

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
BENEFICIAL USE FIELD REPORT

A. GENERAL INFORMATION

Permit No: 63-31999

Exam Date: 6/1/2012

1. Current Owner: FLINDA F TERTELING
3713 N. Woody Drive
BOISE ID 83703
(208)381-5205

2. Accompanied by: Joe & Flinda Terteling

Phone No:

Address:

Relationship to Permit Holder:

3. SOURCE

WASTE WATER

TRIBUTARY

BOISE RIVER

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 SYSTEM1. LOCATION OF POINT(S) OF DIVERSION:

WASTE WATER

NE1/4SE1/4

Sec. 29, Twp 04N, Rge 02E, B.M.

ADA County

Method of Determination: ArcMap (Aerial Photo); GPS N1386119, E2319724, Garmin III Plus; Datum NAD 83.

2.

PLACE OF USE: HEATING

Twp	Rge	Sec	NE				NW				SW				SE				Totals
			<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>	
04N	02E	29													X				

Method of Determination: ArcMap (Aerial Photo)

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 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 Size</u>
____N/A____	____N/A____	N/A	____N/A____	____N/A____	____N/A____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

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

D. FLOW MEASUREMENTS

1.

<u>Measurement Equipment</u>	<u>Type</u>	<u>Make</u>	<u>Model No.</u>	<u>Serial No.</u>	<u>Size</u>	<u>Calib. Date</u>
____N/A____	____N/A____	____N/A____	____N/A____	____N/A____	____N/A____	____N/A____
_____	_____	_____	_____	_____	_____	_____

2. Measurements: No field measurement. Geothermal well system to 36th Street Garden Center not in operation during field examination.

E. FLOW CALCULATIONS☒ Additional Computation Sheets Attached

Measured Method (Residential Space Heating/Cooling Requirements for Cold or Geothermal Sources Spreadsheet):

Since geothermal well was not operating, could not obtain waste water temperature. Therefore, computed flows based on random waste water temperatures - 80°, 85°, and 90°, and 83°:

$$Q(80^\circ) = 0.16 \text{ cfs}$$

$$Q(85^\circ) = 0.10 \text{ cfs}$$

$$Q(90^\circ) = 0.07 \text{ cfs}$$

$$Q(83^\circ) = 0.11 \text{ cfs} = Q \text{ (Permit)}$$

The approximate flow capacity for a 3" pipe in a pump and closed pipeline system is approximately 0.25 cfs. Although the waste water supply system is not a closed system, the three geothermal wells which are available to divert the geothermal water to the 36th Street Garden Center distribution system, under Water Rights 63-12, 63-13, and 63-15, have the combined capacity to divert 1.60 cfs. Therefore, when the geothermal well system is operating, there should be more than sufficient flows to meet the applicants needs for home heating.

F. VOLUME CALCULATIONS

1. Volume Calculations for Irrigation:

$$V_{I.R.} = (\text{Acres Irrigated}) \times (\text{Irrigation Requirement}) =$$

$$V_{D.R.} = [\text{Diversion Rate (cfs)}] \times (\text{Days in Irrigation season}) \times 1.9835 =$$

$$V = \text{Smaller of } V_{I.R.} \text{ and } V_{D.R.} =$$

2. Volume Calculations for Other Uses:

$$V(d) = Q \times \text{days} \times 1.9835$$

Assume 300 days of available waste water per year since

$$V(r) = (\text{gallons/year}) / 325,850 \text{ gallons/af}$$

waste water is not available year round.

$$V(d) = 0.11 \times 365 \times 1.9835 = 65.5 \text{ afa}$$

$$V(r) = 21,384,000 / 325,850 = 65.6 \text{ afa}$$

$$V = 65.5 \text{ afa}$$

65.6 →

79.6 af per discussion w
owner - SL**G. NARRATIVE/REMARKS/COMMENTS****WASTE WATER DELIVERY SYSTEM:**

Three geothermal wells, known as the Tiegs, House, and Silky, related to water rights 63-12, 63-13, and 63-15, are used for the heating systems for the 36th Street Garden Center and corresponding office buildings. The waste water from the heating and cooling systems discharge to a 3" PVC waste water pipeline which runs southerly to a short section of 3" PVC pipeline extending along the southerly property line of the 36th Street Garden Center development. The 3" PVC waste water pipeline continues westerly to a concrete cistern. A small section of 12" ABS overflow pipe discharges the waste water to an open ditch.

