

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
BENEFICIAL USE FIELD REPORT

A. GENERAL INFORMATION

Permit No: 86-7371

Exam Date: 8/15/2012

1. Current Owner: US DEPT OF ENERGY
BONNEVILLE POWER
PO BOX 3621 TRF 3
PORTLAND OR 97208-3621
(503)230-5572
2. Accompanied by: Steve Rodgers
Phone No: 208-843-7384
Address: H18985 Hubbard Gulch Rd.
Relationship to Permit Holder: Hatchery Supervisor

3. SOURCE TRIBUTARY
CLEARWATER RIVER SNAKE RIVER

B. OVERLAP REVIEW

1. Other water rights with the same place of use: 86-7372 and 86-7373
2. Other water rights with the same point of diversion: none

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

CLEARWATER RIVER NE1/4SW1/4 Sec. 25, Twp 37N, Rge 03W, B.M. NEZ PERCE County

Method of Determination: Field verification using a Garmin GPS handheld unit

2.

PLACE OF USE: FISH PROPAGATION

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>	
37N 03W 25									X	X							
									L 15	L 19							

Method of Determination: Field verification and aerial photographs

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>
SW#1		50			01B00260-01A
SW#2		50			01B00260-01B
SW#3		50			01B00260-01C
SW#4		50			01B00261-01

*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>
Magnetic Flowmeter						

2. Measurements:

SW#1 = 1,462 gpm

SW#2 = off

SW#3 = off

SW#4 = 1,950 gpm

Readings were collected from previously installed magnetic flowmeters.

E. FLOW CALCULATIONS

Measured Method: See narrative section

☐ Additional Computation Sheets Attached

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:

See narrative section

G. NARRATIVE/REMARKS/COMMENTS

Hatchery Information: The Nez Perce Tribal Fish Hatchery (NPTH) began fish production in 2002. The hatchery traps, spawns, and raises juvenile fall and spring Chinook salmon to release into the wild to mitigate effects of the Federal Columbia River Hydropower System on naturally-reproducing salmon in the Clearwater River basin.

The hatchery currently has three water right permits associated with the fish production at this facility. One permit allocates 35 cfs of surface water be diverted and 2.9 AF stored from the Clearwater River (86-7371). One permit authorizes 7 cfs of ground water be diverted and 2.9 AF of ground water be stored (86-7372). The hatchery also has a domestic water right with ground water as the source for employee and residential uses, authorizing 0.24 cfs of ground water (86-7373). This memo will focus on the non-domestic permits, as the domestic permit will be licensed separately.

Proof of beneficial use was filed with the department in 2005 for all three permits.

Annual Production: Production records from the facility are available for 2005 and 2011. In 2005, the hatchery raised and released 1,491,336 (27,174 pounds) of Chinook salmon. In 2011, the hatchery raised and released 2,789,857 (52,867 pounds) of Chinook salmon. The difference in the numbers is due to the fact that in 2005 the hatchery was still early in the process of raising salmon. In other words, they had not raised enough fish in the first few years to get a full return of spawning adults for future years. The 2011 numbers represent close to actual current production.

PODs -- Wells: There are currently four wells operating at the hatchery. The production rates of the wells vary based on the well. In addition, the hatchery manager informed me that the production rates have been declining annually on all of the wells. The duration of the flow from each individual well varies based on time of year, water flows in the river, water quality and temperature of the river, and demand for the ground water. At the time of the field exam, flow rates from the individual well (observed through flow meter outputs) were as follows:

Well #1 = 520 gpm

Well#2 = 160 gpm

Well #3 = 585 gpm

Well #4 = 460 gpm

Total = 1,725 gpm

SW Intake Rates: Four surface water intake pumps. Each intake is identical with a 50 Hp motor designed to pump 1,500 gpm. During field exam, two pumps were operating under the following rates:

Pump #4 = 1,950 gpm

Pump #1 = 1,462 gpm

Outdoor Volumes:

Raceways: 8,900 ft³

Rearing Ponds: 38,315 ft³

S Channels: 14,038 ft³

Adult Holding Ponds: 11,092 ft³

Adult trap: 1,600 ft³

Adult ladder: 3,200 ft³

Total Outdoor volume = 77,145 ft³

Indoor Volumes:

Nursery holding tanks = 6,840 ft³

Incubation trays = 994 ft³

Total Indoor Volume = 7,834 ft³

Headtank Volumes:

Headtanks (4 in total – 1 adult, 1 outside rearing, 1 inside, 1 oxygenated)

Adult headtank: 1,640 ft³

Combined Headtank: 2,736 ft³

LHO Headtank: 810 ft³

Main Headtank: 3,045 ft³

Total Headtank Volume: 8,231 ft³

Volume Calculations:

PD: There are four ground water wells and four surface water intakes. Permitted flow rate is 42 cfs. The wells and surface intakes fluctuate annually in terms of rates and duration of flow.

