

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
BENEFICIAL USE FIELD REPORT

A. GENERAL INFORMATION

Current owner: Crooked Tree LLC
Accompanied by: Roland Evans
Phone No: 503-292-3295
Address: PO BOX 609 LAVA HOT SPRINGS, ID 83246
Email: therevans@comcast.net
Relationship to permit holder: Manager

PERMIT NO

29-14033

EXAM DATE

June 15, 2021

SOURCE

Unnamed Stream

TRIBUTARY TO

Dempsey Creek

PURPOSE OF USE

POWER

B. OVERLAP REVIEW

Other water rights with the same place of use:

No Overlap

Water Right No.	Source	Purpose of Use	Basis

Comments:

Other water rights with the same point of diversion:

No Overlap

Water Right No.	Source	Purpose of Use	Basis

Comments:

C. DIVERSION AND DELIVERY SYSTEM

LOCATION OF POINT(S) OF DIVERSION:

SWNE SEC. 33 TWP 10S RGE 38E

Metal Tag No.

New Metal Tag? No

Method of Determination:

Place of Use

Twp	Rng	Sec	NE				NW				SW				SE				Totals
			NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
10S	38E	28															X		

Method of Determination: Site Visit and GPS

- x Delivery System Diagram Attached (required). Indicate all major components and distances between components.
- x Map attached showing location(s) of point(s) of diversion and place(s) of use (required). Scale must be 1:24,000 or greater.
- x Aerial photo attached (required for irrigation of 10+ acres).
- x Photo of diversion and system attached.

D. FLOW MEASUREMENTS

Were flow measurements taken?

No

Measurement Equipment	Type	Make	Model No.	Serial No.	Size	Calib. Date

Measurement Comments: Flow measurement was unsuccessful. Manning's Equation was used in the flow calculations.

E. FLOW CALCULATIONS

 Additional Computation Sheets Attached

Measured Method: Manning's Equation

Calculations:
$$1.30 \text{ cfs} = 1.49 \left(\frac{1}{0.009} \right) (0.10 \text{ ft}^2) \left(0.12^{\frac{2}{3}} \right) \sqrt{0.1062}$$

Manning's equation is based on a 4 inch pipeline with a 226.03 feet of head over a distance of 2100 feet. Diversion system is capable of exceeding permitted diversion rate of 0.25 cfs. Valves exist on the mainline capable of limiting flow but no flow meter was installed at the time of exam.

F. VOLUME CALCULATIONS

Volume calculations for other uses:

Volume by Rate of Diversion:
$$0.25 \text{ cfs} \times 1.9835 \times 365 \text{ days} = 181 \text{ AF}$$

Efficiency Calculation

Feet of Head = 226.03 ft. based on the elevation difference between the point of diversion (6291.51 ft) and the point of re-diversion (6065.48 ft.). GPS site data was taken at both locations and the difference was found. A difference of 226.03 ft.

$$P = \frac{QHE}{11.8} = \frac{0.25 \times 226.03 \times 0.8}{11.8} = 3.8 \text{ kw } 80\% \text{ efficiency}$$

G. NARRATIVE/REMARKS/COMMENTS

A Beneficial use Field Exam was performed by Jared Adamson on 6/15/2021. The exam documented the locations of the diversion point, the power generator, the point of re-diversion, and the place of use. The system was well constructed with minimal impact to the stream. The point of diversion is made of a screen inlet, allowing water to pour into and over a 4 inch PVC pipeline. The pipe conveys the water downhill and underground to the power generator. The water is then re-diverted into the stream channel.

A flow measurement using a portable flow meter was unsuccessful due to the lack of straight pipe. Also, a low water flow due to dry conditions might show a lower than normal flow rate. Manning's equation was used to determine the flow rate through the 4 inch pipe.

The address for Crooked Tree LLC has changed from the Oregon address, found on the permit and proof of beneficial use form, to PO BOX 609 LAVA HOT SPRINGS, ID 83246.

H. RECOMMENDATIONS

Have conditions of permit approval been met? **Yes**
If not, what condition(s) were not met?

Recommended Amounts

Beneficial Use	Period of Use	Rate of Diversion	Annual Volume
Power	01/01 to 12/31	.25 CFS	181 AF
	Totals:		

Recommended Amendments

Point of Diversion: N/A

Place of Use: N/A

Other Recommendations: N/A

I. AUTHENTICATION

Field Examiner

Jared Adamson

Signature



Date

7/22/2021

Reviewer

Date

7/26/2021

J. PHOTOS



Overall point of diversion. Controlling works are in place and can be accessed through the vertical PVC pipes just beyond the gate.



Point of diversion with screen.



PSI in the system at the time of the exam.



Hydro-generator. Water to the generator can be cutoff and diverted directly to injection point.



Point of re-diversion into the stream channel.

