

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
BENEFICIAL USE FIELD REPORT

A. GENERAL INFORMATION

Permit No: 47-7745

Exam Date: 7/13/2012

1. Current Owner: FIRST CHURCH OF THE NAZARENE
1231 WASHINGTON ST N
TWIN FALLS ID 83301
(208)733-6610
2. Accompanied by: Connie Englar
Phone No: 208-733-6681
Address: 1231 Washington St. N., Twin Falls, ID 83301
Relationship to Permit Holder: Administrative Assistant/Facility Manager

3. **SOURCE**

GROUND WATER

B. OVERLAP REVIEW

1. Other water rights with the same place of use: Municipal; City of Twin Falls
2. Other water rights with the same point of diversion: None

C. DIVERSION AND DELIVERY SYSTEM1. **LOCATION OF POINT(S) OF DIVERSION:**

GROUND WATER

NE1/4SE1/4

Sec. 5, Twp 10S, Rge 17E, B.M.

TWIN FALLS 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 to be in Twp 10S Rge 17E S 5 NESE¼. See attached map.

2.

PLACE OF USE: COOLING

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>	
10S	17E	5													X				

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>	
10S	17E	5													X				

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 places of use to be in Twp 10S Rge 17E S 5 NESE¼. 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>
416437	Sabina	7.5	6763-D17146.4	Sabina VFD	

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>
Ultrasonic Flow Meter		Fuji	Portaflow	240335	FLG1S	04/2012

2. Measurements:

560 gallons total collected over 10 minutes/ 56 gpm

E. FLOW CALCULATIONS

☒ Additional Computation Sheets Attached

Measured Method: See Attachment #1 for Heating Use Analysis & Heating Volume Analysis.

F. VOLUME CALCULATIONS

2. Volume Calculations for Other Uses: Heating and cooling:

Actual Heating volume based on seasonal use:

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

Heating: 0.13 cfs x 212 days x 1.9835 af = **54.70 AF**

Cooling Season 5/1 – 9/30 or 153 days:

Cooling: 0.13 cfs x 153 days x 1.9835af = **39.50 AF**

Total: 94.20

G. NARRATIVE/REMARKS/COMMENTS

Application for permit 47-1145 was submitted by the First Church of the Nazarene on September 28, 1981, and proof of beneficial use was submitted July 15, 1997.

The original application requested 0.7 cfs for heating from 1-1 to 12-31 and 0.2 cfs for irrigation from 3-15 to 11-15. When the permit was filed, the long term plan was to utilize the low temperature geothermal well for heating all the church facilities and providing irrigation for the grounds. As time progressed, multiple requests for extension of time to submit proof of beneficial use were submitted due to ongoing litigation concerning water rights in the Twin Falls geothermal aquifer and "construction difficulties" preventing development of beneficial use.

In 1987, an agreement referred to as the CSI agreement was reached with the Nazarene church, as a permit holder, being one of the parties involved in the litigation. As part of this agreement, all parties involved agreed not to use the heat resource in applications where cold water was adequate for the beneficial use. The irrigation component of this permit was abandoned as a result. I was informed that the church had planned on utilizing the low temperature geothermal water for a planned future expansion, but abandoned those plans after the CSI agreement was reached. What has been developed using the low temperature geothermal well is a radiant floor heating system with 2" supply lines from the well that supply water to the main sanctuary with 16,250 ft², and the gymnasium with 13,125 ft². The church expansion was completed and approximately one third of the church building is heated with a natural gas furnace.

During the field exam I verified the irrigation system was connected to municipal water and not the well by locating all valves and incoming water lines and measuring flow from the well with the irrigation system running. Every circuit in the irrigation system was checked. I used a Fuji Portaflow ultrasonic flow meter to measure flow through the system with the entire system in operation and measured a flow rate of 0.13 cfs. I spoke with the heating and cooling specialist that maintains the system, Roger Lowder, and he informed me the flow rate through the system is fairly constant regardless of whether the water is run through chillers for cooling or water is run through the system for heating. He felt that 0.13 cfs was an accurate measure of the flow rate required to operate and maintain the system.

The original application for permit requested heating from 01/1 to 12/31 even though a cooling system was incorporated into the system. Therefore, I am recommending this be licensed as heating and cooling. Volumes are based on a 24/7 operation because the system is always in operation. Numbers derived from the heating use analysis have been included in attachment #1, but the derived rate of flow (0.34 cfs) was more than double the measured flow rate, and the volume (42.29 af) was considerably less than the calculated volume of 94.2 af based on the measured flow rate.

