

MEMORANDUM

TO: File 85-7659

FROM: Daniel Nelson – Staff Hydrologist

DATE: June 16, 2014

SUBJECT: Review of System for Licensing

Sandy Hemenway performed the field exam on this permit and was unable to complete the field report due to retirement. Sandy properly located the point of diversion and place of use for this permit, but was unable to determine the flow rates needed to complete the report. I re-visited the site while working on other water rights in the area and retrieved enough information to complete the field exam.

This permit uses Lapwai Creek and ground water to supply water to two 0.6 af fish ponds used to acclimate salmon before releasing them into Lapawai Creek. This permit is for the Lapawai Creek water system, which I have determined can divert up to 5.69 cfs. I was unable to see the system while it was operating, but the system was designed to divert 850 gpm from three pumps, so a theoretical calculation was easy to determine. The permit is limited to 5.10 cfs, so I am recommending a diversion rate from the Lapawai Creek water system of 5.10 cfs.

According to manage of the fish hatchery, these ponds are only used between mid-April and May 31. The actual days may change from year to year, but they facility is only used in the spring. The fish are kept in this facility for 43 days to allow them acclimate to the creek water. Sometimes the creek water gets too warm, and they need to release them early, but they try to keep them in the facility for the full 43 days if possible. The permit has two separate seasons, but there is only one season used. I am recommending a season from April 1 to June 15 to allow some room for changes in the schedule for this facility.

This permit should be recommended as follows:

Fish propagation – 5.10 cfs and 434.4 af ($5.10 \text{ cfs} \times 1.9835 \times 43 \text{ days} - 0.6 \text{ storage} = 434.4 \text{ af}$)
Fish propagation storage – 0.6 af
Diversion to storage = 5.10 cfs.

Sandy Hemenway created all of the shape files for this permit, so the only real need was to determine the flow rates for this permit. I performed a fish facility analysis on this system, and discovered that they are actually diverting less water than would normally be diverted for a fish rearing facility. Therefore, I feel the diversion rates are reasonable.

There is a backup pump that only pumps water when the natural flow cannot be diverted through the screens. There are two pumps they are listed below

Backup pump #1 –

WEGW21 – 25 Hp Motor – Model # 02518EP3E285T – Pump – Goodwin – Searial # 0127989-2

Backup pump #2 –

WEGW21 – 25 Hp Motor – Model # 02518EP3E285T – Pump – Goodwin – Searial # 0231261-3

The backup pumps can pump up to 4.74 cfs

THEORETICAL HORSEPOWER EQUATION WORKSHEET (cjh 1/92)

Water Right No.: 85-7659
 Reviewer: Dan Nelson
 Date of Review: 5/28/2014

P/D No.:	Senerio 1	Senerio 2	Senerio 3
PUMP HORSEPOWER	20	20	20
BOOSTER HORSEPOWER	0	0	0
PUMPING LEVEL	10	10	10
DISCHARGE PRESSURE	23.8	23.8	23.8
RATE OF FLOW (cfs)	1.90	1.90	1.90
	851	851	851
			5.69
			2552.81

The above calculates the formula =

$$Q = \frac{8.8 * (\text{Efficiency}) * \text{hp}}{\text{depth to water} + 2.31 * (\text{psi}) + \text{friction}}$$

Assumptions: %70 efficiency.
 No Friction

Examiners Notes:

There are 3 pumps on the river diversion. Each pump is a 20 Hp pump, that lifts water from a fault. The lift is approximately 10 feet. The water is then diverted up to a mixing house that is approximately 25 to 30 feet in elevation difference from the pumping station. There is an additional 20 feet of headed needed to push the water out of the pipeline. I estimated that total dynamic head at 65 feet. This falls in line with the pump ratings for this site. The pumps are rated for 850 gpm per pump according to the fish hatchery manager.

Fish Propagation Worksheet

Determination of Density Index = Weight of Fish Produced in pounds/ (Fish length in inches X Facility Volume in ft³)		
Fish Weight	10,000.00	
Length	3.00	
Volume	26,136.00	
Density Index	0.13	
Under Ideal Conditions, Density Index should be between 0.4 and 1		

Determination of facility exchange = Diversion Rate in cfs X 3600/ Facility Volume in ft³		
Diversion Rate	6.50	
Facility Volume	26,136.00	
Exchanges per Hour	0.90	
Under Ideal Conditions, Exchanges per Day should be 2.5 for Trout.		

Diversion Capacity Calculation = Diversion Rate in cfs X 1.9835 X 43 days		
Diversion Rate	6.5	
Total Volume	554.4	

Determination of Flow Index = Weight in Pounds/ (Fish Length X Diversion Rate in gpm).		
Fish Weight	10,000.00	
Length	3.00	
Diversion Rate	2,917.20	
Flow Index	1.14	
Under Ideal Conditions, Flow Index should be between 0.83 and 2.7		

Adjusted Density Index if the Facility was a Standard Facility is as follows: Adjusted Density Index = (Actual Density Index X Standard Exchange of 2.5 per Hour)/ Actual Exchanges per Hours=.		
Actual Density Index	0.13	
Actual Exchanges Per Hour	0.90	
Adjusted Density Index	0.36	
If the Adjusted Density Index is between 0.4 and 1 then the density Index was Lowered to handle a lower diversion rate, so the annual volume should equal diversion capacity.		

<---- Use This Volume if Adjusted Density Index falls Within
Standards.

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 Reviewer: Dan Nelson
 Date of Review: 5/28/2014

P/D No.:	Senerio 1	Senerio 2	
PUMP HORSEPOWER	25	25	
BOOSTER HORSEPOWER	0	0	
PUMPING LEVEL	10	10	
DISCHARGE PRESSURE	23.8	23.8	
RATE OF FLOW (cfs)	2.37	2.37	4.74
	1064	1064	2127.34

The above calculates the formula =
$$Q = \frac{8.8 * (\text{Efficiency}) * \text{hp}}{\text{depth to water} + 2.31 * (\text{psi}) + \text{friction}}$$

Assumptions: %70 efficiency.
 No Friction

Examiners Notes:

There are 3 pumps on the river diversion. Each pump is a 20 Hp pump, that lifts water from a fault. The lift is approximately 10 feet. The water is then diverted up to a mixing house that is approximately 25 to 30 feet in elevation difference from the pumping station. There is an additional 20 feet of headed needed to push the water out of the pipeline. I estimated that total dynamic head at 65 feet. This falls in line with the pump ratings for this site. The pumps are rated for 850 gpm per pump according to the fish hatchery manager.