The geothermal wells were not operating during the field exam. However the home heating system has been in operation to heat the home during home construction. Mr. Terteliling indicated that the well pumps generally operated at approximately 18 psi, with a residual pressure of approximately 6 psi at the gate valve to discharge to the home distribution system.

DIVERSION AND HOME USE SYSTEM:

Near the bend of the 3" PVC waste water pipeline along the southerly property line, a 3" PVC tee was installed on the 3" PVC waste water pipeline. A 3" gate valve was installed on the 3" PVC supply line to the Terteliling home to regulate the waste water flow to the home. The waste water, when available, is diverted to the mechanical room piping for distribution to the heat pumps and heat exchangers within the home. The waste water is distributed throughout the home, garage, and workshop through plastic tubing installed within the floors. Once the waste water has been cycled through the home, the waste water is discharged through a 3" PVC return line to the 3" PVC waste water pipeline for discharge into the open ditch. Volumetric flow meters have been installed in the mechanical room piping to measure the waste water flows to the home and return flows to the 3" PVC waste water pipeline.

RATE &/OR STORAGE RECOMMENDED FOR LICENSING

Description	Rate of Flow (cfs)		Storage (af)
Permit Amount	0.11	&/or	65.5
Beneficial Use Limit	0.11	&/or	N/A
System Measurement	0.11(spreadsheet)	&/or	67.1
Proof Fee Amount	0.20	&/or	20.0
Recommended Amount	0.11	&/or	65.5

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

Condition No.4 - Measuring devices have not been installed at the point of diversion (supply line), and proposed discharge (return line). However, volumetric flow meters have been installed in the mechanical room to measure the waste water flows into the home distribution system, and the waste water flows returning to the 3" PVC waste water pipeline.

H. RECOMMENDATIONS**1. Recommended Amounts**

<u>BENEFICIAL USE</u>	<u>PERIOD OF USE</u>	<u>DIVERSION RATE</u>	<u>ANNUAL VOLUME</u>
HEATING	01/01 to 12/31	0.110 CFS	~~65.5~~ AFA
			65.6
	<u>Totals:</u>	0.110 CFS	~~65.5~~ AFA

2. Recommended Amendments

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

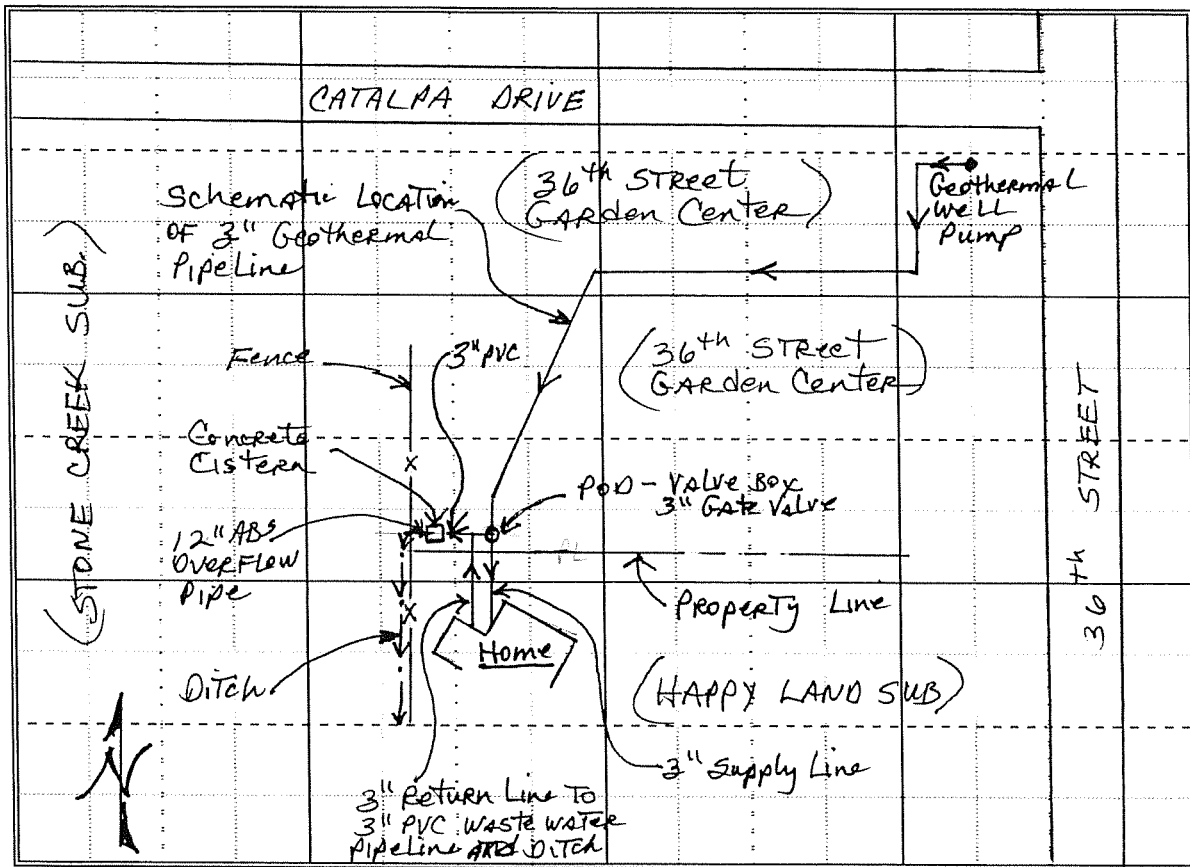
☐ Change P.U. as reflected above ☐ Add P.U. as reflected above ☐ Other