Recommend permitting a flow rate of 0.13 cfs with a volume of 54.7 AF for heating and a flow rate of 0.13 cfs with a volume of 39.5 for 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>
COOLING	05/01 to 09/30	0.130 CFS	39.50 AF
HEATING	10/01 to 04/30	0.130 CFS	54.70 AF
<u>Totals:</u>		0.130 CFS	94.20 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 Bill Mott Date 8-14-2012

Reviewer Ad Mervin Date 10/22/12

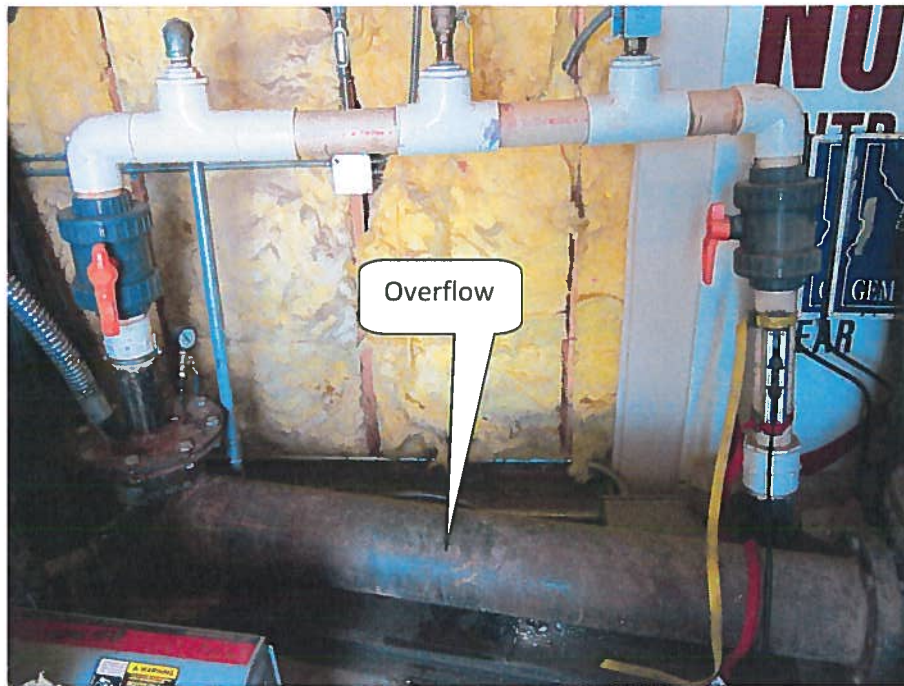


Figure 1: Well head, 4" distribution line and overflow

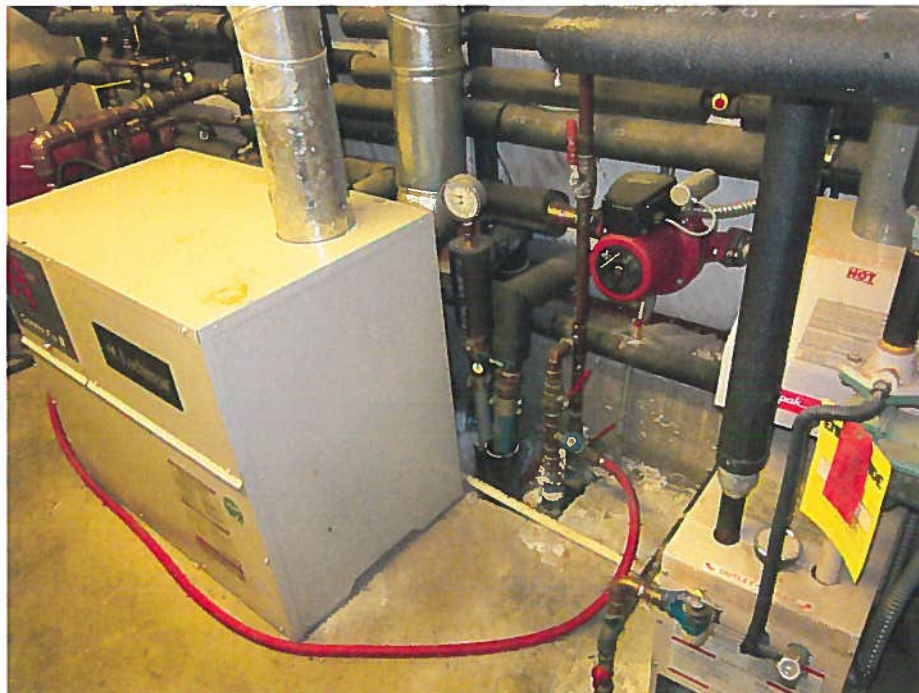


Figure 2: Heating network in gymnasium.



