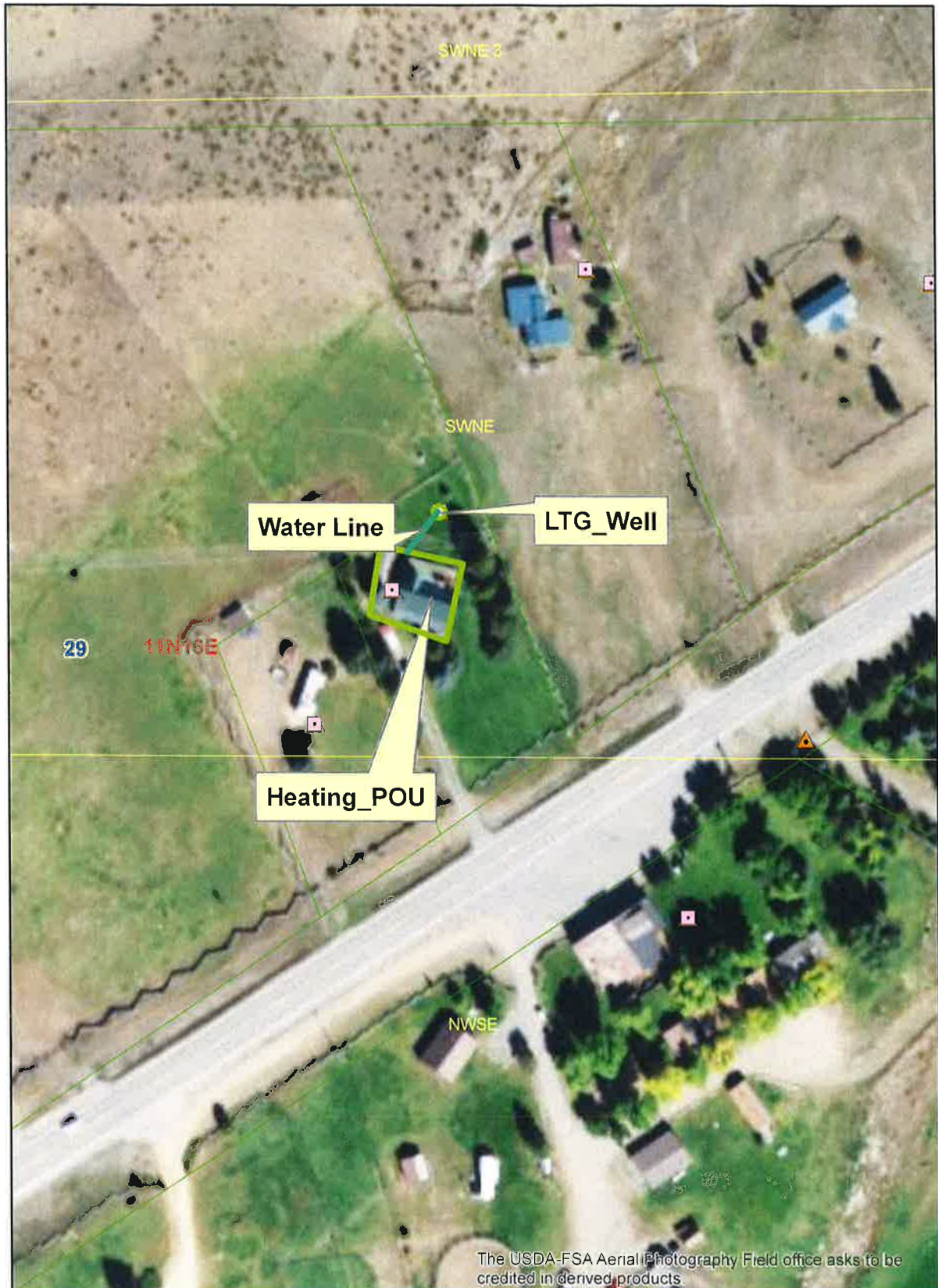
_____ Change P.D. as reflected above _____ Add P.D. as reflected above X None
 _____ Change P.U. as reflected above _____ Add P.U. as reflected above X None

I. AUTHENTICATION

Kent Aasa - Water Resource Agent

Field Examiner's Name Jana Reeder/Benny Walker Date 02-23-2015
 Reviewer [Signature] Date 5-31-2019

72-7555



Legend



Water Right POD



Parcels



Sections



Township/Range

QQ



Field Exam
72-7555

72-7555 POD



72-7555 Heating POU



Volume Calculations

Calculated value	Answer	Input value	Constant
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Heat Load

BTU/hr required House efficiency factor Design temperature Area of live Two story house

.28 - Best, .44 Better, Twin falls in between If not a two story house

BTU/hr BTU/hr ft² - °F °F ft² 0.8

E e ΔT A 0.8

127872.0 1.11 90 1280 1

$$E = e \times \Delta T \times A \times 0.8 = 127872.0 \text{ BTU/hr}$$

99.9 BTU/ft² hr

Temperature Drop Across System

Temperature drop across Geothermal source temperature

Temperature of water Commonly

°F °F °F

ΔT_s S t

6.6 92 70

$$\Delta T_s = 0.3 \times (S - t) = 6.6 \text{ °F}$$

Estimating a Flow Rate for Geothermal Heating

Flow Rate System heat load Temperature Caution: This calculation should not be used to design a geothermal heating system, but will give an indication of the approximate flow needed for a geothermal resource when applying for a water right. Value should not be used for licensing. An actual measurement from the system should be taken.