I. AUTHENTICATION

Field Examiner's Name Rick Collingwood Date 8/8/12

Reviewer _____ Date _____

3. **Delivery System Diagram:** Indicate all major components and distances between components. Indicate weir size/ditch size/pipe diameter (inside), as applicable. Use the space provided or ☐ see attached.



Scale: 1" = 200'

- ☐ Copy of USGS Quadrangle attached showing location(s) of point(s) of diversion and place(s) of use (required)
- ☒ Aerial photo attached (required for irrigation of 10+ acres)
- ☒ Photo of diversion and system attached

Legend

- Water Permit POD
- Township/Range
- Sections
- QQ
- Water Permit POU

 Water Permit POD
 Township/Range
 Sections
 QQ
 Water Permit POU

- Water Permit POD
- ▭ Township/Range
- ▭ Sections
- ▭ QQ
- ▭ Water Permit POU

RESIDENTIAL SPACE HEATING/COOLING REQUIREMENTS FOR COLD OR GEOTHERMAL SOURCES

Worksheet created by Cindy Hodges, 11/93.

Data entered by: Rick Collingwood
Exam Date: 06/01/12
File No: 63-31999
Computations for: Heating of home, garage, and workshop

REQUIRED DATA:

Area of livable floor space, ft2 (A) 7911
2 story? (N=1, Y=2) 2
House efficiency factor (e) * 0.44
Inside design temperature (Ti) 72
Average outside temperature (To) ** 42
Source temperature, degrees F (S) 90
Heating/cooling days per season (D) 300
Hours/day system operates (H) 24

CALCULATED DATA:

DESIGN HEAT LOAD (BTU/hr required)
Formula: $E = [e \times (Ti - To)] \times A$
Applies factor of 0.8 for two-story dwelling

E = 83,540 BTU/hour

TEMPERATURE DROP ACROSS SYSTEM

Formula: $T_s = 0.3 \times [S - Ti]$

Ts = 5.4 degrees F

* e values are as follows:

- 0.28 Best energy efficiency - extra insulation, caulked and weatherstripped, with storm windows and doors
- 0.44 Better energy efficiency - standard insulation, caulked and weatherstripped, with storm windows and/or doors
- 0.67 Average residence - standard insulation, no weatherproofing but with storm windows or double panes
- 1.11 Poor energy efficiency - minimal insulation, no weatherproofing or storm windows (older homes, shops or greenhouses)

** Suggested average outside temperatures:

WINTER
4 deg F Boise
6 deg F Grand View
-8 deg F Cascade

SUMMER
80 deg F Boise
90 deg F Grand View
70 deg F Cascade

FLOW RATE REQUIRED (at given source temperature)

Formula: $Q = E/(500 \times Ts) \times 448.8$

Q = 0.07 cfs

DIVERTED VOLUME OVER SEASON

Formula: $Vdiv = Q \times D \times H/24 \times 1.9835$

Vdiv = 41.0 AFA

AVERAGE TEMPERATURE CALCULATION:

4 DEG MIN + 80 DEG HIGH / 2 =
42 DEG AVERAGE YEAR ROUND TEMP.

RESIDENTIAL SPACE HEATING/COOLING REQUIREMENTS FOR COLD OR GEOTHERMAL SOURCES

Worksheet created by Cindy Hodges, 11/93.