POU: The hatchery complex which includes outdoor raceways and ponds, indoor nursery complex, and an adult trap and ladder complex.

Volume Calculation: At the time of the field exam, only the adult trap, ladder, and holding ponds were in operation. To determine the amount of water beneficially used, I will use the Density Index and Flow Index equations. The known factors are; the weight of the fish raised in 2005 was 27,174 pounds, the volume of the facility is 93,210 ft³, the length of fish released in 5 inches, and the density index ranges from 0.1 – 0.3.

Density Index ($W=D*L*V$)

W = weight in pounds

D = 0.1-0.3 (unitless)

V = 93,210 ft³ (volume of ponds)

L = 5 inches (length of fish)

Flow Index ($F=W/(Q*L)$)

F = 1.5 (unitless)

W = weight in pounds

L = 5 inches (length of fish)

Q = 17 cfs or 7,749 gpm

W = 46,605 – 139,815 pounds of fish

W = 58,118 pounds

The pounds listed above are theoretical amounts if the hatchery is operating at full capacity and the full rate of permitted flow is being beneficially used. However, the hatchery has provided the pounds of fish produced in 2005. To determine the volume needed to raise the reported weight of fish, the Density Index equation is used:

$$27,174 \text{ lbs} = 0.1-0.3 \text{ (range)} * 5 * V$$

$$V = 18,116 \text{ ft}^3 - 54,348 \text{ ft}^3$$

Despite the volume of the hatchery being 93,210 ft³, the volume range necessary for raising the reported weight of fish is 18,116 – 54,348 ft³. To account for the amount of water required to maintain adequate water quality, a water change of 2.5 times per hour was used. The calculations are as follows:

2.5 times per hour is 60 changes a day.

$$60 * 18,116 = (1,086,960 \text{ ft}^3/\text{day} * 365)/43,560 = 9,108 \text{ afa}$$

$$60 * 54,348 = (3,260,880 \text{ ft}^3/\text{day} * 365)/43,560 = 27,324 \text{ afa}$$

The amount of water beneficially used for the amount of fish raised does not exceed 27,324 afa.

Secondary Check:

Annual Volume for fish propagation:

1. Calculate changes per hour:
 $\text{Total flow into facility (cfs)} * 3600 / \text{facility volume (ft}^3\text{)} = \text{changes}$
 $17.2 \text{ cfs} * 3600 / 93,210 = 0.7 \text{ changes}$
2. Calculate annual volume:
 $\text{Facility volume (AF)} * \text{changes} * 8,760 = \text{AFA}$
 $2.1 \text{ AF} * 0.7 * 8,760 = 12,877.2 \text{ AFA}$
3. Calculate volume given by permitted flow:
 $\text{Flow rate (cfs)} * 1.9835 * 365 \text{ days} = \text{AFA}$
 $17.2 \text{ cfs} * 1.9835 * 365 \text{ days} = 12,452.4 \text{ AFA}$

I recommend this permit be licensed with a combined volume limit (ground water PODs and surface water PODs) to 12,542.4 AFA. It should be noted, if production records from 2011 (close to full production of Phase I of the hatchery) were used, the calculations performed above would result in a larger amount of water beneficially used. However, due to the fact that the hatchery submitted the proof of beneficial use paperwork in 2005, we are forced to limit the volume limit to the fish production from that year; the 12,452.4 AFA.

I recommend the maximum flow rate from the surface water intake is 13.4 cfs, determined by taking the designed flow rate (1,500 gpm) for each of the four surface water intakes.

I recommend that the storage component of this water right be dropped, as water is not technically stored on the facility. The dropping of this component will not reduce the recommended volume limit, as the total facility volume was included in the calculations.

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

H. RECOMMENDATIONS**1. Recommended Amounts**

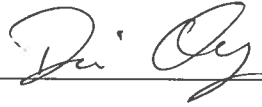
<u>BENEFICIAL USE</u>	<u>PERIOD OF USE</u>	<u>DIVERSION RATE</u>	<u>ANNUAL VOLUME</u>
FISH PROPAGATION	01/01 to 12/31	13.400 CFS	12,452.00 AF
<u>Totals:</u>		13.400 CFS	12,452.00 AF

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 Dennis Owsley  Date 1/3/2013

Reviewer _____ Date _____

Field Exam Photos – 86-7371 -- Photos taken on 8/15/2012 by D. Owsley



Photo #1. Photo of the surface water intake from the Clearwater River.

