

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
BENEFICIAL USE FIELD REPORT

OCT 31 2001

**Department of Water Resources
Southern Region**

A. GENERAL INFORMATION

Permit No. 37-8670

1. Owner: BENJAMIN S. CROCKER et al.

Phone No. 206-448-9501

Current Address: 87 VIRGINIA #12 SEATTLE WA 98101

2. Accompanied by: JEFFREY S. RAW P.E.

EXAM DATE : 10/28/01

Address: BROCKWAY ENGR 2016 N. WASHINGTON ST SUITE 4
TWIN FALLS, ID 83301

Phone No. 208 - 736 - 8543

Relationship to Permit Holder: ENGINEERING CONSULTANT

3. Source: GROUNDWATER tributary to N/A

B. OVERLAP REVIEW

OTHER IRRIGATION RIGHTS

1. Other water rights with the same place of use: 37-4139 (STAT CLAIM), 37-4138, 37-4440

2. Other water rights with the same point of diversion: 37-4139 (STAT CLAIM)

C. DIVERSION AND DELIVERY SYSTEM

1. Point(s) of Diversion:

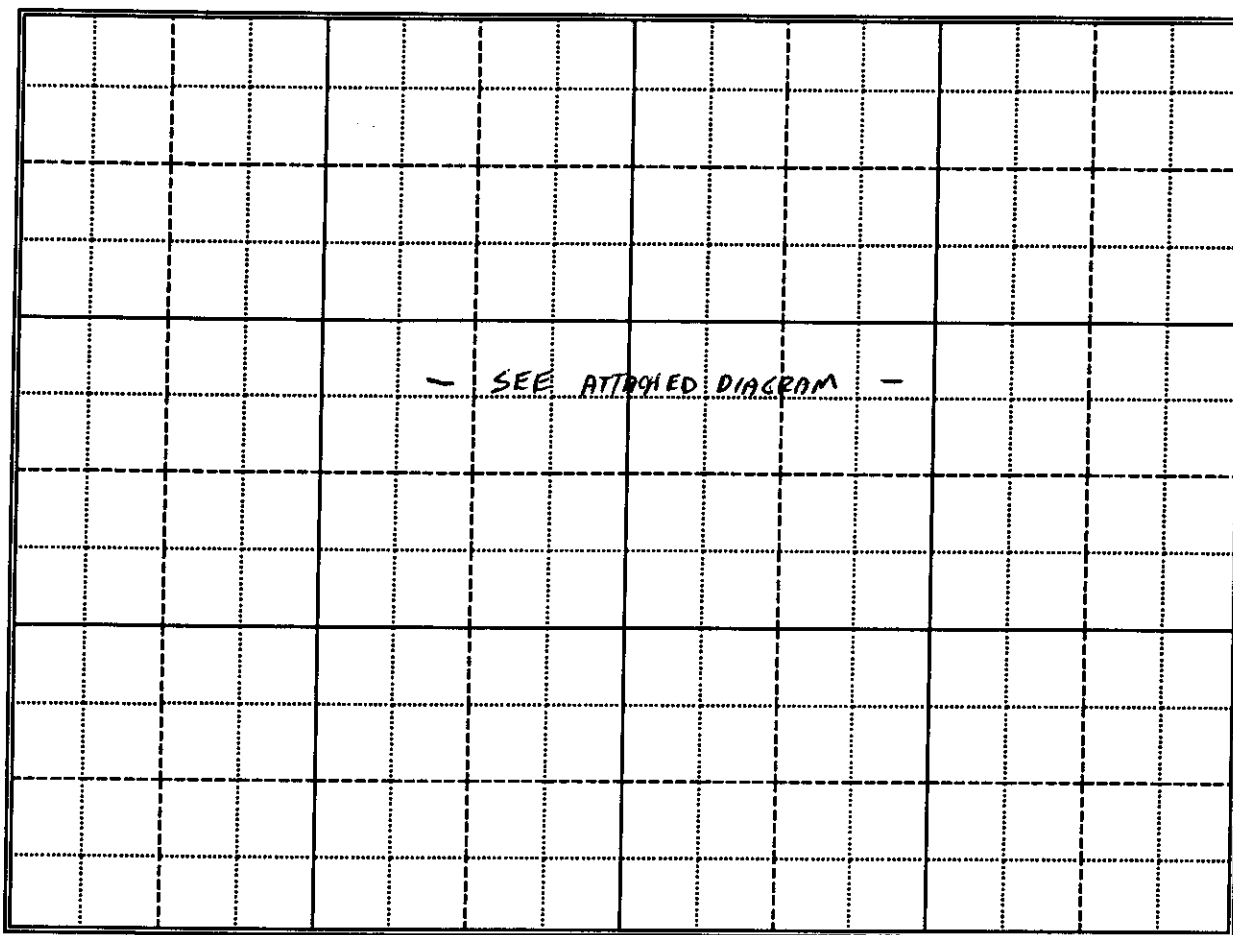
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2. Place(s) of Use:

Indicate Method of Determination

[illegible]

3. **Delivery System Diagram:** Include all major components and distances between components. Indicate weir size/ditch size/pipe i.d. as applicable.



Scale: 1" = _____

☒ 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

4.

Well or Diversion Identification No.*	Motor Make	Hp	Motor Serial No.	Pump Make	Pump Serial No. or Discharge Size
HOT WATER TO GYMNASIUM SYSTEM	GRUNDFOS	1/12	P/N: 527 22322	TYPE UP 25-	64 SF
HOT WATER TO PATIO SYSTEM	GRUNDFOS	1/25	P/N: 598 96178	TYPE UPS 15-	42 F

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

D. FLOW MEASUREMENTS

1.

Measurement Equipment	Type	Make	Model No.	Serial No.	Size	Calib. Date
CALIBRATED BUCKET						
PUMP CURVE / SYSTEM CURVE						

4" ORIFICE METER WITH 3.00" ORIFICE PLATE

2. Measurements: SEE NARRATIVE FOR EXPLANATION OF FLOW MEASUREMENTS

E. NARRATIVE/REMARKS/COMMENTS

- SEE ATTACHED NARRATIVE -

Have conditions of permit approval been met? ☐ yes ☒ no SEE NARRATIVE

F. FLOW CALCULATIONS

- SEE NARRATIVE

Additional Computation Sheets Attached

Measured Method:

- A) HOT WATER SYSTEM FROM PATIO $\Rightarrow$ BUCKET MSMT = 6.5 GAL IN 2.0 MIN = 3.25 GPM = 0.007 cfs
 B) SEE SYSTEM CURVE FOR GLYCOL/HOT WATER SYS PUMP = $Q = 28.5 \text{ GPM} = 0.064 \text{ cfs}$
 C) PUMP & ORIFICE MSMT = 5.75" O.D. 3" ORIFICE = 95 GPM = 0.212 cfs

G. VOLUME CALCULATIONS

1. Volume Calculations for Irrigation:

$$V_{IR} = (\text{Acres Irrigated}) \times (\text{Irrigation Requirement}) = \underline{\underline{N/A}}$$

$$V_{D.R.} = [\text{Diversion Rate (cfs)}] \times (\text{Days in Irrigation Season}) \times 1.9835 = \underline{\quad N/A \quad}$$

$V = \text{Smaller of } V_{I,R} \text{ and } V_{D,R} = \underline{\hspace{2cm} X \hspace{2cm}}$

2. Volume Calculations for Other Uses:

$$\text{HEATING} = 0.071 \text{ LFS FOR } 270 \text{ DAYS} \times 24 \text{ HR/DAY} = \underline{38 \text{ AF}}$$

$$\text{RECREATION} = 80 \text{ ft}^3 \text{ FOR KID POOL} \times 90 \text{ FILL/YEAR (ESTIMATED)} = 0.17 \text{ AF}$$

WILDLIFE = 0.212 CFS FOR 365 DAYS * 24 HR/DAY = 153.5 AF

H. RECOMMENDATIONS

1. Recommended Amounts

Beneficial Use	Period of Use		Rate of Diversion Q (cfs)	Annual Volume V (afa)
	From	To		
HEATING	1/01	12/31	0.071 cfs	38.0
RECREATION	1/01	12/31	0.007 cfs	0.17
WILDLIFE	1/01	12/31	0.212 cfs	153.5
Totals:			0.212 cfs	191.67

2. Recommended Amendments

(SEE NARRATIVE)