Data entered by: Rick Collingwood
Exam Date: 06/01/12
File No: 63-31999
Computations for: Heating of home, garage, and workshop

REQUIRED DATA:

Area of livable floor space, ft² (A) 7911
2 story? (N=1, Y=2) 2
House efficiency factor (e) * 0.44
Inside design temperature (Ti) 72
Average outside temperature (To) ** 42
Source temperature, degrees F (S) 85
Heating/cooling days per season (D) 300
Hours/day system operates (H) 24

CALCULATED DATA:

DESIGN HEAT LOAD (BTU/hr required)
Formula: $E = [e \times (T_i - T_o)] \times A$
Applies factor of 0.8 for two-story dwelling

E = 83,540 BTU/hour

TEMPERATURE DROP ACROSS SYSTEM
Formula: $T_s = 0.3 \times [S - T_i]$

T_s = 3.9 degrees F

FLOW RATE REQUIRED (at given source temperature)
Formula: $Q = E / (500 \times T_s) \times 44.8$

Q = 0.10 cfs

DIVERTED VOLUME OVER SEASON
Formula: $V_{div} = Q \times D \times H / 24 \times 1.9835$

V_{div} = 56.8 AFA

** Suggested average outside temperatures:

WINTER SUMMER
4 deg F Boise 80 deg F Boise
6 deg F Grand View 90 deg F Grand View
-8 deg F Cascade 70 deg F Cascade

AVERAGE TEMPERATURE CALCULATION:

4 DEG MIN + 80 DEG HIGH / 2 =
42 DEG AVERAGE YEAR ROUND TEMP.

RESIDENTIAL SPACE HEATING/COOLING REQUIREMENTS FOR COLD OR GEOTHERMAL SOURCES

Worksheet created by Cindy Hodges, 11/93.

Data entered by: Rick Collingwood
Exam Date: 06/01/12
File No: 63-31999
Computations for: Heating of home, garage, and workshop

REQUIRED DATA:

Area of livable floor space, ft² (A) 7911
2 story? (N=1, Y=2) 2
House efficiency factor (e) * 0.44
Inside design temperature (Ti) 72
Average outside temperature (To) ** 42
Source temperature, degrees F (S) 80
Heating/cooling days per season (D) 300
Hours/day system operates (H) 24

CALCULATED DATA:

DESIGN HEAT LOAD (BTU/hr required)
Formula: $E = [e \times (T_i - T_o)] \times A$
Applies factor of 0.8 for two-story dwelling

E = 83,540 BTU/hour

TEMPERATURE DROP ACROSS SYSTEM
Formula: $T_s = 0.3 \times [S - T_i]$

Ts = 2.4 degrees F

FLOW RATE REQUIRED (at given source temperature)
Formula: $Q = E / (500 \times T_s) \times 448.8$

Q = 0.16 cfs

DIVERTED VOLUME OVER SEASON
Formula: $V_{div} = Q \times D \times H / 24 \times 1.9835$

Vdiv = 92.3 AFA

** Suggested average outside temperatures:

WINTER	SUMMER
4 deg F Boise	80 deg F Boise
6 deg F Grand View	90 deg F Grand View
-8 deg F Cascade	70 deg F Cascade

AVERAGE TEMPERATURE CALCULATION:

4 DEG MIN + 80 DEG HIGH / 2 =
42 DEG AVERAGE YEAR ROUND TEMP.

RESIDENTIAL SPACE HEATING/COOLING REQUIREMENTS FOR COLD OR GEOTHERMAL SOURCES

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Exam Date: 06/01/12
File No: 63-31999
Computations for: Heating of home, garage, and workshop

REQUIRED DATA:

Area of livable floor space, ft² (A) 7911
2 story? (N=1, Y=2) 2
House efficiency factor (e) * 0.44
Inside design temperature (Ti) 72
Average outside temperature (To) ** 42
Source temperature, degrees F (S) 83
Heating/cooling days per season (D) 300
Hours/day system operates (H) 24

CALCULATED DATA:

DESIGN HEAT LOAD (BTU/hr required)
Formula: $E = [e \times (Ti - To)] \times A$
Applies factor of 0.8 for two-story dwelling

E = 83,540 BTU/hour

TEMPERATURE DROP ACROSS SYSTEM
Formula: $T_s = 0.3 \times [S - Ti]$

T_s = 3.3 degrees F

* e values are as follows:

- 0.28 Best energy efficiency - extra insulation, caulked and weatherstripped, with storm windows and doors
- 0.44 Better energy efficiency - standard insulation, caulked and weatherstripped, with storm windows and/or doors
- 0.67 Average residence - standard insulation, no weatherproofing but with storm windows or double panes
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** Suggested average outside temperatures:

WINTER
4 deg F Boise
6 deg F Grand View
-8 deg F Cascade

SUMMER
80 deg F Boise
90 deg F Grand View
70 deg F Cascade

FLOW RATE REQUIRED (at given source temperature)
Formula: $Q = E / (500 \times Ts) \times 448.8$

Q = 0.11 cfs

DIVERTED VOLUME OVER SEASON
Formula: $Vdiv = Q \times D \times H / 24 \times 1.9835$

Vdiv = 67.1 AFA

AVERAGE TEMPERATURE CALCULATION:

4 DEG MIN + 80 DEG HIGH / 2 =
42 DEG AVERAGE YEAR ROUND TEMP.

FIELD EXAM PHOTOS

Water Right Permit: 63-31999

Field Exam Date: 6-1-12

PLS: NE1/4, SE1/4 Section 29, T.04N, R.02E.

Field Examiner: RC



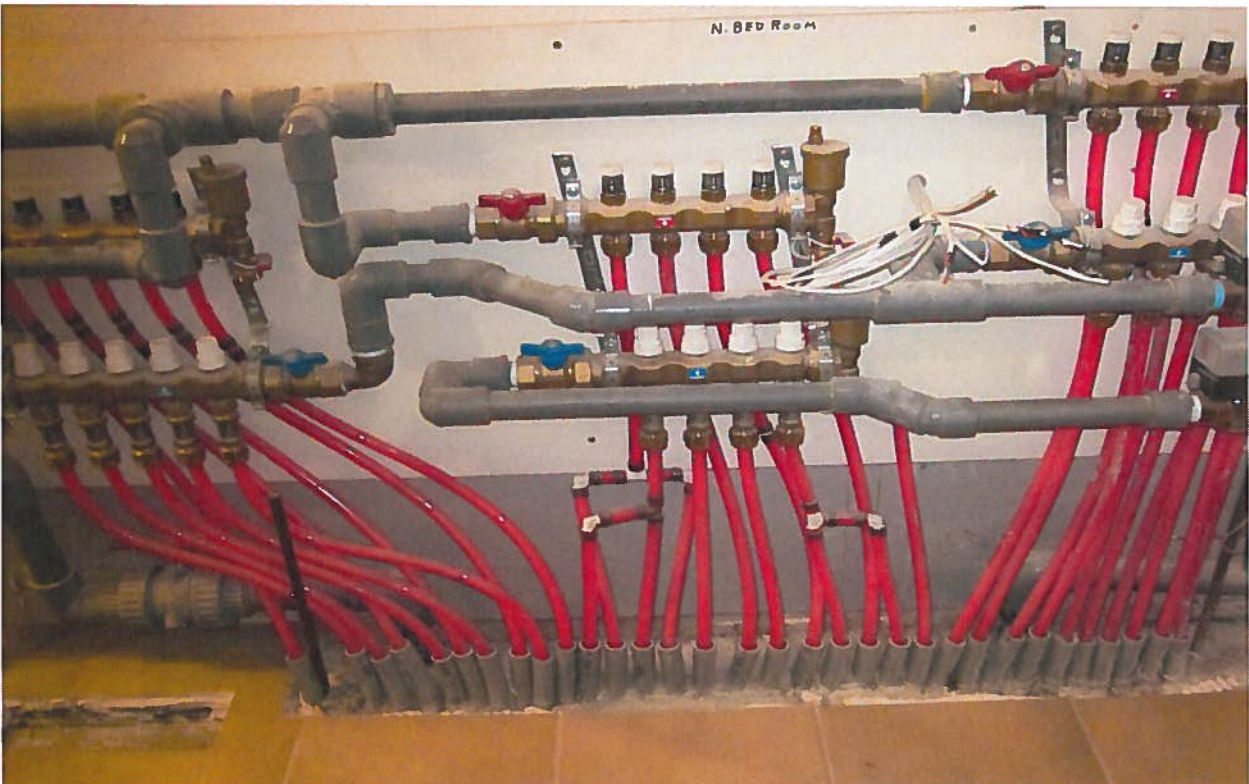
Point of Diversion: PVC valve box for 3" gate valve on 3" PVC supply line to home. A 3" PVC 'tee' fitting is connected to the 3" PVC waste water line from 36th Street Garden Center. The 3" PVC waste water line continues west and discharges into an open ditch.



Waste water discharge to open ditch. Waste water is discharged from 3" PVC pipe to a concrete cistern with a 12" ABS pipe overflow to the open ditch.



Place of Use: View inside of home of waste water mechanical room distribution piping and pressure and flow controls.



Place of Use: View inside home of a typical manifold piping and flow control system for floor heating.