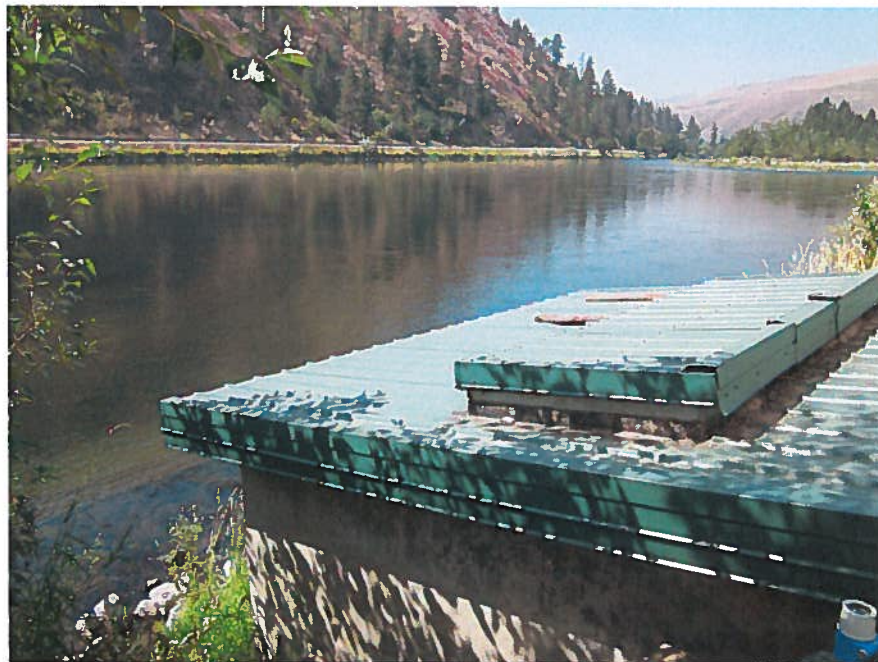


Photo #2. Surface water intake structure housing the surface water intake pumps.

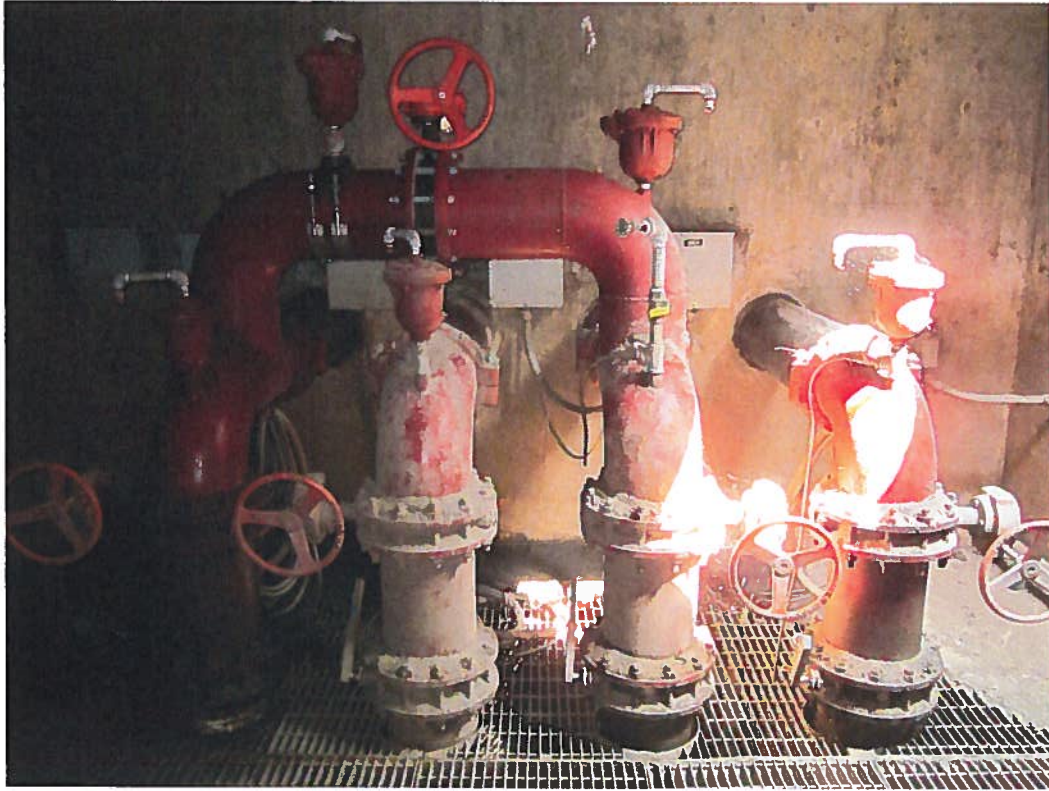


Photo #3. Surface water intake distribution system.



Photo #4. Surface water distribution.



Photo #5. S-Curve raceways.



Photo #6. S-Curve raceways.



Photo #7. Acclimation Pond.



Photo #8. Raceway.



Photo #9. Nursery tanks.



Photo #10. Close-up of nursery tank.



POU

Clearwater River

Surface Water Intake

0 0.05 0.1 0.2 Miles

ALARM POINT
ELECTRICAL



FIGURE 1-4