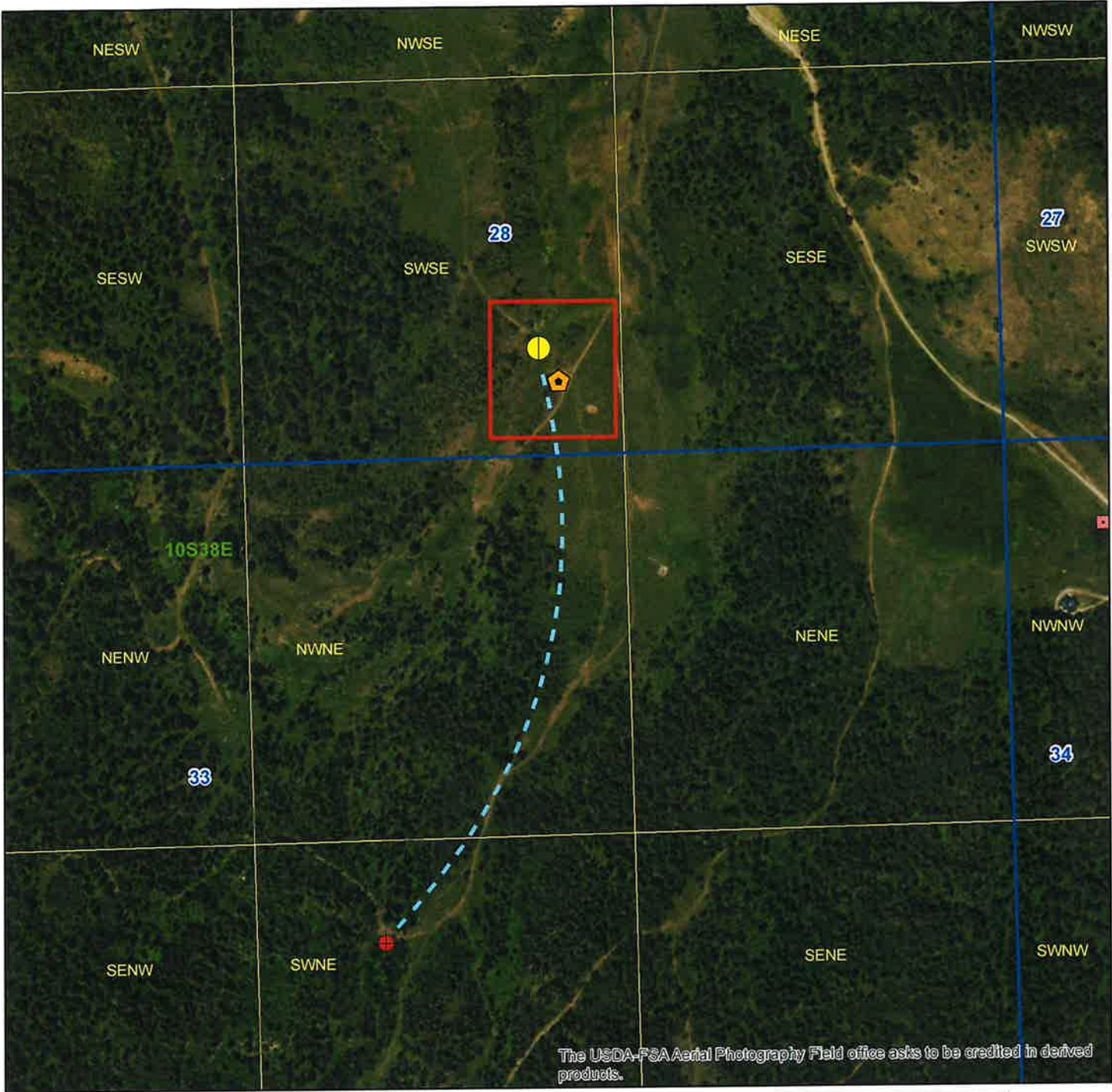


Overall photo of the re-diversion. A power line was constructed going over the stream.



Cabin and out buildings
where power is used.

Beneficial Use Field Exam Map



0 200 400 800 Feet



- Pipeline
- Point of Diversion
- Power House
- Point of Rediversion
- Place of Use
- Township/Range
- Sections
- QQ

Manning's Equation Calculator for Flow Rate in Any Open Channel

READ ME

S = 0.1062 ft/ft

n = 0.009 manning's coefficient

A = 0.10 area (ft²)

WP = 0.84 wetted perimeter (ft)

R = 0.12 hydraulic radius (ft)

Q = 1.30 flow rate (CFS)

Channel Slope

Slope Options

☐ Manual Entry

☒ Slope Calculator

Slope Calculator

Rise = 223 feet

Run = 2100 feet

Slope, S = 0.1062 ft/ft

Channel Material, (n):

plastic (pvc, abs)

Manning's Equation (1), is an empirical formula that solves for velocity (v) in a open channel under uniform flow. The continuity equation (2) when combined with equation (1) allows for the computation of the flow rate (Q) in an open channel under uniform flow.

In equations (1) and (3), n refers to Manning's Coefficient of Roughness and can be found in tabulated form for many open channel types. R is the hydraulic radius of the open channel and equal to the area of the open channel divided by the wetted perimeter, $R = A/P$. S is the slope of the energy grade line which often assumed to be equal to the slope of the channel.

Because Manning's Equation is empirical the units are not arbitre To obtain a velocity in ft/s and a flow rate in ft³/s, area must be reported in ft², hydraulic radius must be reported in ft, and S must be reported in ft/ft. Manning's Coefficient of Roughness is a unitless constant.

$$(1) \quad v = 1.49 \left(\frac{1}{n} \right) \left(R^{\frac{2}{3}} \right) \sqrt{S}$$

$$(2) \quad Q = vA$$

$$(3) \quad Q = 1.49 \left(\frac{1}{n} \right) (A) \left(R^{\frac{2}{3}} \right) \sqrt{S}$$