gpm BTU/hr °F

W Q ΔT_s

38.7 127872.0 6.6

$$W = Q / (500 \times \Delta T_s) = 38.7 \text{ gpm}$$

Peak heat required per square foot of floor area

Design temperature difference (inside design temperature) 90

x	y	
84	184	197 BTU/hr
104	186	161 BTU/hr
110	178	146 BTU/hr
124	118	86 BTU/hr
116	74	57 BTU/hr
124	54	39 BTU/hr
128	36	25 BTU/hr

Empirical correction factor

Degree Days 10839

Degree days (x) Factor C_d + σ

0 1.2

5000 0.83

9000 0.92

y intercept for value 0.71

If 0-5000 then 0.27

If 5000-9000 then 0.70

0.70

If greenhouse 0.85 0

Annual water requirement for geothermal heating

Volume of Geothermal Peak heating load Annual heat Conversion Empirical Design temperature Correction factor

See table for degree days Use 0.85 for greenhouses,

afa BTU/day °F hr/day °F

V HL DD 24 C_D ΔT₁ k

16.0 127872.0 10839 24 0.70 90 0.9

$$V = (HL \times DD \times 24 \times C_D) / (\Delta T_1 \times k \times C \times \Delta T_2) = 16.0$$

or for heating effect vs. 65°F degree days

Factor C_d	Factor $C_d - \sigma$
0.86	0.51
0.59	0.36
0.66	0.4
0.51	0.31

0.70

Constant	Temperature loss across system
Units conversion factor	
BTU/af - °F	°F
C	ΔT_2
2720000	6.6

Method	#1	Chose a house efficiency factor (.28 - Best, .44 Better, .67 Average, 1.11 Poor)	1.11	BTU/hr ft ² - °F
	#1	Design temperature (Twin Falls = 73)	90	°F
	1&2	Area of heated space	1280	ft ²
	#1	Single story = 1 Two story = 0.80	1	
	1&2	Geothermal source temperature	92	°F
	1&2	System Temperature, Home = 70 Greenhouse = 60	70	°F
	1&2	Degree Days (see degree days tab)	10,839	°F
	1&2	Greenhouse empirical correction factor, greenhouse = 0.85, other = 0	0	
		Heat load (pick value from table below)	127,872	BTU/hr

Heat load in BTU/hr			
Method	#1	Mathematically calculated	127,872 BTU/hr
	#2	Well Insulated	32,400 BTU/hr
		Normally Insulated	50,168 BTU/hr
		Older Homes	73,490 BTU/hr
		Double Poly	109,626 BTU/hr
		Single Poly	186,415 BTU/hr
		Fiberglass	206,031 BTU/hr
		Glass	252,343 BTU/hr

Volume of water required for heating	16.0 afa
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House efficiency factor: 1.11

Outside design temperature: No data was available for areas near Stanley. It is common for winter low temperatures in the Stanley area to be below zero. Therefore **minus 20° Fahrenheit** (-20°F) was used in the calculations.

Area of heated space: 1280 sq. ft. (from Custer County Assessor)

Geothermal Heat Source: 86° Fahrenheit (from applicant)

System Temperature: 70° Fahrenheit

Heat Load Calculation

$$E = e \times \Delta T \times A$$

$$E = 1.11 [70^\circ - (-20^\circ)] 1280 \text{ ft}^2$$

$$E = 1.11 (90^\circ) (1280 \text{ ft}^2)$$

$$E = \underline{127,872 \text{ BTU/hr}}$$

Temperature Drop Across System

$$\Delta T_s = 0.3 \times (S - t)$$

$$\Delta T_s = 0.3 (86^\circ - 70^\circ)$$

$$\Delta T_s = \underline{4.8}$$

Flow Rate Calculation

$$W = Q / (500 \times \Delta T_s)$$

$$W = \frac{127,872 \text{ BTU/hr}}{500 (4.8)}$$

$$W = 53.28$$

$$W = \frac{53.28}{448.83} = 0.119 \text{ cfs or } \underline{0.12 \text{ cfs}}$$

(Sign once if Firm Official & Operator)

Field Exam 72-7555

RPHO11N16E8860
Property Detail

Taxes, Levies and Assessments for 2018

Land and Property Ownership - Physical Address: 21022 HIGHWAY 75 (zip code 83278)

Mailing Address: GLHULY, ANNE M HC 67 BOX 725 STANLEY, ID 83278 Deeds (Last Deed Date: 10/20/1999) 219736 217785 210347 205787 Legal Description: TRACT 73-33 IN FHE #583 T11N R16E Tax Code Area: 110000 Classes (Last appraised in 2014) RURAL RES TR 0.480 AC \$ 22,700 RURAL WP ON AG \$ 1,500 BLDG RES TR \$ 68,660			Taxes for 2018 ASSESSED VALUE : \$ 92,860 TAX AND SPECIAL CHARGES: \$ 208.82 Taxing Districts Levy STATE 0.000000000 COUNTY 0.002335348 SCHL 181 LEVY 0.000000000 SCHL 181 TORT 0.000011219 SCHL 181 BOND 0.000000000 SCHL 181 PLANT 0.000083534 SCHL 181 SPLMT 0.000668270 CHALLIS CEM 0.000158037 NO. CUSTER FIRE 0.000480794 N. C. HOSP 0.000265615 This information is provided as a courtesy to our taxpayers. If this parcel has changed code areas, or been split or combined with another parcel, the tax and assessment data shown may not apply or be current. For more information, please contact the appropriate county office.		
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Improvement R01 Residential Dwelling

Year Built : 1970 Total : 1280 sq. ft. Last Appraised : 2019 Stories : 2 Bedrooms : 3 Bathrooms : 1 (Click on photo to enlarge)			 		
Field Exam 72-7555					

Other Improvements