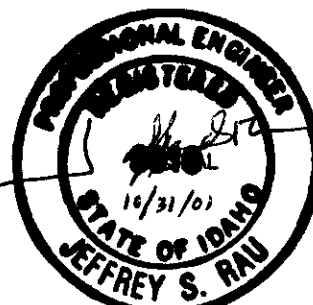
X Change P.D. as reflected above Add P.D. as reflected above None

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

I. AUTHENTICATION

Field Examiner's Name [Signature] Date 10/31/01

Reviewer _____ Date _____



CERT # 06-127

Beneficial Use Field Report – Narrative
WR #37-08670
Prepared by Jeffrey S. Rau, P.E.
Brockway Engineering, PLLC

Revised 12-6-01 (*Revised Sections in Italics*)

System Description

Water right permit #37-08670 is a 4.0 cfs hot water groundwater right permit for wildlife, heating, and recreation uses. The right has not been fully developed per the permit and has been recommended at the rates shown in the field report.

The hot water under this right is collected in a covered concrete collection box located over a natural hot spring. The concrete box is approximately 40 feet long by 8 feet wide and approximately 4-5 feet deep. A 6" PVC pipe carries the hot water from the collection box, underground approximately 1,580 feet, to a hot water sump located near the residence. The sump contains a 6" PVC overflow pipe which gravity drains to an outfall location at a small reservoir. Two hot water heating systems remove hot water from the sump and use it for heating purposes. The waste from each system discharges directly into the 6" overflow pipe to the reservoir and does not mix with the fresh hot water from the collection box. Each hot water system is described as follows:

Hot Water Heating System for Patio

A single 1" poly pipe takes hot water from the sump and via a small Grundfos recirculation pump, forces the hot water through a system of three heat loops within the concrete patio. Approximately 700 square feet of patio is heated with this system. The three loops are collected at a header pipe and return to the overflow pipe at the sump via a 1" poly pipe. On the day of the exam, the inlet temperature upstream of the pump was 105 degrees F and the outlet temperature was 75 degrees F, based on the temperature gauges on the system. The pump which services this system is a Grundfos Type 15-42F, 1/25 horsepower, recirculation pump.

Hot Water Heating System for Glycol Recirculation System

A 1¼" PVC pipe conveys hot water from the sump, via a Grundfos recirculation pump, through a Tau Energy Products heat exchanger and back to the overflow pipe at the sump. The heat exchanger system is located in the crawlspace area of the shop building. The other side of the heat exchanger system contains a glycol loop which services radiant floor heating systems in the house, garage, and shop building. Based on correspondence with the permit holder, the glycol system heats approximately 1,500 square feet (sq ft) in the house, 2,000 sq ft in the workshop, and approximately 1,000 sq ft in the utility garage. To boost the

overall temperature in the glycol system, two hot water tanks with electronic elements are connected in series in the system. The hot water tanks boost the glycol temperature after it has passed through the heat exchanger. A single Grundfos, 1/12 horsepower, Type UP 25-64SF, pump is installed in the hot water recirculation line servicing the heat exchanger.

FLOW MEASUREMENTS

Three different methods were used to determine the flow rates recommended under this beneficial use exam. Each system is described separately.

Patio Recirculation System

To measure the flow rate in the patio system, the sump was pumped down to prevent any water from leaving the overflow pipe. The patio pump was shut down for a period of time until a zero flow was recorded from the outfall pipe at the reservoir. The patio pump was then primed and allowed to run for approximately 0.5 hours to allow it to operate in a steady state condition. The amount of water coming from the outfall pipe at this time was measured using a calibrated bucket and stopwatch. Based on the measurements made on this system, the flow rate through the patio system was measured to be 3.25 gallons per minute (gpm). Occasionally, the owner has used the patio hot water system to fill a small children's recreation pool. This beneficial use is included as a recreation use under this permit. A total of 3.25 gpm (0.007 cfs) is recommended as a recreation use under this right.

Hot Water to Glycol Heat Exchanger System

At the time of the beneficial use exam, the pump servicing this system was malfunctioning and was not pumping, although it was still running. To prevent a fire danger, the pump was shut down and will be replaced with an identical unit. To estimate the flow rate in this system, the pump curve for the Grundfos Type UP 25-64SF pump was obtained and a system curve for the piping arrangement was developed. Based on the system curve analysis and the manufacturer pump curve, the operating point for this system is 28.5 gpm at 8 feet TDH. This amount combined with the 3.25 gpm from the patio system has been recommended for this permit for heating purposes.