Figure 3: Gymnasium



Figure 4: Church exterior. New addition (part with steeple on the left) does not use the low temp geothermal water for heating

Attachment #1:**47-7745 Rate of Flow Heating for Heating Use Analysis**

(Based on Memo #23 (Amended))

Sanctuary:**BTU's**Sanctuary is approximately 16,250 ft² determined during 7/13/2011 Field Exam

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

e for Sanctuary = 0.28 (Better Energy Efficiency; 8" Walls , fully insulated; Ceilings 9" insulation; all windows and doors caulked and weather sealed)

$$\Delta T = (t_i - t_o) = (70^\circ - (-3^\circ)) = 73^\circ \text{ (-3}^\circ \text{ Suggested Outside Design Temperature for Twin Falls)}$$

$$\text{Sanctuary: } E = [0.28 \times 73] \times 16,250 = \underline{332,150 \text{ BTU/Hour}}$$

Gym:**BTU's**Where Gym is 13,125 ft² determined during 7/13/2011 Field Exam

e for Gym = 0.28 (Better Energy Efficiency; 8" Walls , fully insulated; Ceilings 9" insulation; all windows and doors caulked and weather sealed)

$$\Delta T = (t_i - t_o) = (70^\circ - (-3^\circ)) = 73^\circ \text{ (-3}^\circ \text{ Suggested Outside Design Temperature for Twin Falls)}$$

$$\text{Gym: } E = [0.28 \times 73] \times 13,125 = \underline{268,275 \text{ BTU/Hour}}$$

Find Temperature Drop Across System:

$\Delta T_s = 0.3(s - t)$; where s = source temperature (95.4°; determined during 7/13/2011 Field Exam) and t = inside temperature (70°)

$$\Delta T_s = 0.3(95.4^\circ - 70^\circ) = \underline{7.6^\circ \text{ F}}$$

Find Flow Rate:

$$\text{Rate} = E / (500 \times \Delta T_s)$$

$$\text{Sanctuary: } 332,150 / (500 \times 7.6) = 87.4 \text{ gpm} = \underline{0.19 \text{ CFS}}$$

$$\text{Gym: } 268,275 / (500 \times 7.6) = 70.6 \text{ gpm} = \underline{0.15 \text{ CFS}}$$

Total Flow Rate: 0.34 cfs

Heating Volume Analysis

$$\text{Volume} = \frac{\text{HL} \times \text{DD} \times 24 \times C_D}{\Delta t_1 \times K \times C \times \Delta t_2}$$

Where:

Δt_1 = inside minus outside temperature = $70^\circ - (-3^\circ \text{ (value for Twin Falls)}) = 73^\circ$

HL = peak heat load required = 22 for well insulated

DD = annual heating degree days = 6146

$C_D = 0.6$

$K = 0.90$

$C = 2.72 \times 10^6$ (acre feet conversion)

Δt_2 = temperature drop across system; using 7.6 (ΔT_s)

Sanctuary:

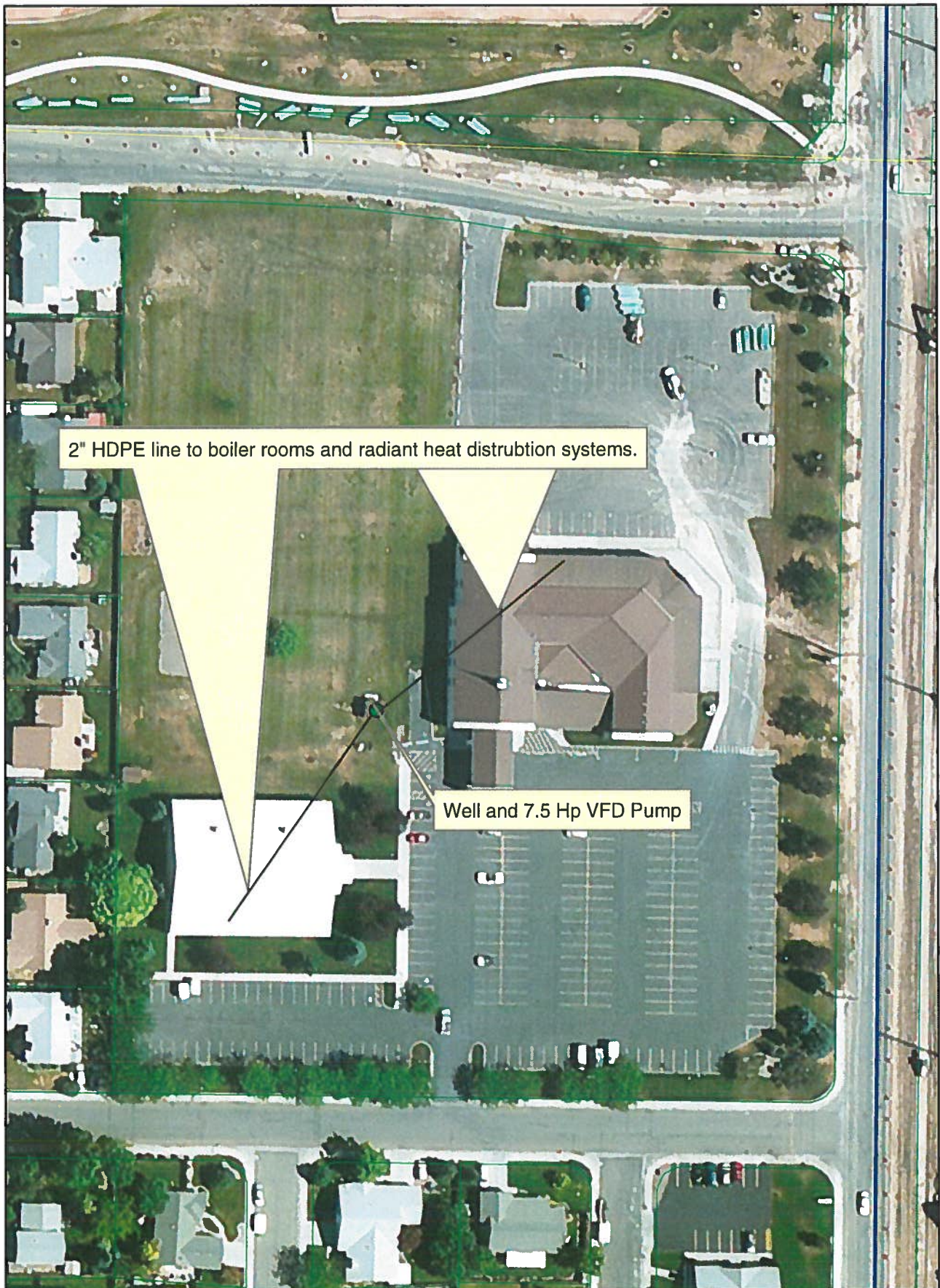
$$\frac{(22)(16250)(6146)(24)(0.6)}{(73)(0.90)(2.7 \times 10^6)(7.6)} = \underline{23.47 \text{ AF}}$$

Gym:

$$\frac{(22)(13125)(6146)(24)(0.6)}{(73)(0.90)(2.72 \times 10^6)(7.6)} = \underline{18.82 \text{ AF}}$$

Total = **42.29 AF**

47-7745 System Diagram



Merritt, Allen

From: Neely, Ken
Sent: Monday, August 27, 2012 4:43 PM
To: Merritt, Allen
Subject: RE: Licensing exam for 47-7745 in the name of "First Church of the Nazarene"

Allen

I remember going to that well, maybe once, with Funderberg, I think. I don't think there was a straight pipe long enough to get a decent measurement. Oh, and I think there was some issue about shutting the well in all the way to get a pressure reading. Anyway, the USGS measured water levels for a while, but I don't remember seeing any production info.

http://nwis.waterdata.usgs.gov/id/nwis/gwlevels?search_station_nm=10S17E05DAA1&search_station_nm_match_type=beginning&sort_key=site_no&group_key=NONE&sitefile_output_format=html_table&column_name=agency_cd&column_name=site_no&column_name=station_nm&format=gif&date_format=YY-MM-DD&rdb_compression=file&list_of_search_criteria=search_station_nm

Ken

From: Merritt, Allen
Sent: Monday, August 27, 2012 4:34 PM
To: Neely, Ken
Cc: Mills, William
Subject: Licensing exam for 47-7745 in the name of "First Church of the Nazarene"

Ken,

Do you have historical data for the volumes for the hot well at the Nazarene church in Twin Falls. What do you use when you calculate withdrawals in the TFGMA?

Bill is recommending licensing the right for 94.2 afa based on 24/7 year round use at 56 gpm (0.13 cfs) for Heating and Cooling.

Thanks,

Allen

