

Cox, Sharla

From: Amy Verbeten [amy@tetonwater.org]
Sent: Wednesday, January 08, 2014 12:56 PM
To: Cox, Sharla
Cc: Sarah Rupp; Keith C. Wilson (kwilson@rockymountainenvironmental.com)
Subject: FW: 22-14130 William Graham application for Heating & Cooling
Attachments: Ltr-FTR_01-08-14.pdf

Dear Sharla,

Thank you for sending us an invitation to comment on Application to Permit No. 22-14103, William Graham application for heating and cooling.

Based on a review of the information you provided, along with additional information provided by Keith Wilson at Rocky Mountain Environmental, Friends of the Teton River does not intend to protest this application, nor to make any additional comment on the water right application.

Kind Regards,

Amy Verbeten

Executive Director

Friends of the Teton River

PO Box 768

18 North Main Street Suite 310

Driggs, Idaho 83422

208.354.3871 ext. 13

amy@tetonwater.org



Working together for clean water, healthy streams & resilient fisheries

From: Keith C. Wilson [<mailto:kwilson@rockymountainenvironmental.com>]
Sent: Wednesday, January 08, 2014 12:43 PM
To: Amy Verbeten; Sarah Rupp
Subject: 22-14130 William Graham application for Heating & Cooling

Amy,

I've attached a letter & additional information on the William Graham proposed application for permit. I thought that this would be the fastest way to communicate the information.

Please feel free to contact me if you have any additional questions or concerns.

Keith C. Wilson

Senior Water Rights Analyst

482 Constitution, Suite 303, Idaho Falls, ID 83402

E-Mail: kwilson@rockymountainenvironmental.com

VOICE: 208-524-2353 ||| FAX: 208-524-1795 ||| CELL: 208-339-1901



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January 8, 2014

RMEA 13-0123

Friends of the Teton River
18 N. Main St. Suite 310
Driggs, ID 83422

RE: William S. Graham's Application for Permit #22-14130

Amy:

In our telephone conversation you requested information as to the effects of the proposed application for permit # 22-14130, primarily the discharge into the slough during the summer.

I have attached the Heat Pump Specifications and Flow Calculations that were included with the application. As indicated the design temperature is based on 45° F ground water from the well and a temperature change of 4.7° F across the system. In winter the discharge temperature into the Teton River would be approximately 40° F, and in the summer the discharge temperature would be approximately 50° F (10° C).

The 50° F (10° C) summer discharge is well below the 22° C (71.6° F) stress temperature for fish. In addition, with current energy efficiency building standards the heat pump system is not expected to be used much for cooling in the summer.

Please feel free to contact me about questions or concerns that you may have about this project.

Sincerely,

A handwritten signature in blue ink that reads "Keith C. Wilson".

Keith C. Wilson
Senior Water Rights Analyst

WATER TO WATER HEAT PUMP (WWHP)

NO.	OUTPUT WITH 40° SOURCE AND 120° LWT	ELECTRICAL DATA	BOILER MANUFACTURER AND MODEL
WWHP-1	106,200 BTUH	230V, 1PH, 60MCA	CLIMATEMASTER TMW120BG

NOTES:

- PROVIDE 30 PSI SAFETY RELIEF VALVE, WATER TEMPERATURE LIMIT SWITCH AND BLOCK TEMPERATURE SWITCH, PRESSURE/TEMPERATURE GAUGE, DRAIN VALVE
- PROVIDE LOW WATER CUTOFF.

HEAT EXCHANGER (HE)

NO.	SERVING	CAPACITY BTUH	HEAT PUMP SIDE			WELL SIDE			MANUFACTURER AND MODEL
			ΔP FT	ΔT °F	GPM	ΔP FT	ΔT °F	GPM	
HE-1	HEAT PUMP	106,200	14'	5	46.5	14.5'	5	45	GEA ECOFLEX NT50M CYFS-50

NOTES

- MAXIMUM OPERATING PRESSURE: 400 PSIG. MAXIMUM OPERATING TEMPERATURE: 350°F.
- CHANNEL PLATES AISI 316 STAINLESS STEEL, PRESSURE PLATES AISI 316 STAINLESS STEEL WITH MILD STEEL POWDER COATED FRAME.
- HEAT EXCHANGER SHALL BE INSULATED WITH FIBERGLASS INSULATION AND ALUMINUM CLADDING.

CALCULATED FLOW RATE IS AS FOLLOWS:

WELL WATER FLOW WILL BE BASED ON THE SUM
OF THE HEAT PUMP FLOW + DOMESTIC FLOW +
30% OF THE IRRIGATION FLOW OR THE FIRE FLOW,
WHICH EVER IS GREATEST.

PROVIDE VALVES ON DOMESTIC HEAT PUMP AND IRRIGATION
THAT WILL CLOSE ANYTIME FIRE FLOW IS SENSED.

DOMESTIC FLOW REQUIREMENT..... 23 GPM

HEAT PUMP..... 46 GPM

LANDSCAPING FLOW IS CALCULATED
AT 30% OF DESIGN = 30% OF 20GPM..... 6 GPM

TOTAL 75 GPM

PUMP SHALL RUN AUTOMATICALLY ON A CALL FROM THE
PRESSURE SWITCH, VFD AND PUMP SHALL MAINTAIN CONSTANT
SYSTEM PRESSURE OF 60PSI.

Information Prepared by:
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Methods for Determining Rates of Flow for Geothermal Heating Systems Application Processing #23

Data Supplied by Applicant's Engineer

1. Engineering Maximum Required Flow Rate = 45 gpm = 0.10 cfs
 2. Designed Floor Space = 4482 ft²
 3. Design Temperature = -20° F
 4. Temperature Drop across system = 4.7° F
 5. Space Heat Load = 106,200 BTU/hr
 6. Engineering calculations based on 45° F ground water.
-

IDWR Guideline for determining Design Heat Load:

$$E = (e)(\Delta T)(0.8)(A) = \text{BTU/hr required}$$

e = efficiency factor BTU/hr-sq.ft.-°F

Assume = 0.28

0.28 – Best Energy Efficiency
 0.44 – Better Energy Efficiency
 0.67 – Average Residential Efficiency
 1.11 – Poor Energy Efficiency

$$A = \text{Floor space} = 4482 \text{ ft}^2$$

$$\Delta T = \text{Design Temperature difference } (t_i - t_o)$$

$$t_i = \text{Inside Temp} = 70^\circ \text{ F}$$

$$t_o = \text{Outside Temp} = -20^\circ \text{ F} = \text{Design Temperature}$$

$$\Delta T = (t_i - t_o) = [(70^\circ \text{ F}) - (-20^\circ \text{ F})] = 90^\circ \text{ F}$$

$$E = (0.28)(90^\circ)(4482 \text{ ft}^2) = 112,946.4 \text{ BTU/hr}$$

IDWR Guideline for Estimating Rate of Flow for Geothermal Heating Systems:

Temperature Drop: $\Delta T_s = \text{Temperature drop across the system} = 4.7^\circ \text{ F}$

Flow Rate Required: $W = O \div (500)(\Delta T_s)$

$$O = \text{Space Heat Load in BTU/hr} = 112,946.4 \text{ BTU/hr}$$

$$W = (112,946.4 \text{ BTU/hr}) \div [(500)(4.7^\circ \text{ F})] = 48.06 \text{ gpm} = 0.107 \text{ cfs}$$

The IDWR guidelines are not for the design of heating systems; however, using these guidelines the calculated flow rate required = 0.11 cfs.

The engineering data provided estimated the maximum design flow of 45 gpm (0.10 cfs) as a reasonable flow rate.