Hot Water to Reservoir

Hot water which flows from the collection box and is not used by the recirculation system(s) overflows from the sump in a 6" PVC pipe to a small reservoir. The hot water from this line provides wildlife habitat in the reservoir area as

evidenced by animal scat and deer tracks in the immediate area of the outfall pipe. A portable pump and orifice meter was used to pump the sump to determine the capacity of the 6" delivery line and system. The sump elevation stabilized at a constant measured flow rate of 95 gpm as measured with the 3" orifice plate. The sump was pumped for a period of about 1.5 hours at this rate and the system had achieved steady state. This rate has been recommended for wildlife use at the reservoir. The temperature of the water from the sump was measured to be 111.2 degrees F.

VOLUME CALCULATIONS

The volume recommended under each use was calculated as follows. The amount of water for heating purposes was taken to be the measured capacity of the heating system pumping for 24 hours per day over a period of 9 months or approximately 270 days. This equates to the normal heating season of use according to the permit holder. The recreation use volume is difficult since it is a small childrens' pool which was not out at the time of the exam. Assuming a pool volume of 80 cubic feet (conservative), and assuming a maximum number of fills per summer of 90 times, the total diversion volume under the recreation use would be 0.17 acre feet. The wildlife use volume was calculated using a continuous 24 hour flow rate for a year round basis. This is acceptable because there is no control on the system to prevent water from flowing into the collection box and into the wildlife pond. The volume recommended for the wildlife use is 153.5 acre feet.

CHANGE IN POINT OF DIVERSION

The original permit was issued with a point of diversion listed as three existing artesian wells which were to be improved and modified to accommodate the flow rate listed on the permit. The flow rate listed in the permit was to supply heating and recreation uses to a planned subdivision on the property. However, the subdivision was never approved and only one of the wells was improved and tested. This well is located directly adjacent to the existing collection box which supplies water to the system described in this report. Based on a discussion with the permit holder, when the well was pump tested, the water level in the collection box decreased dramatically indicating a direct connection between the artesian well and the collection box. Since the larger volume of water, which would have been supplied from this well, was never required for the subdivision, the improved artesian well was never required. Since the capacity of the collection box was enough to supply the water as outlined in this exam, the artesian well network was implemented. However, according to the observations made by the permit holder during the pump test of the artesian well, the collection box is hydraulically directly connected to the same source of water and a changed point of diversion is required. It is my recommendation that the permit

be recommended with a point of diversion from the collection box located in the same 10 acre parcel as allowed under the permit.

CONCLUSION

The rates recommended in this exam are much below the rates specified in the original permit. The water right permit holder had originally intended to utilize much more hot water for heating, recreation, and wildlife in a proposed subdivision to be built on the property owned by the permit holder. This subdivision has not been approved and the overall beneficial use under this right has been as outlined in this exam. The permit holder is aware of the conditions of the exam and wishes to prove up on this amount at this time.

CONDITIONS OF APPROVAL

Condition #1 – The system servicing the residence is complete. The remainder of the proposed subdivision has not and will likely not be approved in the near future.

Condition #2 - Flow measurement ports were not observed and no flow measurement devices existed on the hot water lines. Flow measurement at the outfall pipe may be made with a flume or bucket measurement as made during our exam. A straight section of pipe on the hot water to the glycol system piping could be used for an ultrasonic meter capable of measuring 1.25" PVC pipe.

Condition #3 – OK

Condition #4 – Use under this right is non-consumptive.

Condition #5 – Water used under this right and returned directly to the reservoir does not come in direct contact with any contaminant sources. Since no mixing occurs and the use is strictly a pass through use, no degradation of water quality can or will occur.

Water Right Report

CHOOSE

10/31/2001

IDAHO DEPARTMENT OF WATER RESOURCES

Water Permit Report

WATER RIGHT NO. 37-8670

Owner Type	Name and Address
Current Owner	BENJAMIN S CROCKER TRUST D
Current Owner	HELEN NAN CROCKER TRUST D
Current Owner	DONALD W CROCKER TRUSTEE
Current Owner	HELEN NAN CROCKER TRUSTEE
	87 VIRGINIA #12
	SEATTLE, WA 98101
	(206)448-9501
Original Owner	CRYSTAL HOT SPRINGS LIMITED PARTNERSHIP

