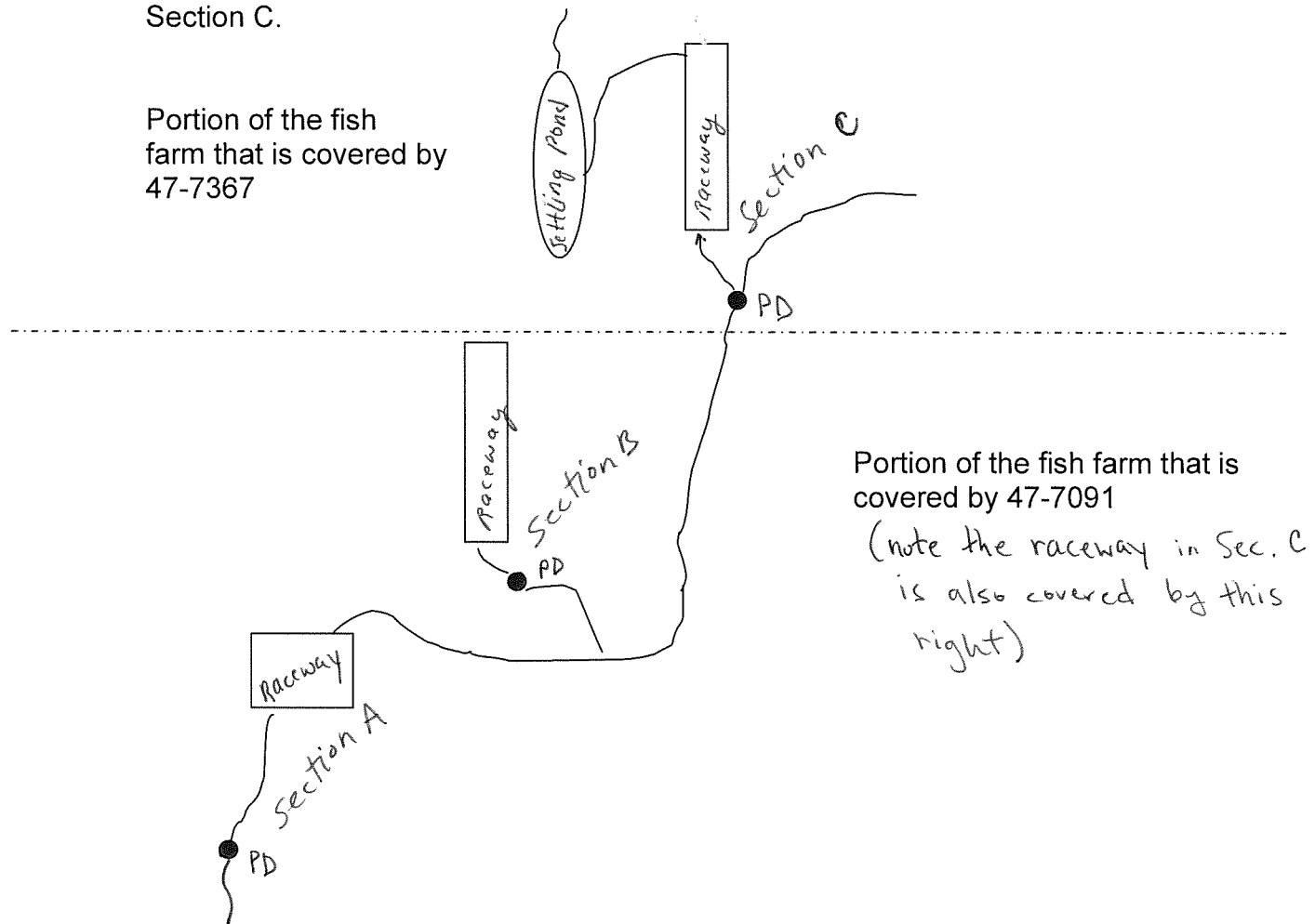


MEMORANDUM

Date: January 24, 2012
To: Water Right File 47-8367
From: cpalmer
Re: Licensing Memo

OVERLAPS: Right 47-7091 was decreed and includes all three raceways that are now located at the fish farm. Right 47-7091 is for 16.5 cfs that is based on a measurement that was made during the field exam at the inlet for Section A. No measurement was made at Section B and a measurement of 9 cfs was made at Section C.