Priority Date: 08/13/1990

Status: Active

Source	Tributary
GROUND WATER	

Beneficial Use	From	To	Diversion Rate	Volume
WILDLIFE	1/01	12/31	4 CFS	
HEATING	1/01	12/31	4 CFS	
RECREATION	1/01	12/31	4 CFS	
Total Diversion			4 CFS	

Location of Point(s) of Diversion:

GROUND WATER	NWNWSE	Sec. 18	Township 02N	Range 18E	BLAINE County
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Place(s) of use:

Place of Use Legal Description: WILDLIFE BLAINE County

Place of Use Legal Description: HEATING BLAINE County

Township	Range	Section	Lot	Tract	Acres	Lot	Tract	Acres	Lot	Tract	Acres	Lot	Tract	Acres
02N	18E	18		NESE			NWSE			SESE				

Place of Use Legal Description: RECREATION BLAINE County

Township	Range	Section	Lot	Tract	Acres	Lot	Tract	Acres	Lot	Tract	Acres	Lot	Tract	Ac
02N	17E	11		SESE										
				NENE			NWNE							
				NENW			NWNW							
		14		NESE			SESE							
				NENE			NWNE			SWNE			SENE	
				SWNW			SENE							
	18E	17		NESW			NWSW							
				SWNE										
				NENW		1	NWNW		2	SWNW			SENE	
		18		NESW		3	NWSW		4	SWSW			SESE	
				NESE			NWSE			SWSE				
Township	Range	Section	Lot	Tract	Acres	Lot	Tract	Acres	Lot	Tract	Acres	Lot	Tract	Acres
02N	18E	18		NWSE										

Conditions of Approval:

1.	26A	Project construction shall commence within one year from the date of permit issuance and shall proceed diligently to completion unless it can be shown to the satisfaction of the Director of the Department of Water Resources that delays were due to circumstances over which permit holder had no control.
2.	01C	A flow measurement port or other device as specified by the Department shall be installed by the right holder to provide for the installation of measuring equipment and the determination of the rate of diversion by the Department.
3.	046	Right holder shall comply with the drilling permit requirements of Section 42-235, Idaho Code.
4.	027	Use of water under this right shall be non-consumptive.
5.	09D	Water used under this right if discharged into a natural channel shall meet Idaho Water Quality Standards.

Remarks:

1.	General	Three points of diversion are located within NWNWSE, S18, T02N, R18E.
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Dates:

Proof Due Date: 11/01/2001

Proof Made Date:

Approved Date: 10/30/1991

Moratorium Expiration Date:

Enlargement Use Priority Date:

Enlargement Statute Priority Date:

Application Received Date: 08/13/1990

Protest Deadline Date:

Number of Protests: 0

Field Exam Date::

Date Sent to State Off:

Date Received at State Off:

Other Information:

State or Federal:

Owner Name Connector:

Water District Number:

Generic Max Rate per Acre:

Generic Max Volume per Acre:

Swan Falls Trust or Nontrust:

Swan Falls Dismissed:

DLE Act Number:

Cary Act Number:

Mitigation Plan: False

A small rectangular button with the word "Close" in a bold, sans-serif font.