Portion of the fish farm that is covered by 47-7367



Even though right 47-7091 includes all Sections in its' POU, the volume and rate under Section C was not added into the right. Right 47-7367 will be covering the point of diversion, the volume for the raceway in Section C, the settling pond, and the diversion rate of 9 cfs.

PD: The point of diversion was measured at 9 cfs by the field examiner. Even though the field examiner recommended that Section B be included in this right's

POU and PD, the decreed right 47-7091 covered that Section during adjudication staff review.

POU: The place of use consists of the settling pond and the raceway in Section C of the fish farm.

VOLUME CALCULATION: The volume that the field examiner recommended is based on the full volume that is available under 9 cfs. To further pin down a volume, I will evaluate the amount of water that is actually required to achieve beneficial use for the size of the operation. There are a few known factors in this case; the diversion rate is 9 cfs, the volume of the ponds is 25,200 cubic ft., and the other factors that I will use in my calculation will come from industry standards per staff engineer Mat Weaver's analysis in connection with permit 47-7659.

<u>Density Index (W = D x L x V)</u>	<u>Flow Index [F=W/(L x Q)]</u>
W=weight in lbs	F=1.5 unitless
D=range 0.4-1 unitless	W=weight in lbs
V=25,200 cubic ft—size of ponds	L=13.5"—length of fish
L=13.5"—length of fish	Q=4,040 gpm or 9 cfs
W= 136,080-340,200 lbs of fish	W=82,000 lbs

Can rate accommodate the fish in a 25,200ft³ pond?-----> NO, can only accommodate 82,000 lbs of fish.

The limiting factor is the diversion rate

Since I know how many lbs of fish 9 cfs can accommodate, I can back-calculate the density index to figure out how much space (volume) is required to raise 82,000 lbs of fish.

$$82,000 \text{ lbs} = 0.4-1 \text{ (range)} \times 13.5 \times V$$
$$V \text{ range} = 6,075 \text{ cubic ft to } 15,185 \text{ cubic ft}$$

Despite the size of the raceways being 25,200 cubic ft, the volume range that is necessary for the amount of fish that they can raise is 6,075 – 15,185 cubic ft. To further calculate how much water is beneficially used in the fish raceways, I calculated how much water is required to keep up the water quality. A water change of 2.5 times per hour is required to maintain adequate oxygen for trout. Using that rule of thumb, I reach the following conclusion:

$$2.5 \text{ times per hour is } 60 \text{ changes in a day.}$$
$$60 \times 6,075 = (364,500 \text{ cubic ft/day} \times 365)/43,560 = 3,050 \text{ afa}$$
$$60 \times 15,185 = (911,100 \text{ cubic ft/day} \times 365)/43,560 = 7,634 \text{ afa}$$

The amount of water beneficial used for the subject fish propagation operation does not exceed 7,634 afa.

Secondary Check

Annual Volume for Fish Propagation

1. Calculate changes per hour:

Total flow into facility x 3600/facility volume (cf) = changes

2. Calculate annual volume:

Facility volume (AF) x changes x 8760 = AFA

3. Calculate volume given by permitted flow:

Flow rate (cfs) x 1.9835 x 365 days = AFA

1. $9 \text{ cfs} \times 3600 / 15,185 \text{ cf} = 2.1 \text{ changes}$

2. $0.35 \text{ AF} \times 2.1 \times 8760 = 6,413 \text{ AFA}$

3. $9 \text{ cfs} \times 1.9835 \times 365 \text{ days} = 6,515 \text{ AFA}$

4. Choose the lowest figure

Recommendation: 6,413 AFA (this is within the range in the beneficial use calculation and is justifiable. I added in the settling pond into this right since it is part of the system. The settling pond is 0.16 acre in size and is only 4 ft deep according to the applicant. Those measurements yield a volume just under 1 af so I will round up the overall volume to 6,414 afa.

CONDITIONS: The right holder is required to maintain measuring devices at the inlet and outlet for the POU. There is a 3' rectangular weir at the inlet and, based on the photos taken by the field examiner, there is a point on the outlet of the settling pond where a measurement can be taken. This condition has been satisfied. There is an agreement with the Twin Falls Canal Company and has been recorded by the county on February 23, 1978 as instrument 731256. I will add a condition to the license that recognizes this agreement.

NO POWER USE DEVELOPED—NOT DESCRIBED IN THE FIELD EXAM.

No Amendment Necessary