USGS Topo Plan
Delivery System for WR #37-08670

Concrete Collection Box @ Spring

6" PVC Buried Line to Sump
 Length = 1580' +/-

Hailey Hot Springs Reservoir

Hot Water Sump

6" PVC Discharge Line to Reservoir

Democrat Gulch

Spring

Spring

Hot Springs Gulch

Prospects

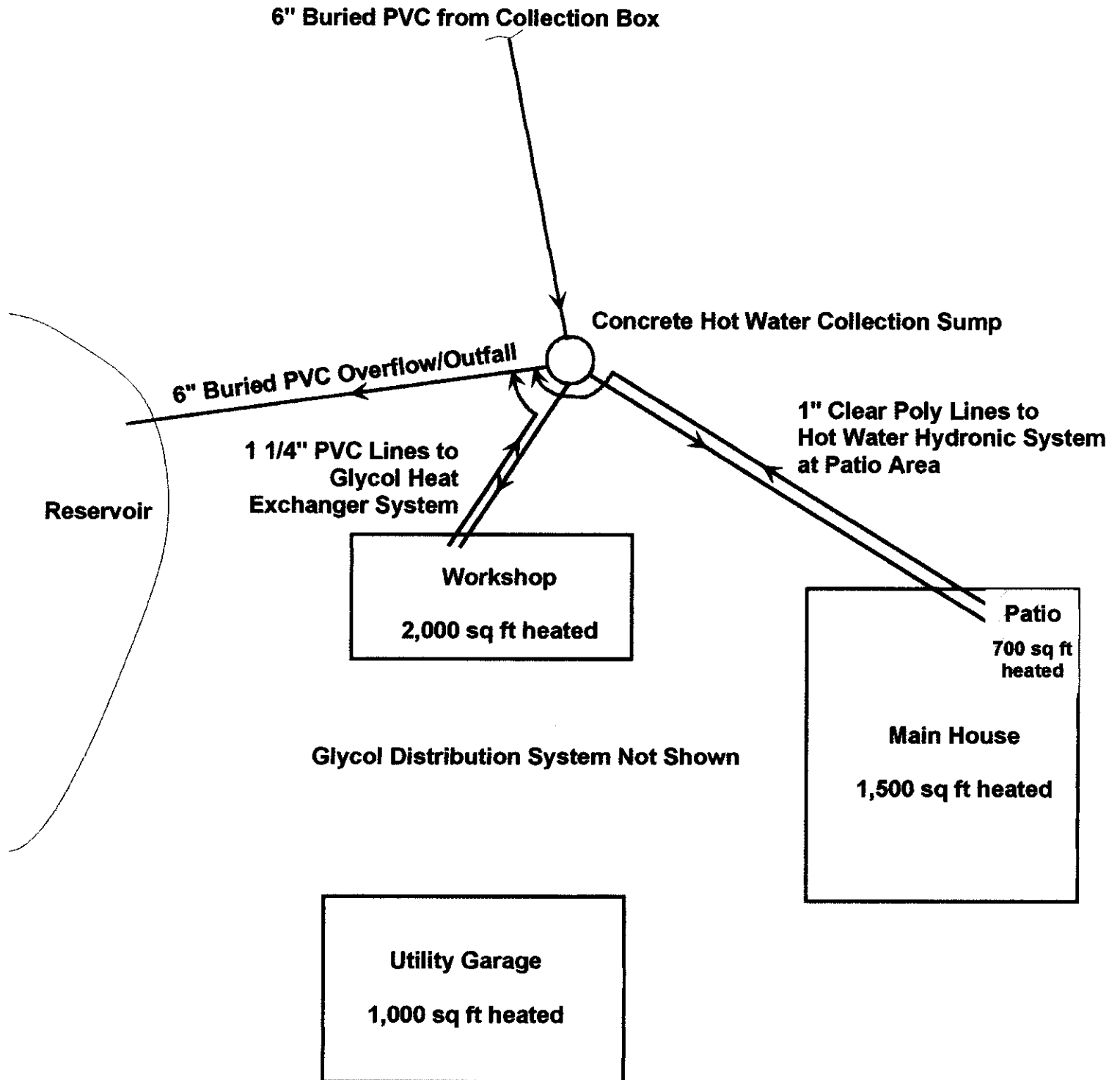
Section 18, Township 2 North, Range 18 East

Brockway Engineering, PLLC
 Beneficial Use Exam - WR #37-08670

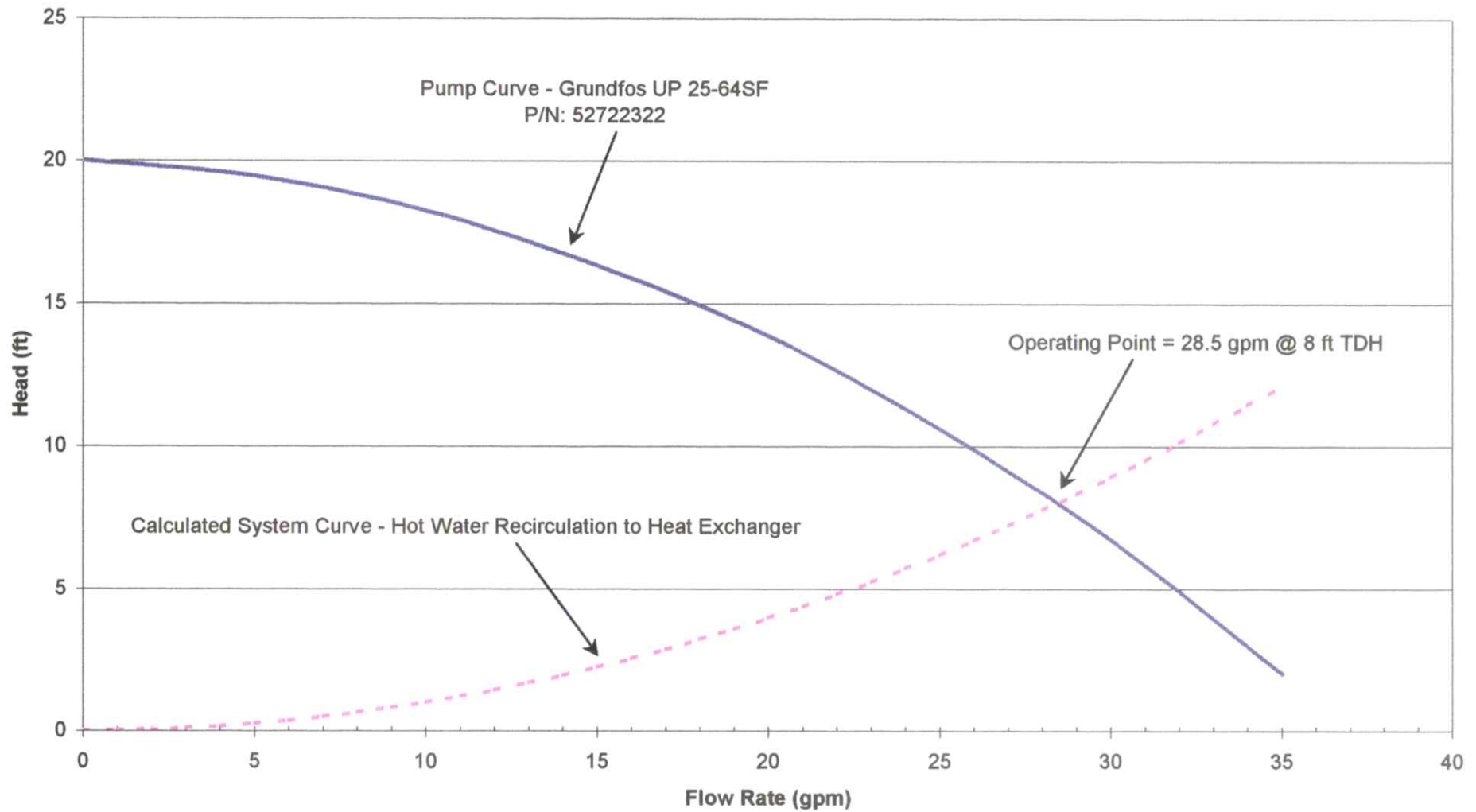
Brockway Engineering, PLLC
Beneficial Use Exam - WR #37-08670

Section 18, Township 2 North, Range 18 East

**Site Plan - Beneficial Use Exam
WR Permit #37-08670**



Pump vs System Curve Crocker Hot Water Recirculation System



**Beneficial Use Exam Photos
WR Permit #37-08670**



Collection Box at Spring Location



Hot Water Sump at End of 6" Delivery Pipe

**Beneficial Use Exam Photos
WR #37-08670**

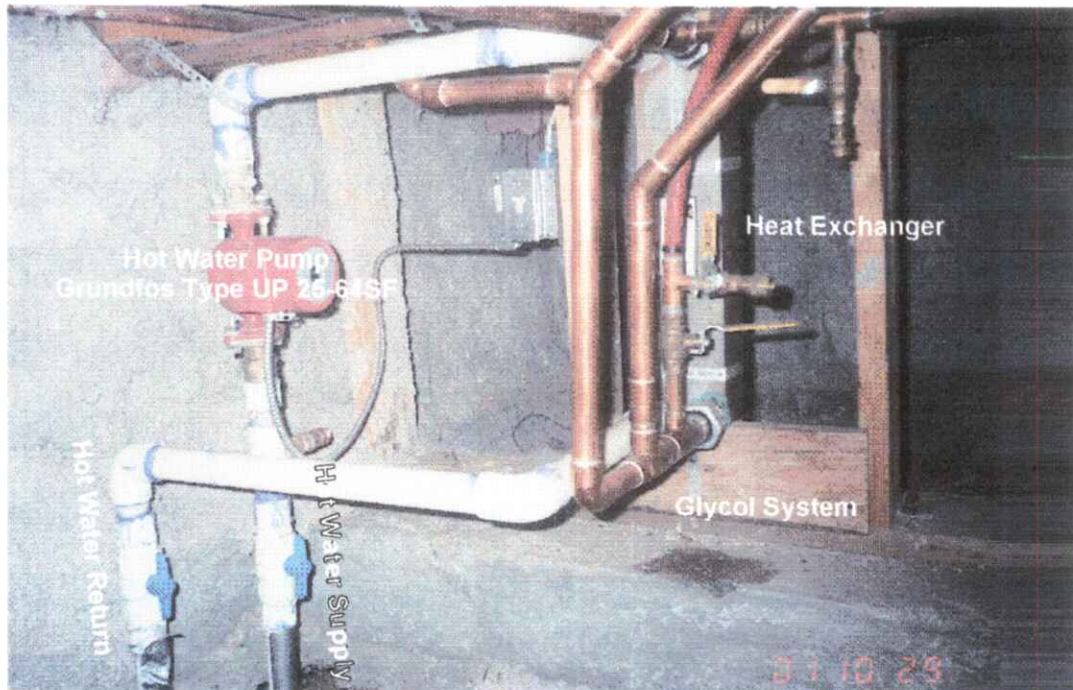


Hot water sump with discharge piping from patio & glycol heating systems.

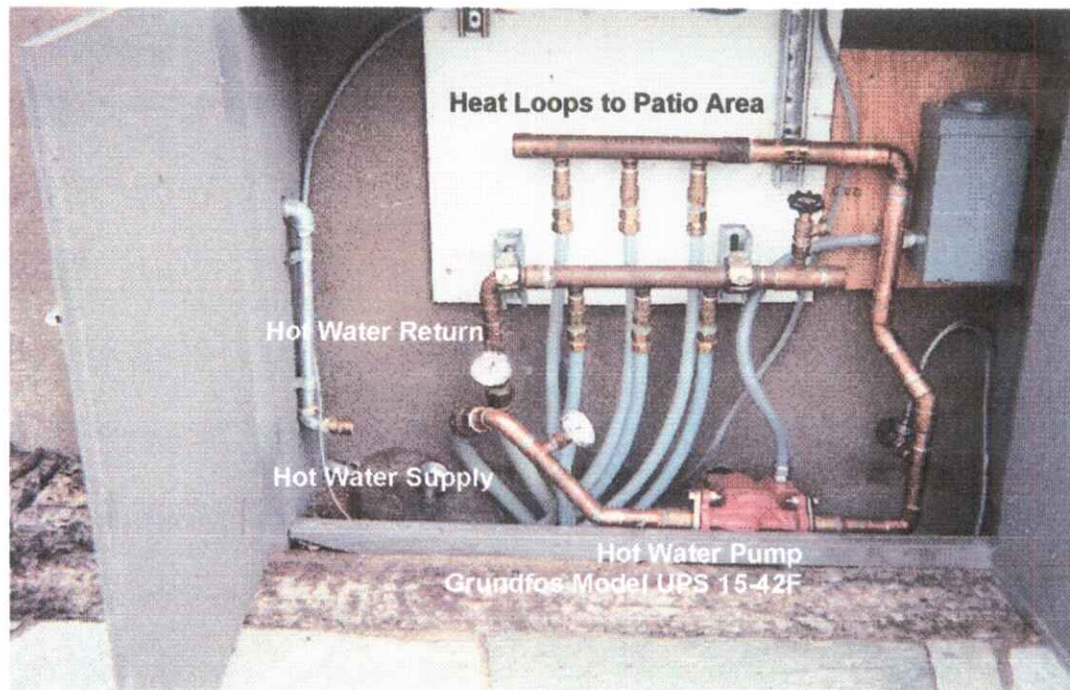


6" Dischage pipe to reservoir @ outfall location

**Beneficial Use Exam Photos
WR #37-08670**



**Heat exchanger system for glycol heating system to house, garage, & shop.
Located in crawlspace of shop.**



Hot Water Heating System for Patio Area - Non-Glycol System

**Beneficial Use Exam Photos
WR #37-08670**



Area Buildings with Heating from Hot Water



Pumping sump to determine system capacity.

**Beneficial Use Exam Photos
WR #37-08670**



Glycol system hot tanks to boost glycol temperature to system.