Best Management Practices Plan
Hagerman National Fish Hatchery

January 2010

NPDES Permit Number IDG130004

Facility Manager: Bryan Kenworthy, 208-837-4896

Goal: To describe the standard operating procedures and best management practices used to minimize, collect, and dispose of pollutants generated during facility operations.

A. Description of Facility

The Hagerman National Fish Hatchery (NFH) is an aquaculture facility that produces approximately 311,000 lbs of steelhead and 20,000 lbs of rainbow trout annually. This facility uses 66, 10x100' raceways for steelhead rearing (which are arranged in three banks of 22 raceways for serial reuse) and 12 8x70' raceways for rainbow trout rearing. There are 60 nursery tanks for fry rearing. Cleaning effluent is directed to a pair of parallel Off-Line Settling Basins (OLSB). Non-cleaning effluent exits the facility at a number of points (see facility diagram). The Hatchery is located near Hagerman, Idaho (T85, R14E, Sec06).

B. Water Source

The Hagerman NFH uses water emanating from nearby springs with TSS levels generally less than 2.0 mg/L. Open spring channels are generally cleaned twice a year to remove aquatic vegetation. Trash rack screens are located on Main Spring, Bickel Lake, and Riley Lake and are cleaned at least daily to prevent vegetation from affecting water flow. The springs provide a water supply at a constant temperature of 59^0 F.

C. Treatment Systems Used

1. Raceways

At the downstream end of each raceway is a 3 foot quiescent zone (QZ). Each QZ has a standpipe covering a passage leading to the OLSB system. Raceways and / or QZs are normally cleaned one to two times per week, depending on fish loads and feeding rates. Raceway cleaning is conducted to minimize disturbance and subsequent discharge of accumulated solids:

a. Cleaning is conducted manually with stainless steel and nylon pool brushes or pond vacuum system. All water during cleaning is diverted to the OLSB via the standpipe drain. The maximum number of raceways that may be diverted to the OLSB system is 12 raceways at 1000 gpm, 6 raceways at 2000 gpm, and 4 raceways at 3000 gpm. Raceways generally have 1350 gpm of flow during peak production from November to April. See example calculation:

To calculate the allowable flow rate for the OLSB, the following formula is used (Idaho Waste Management Guideline for Aquaculture Operations):

$Q = AV$

Q = Volume of flow per unit of time, ft^3 / s.

A = Surface area

V = Settling velocity.

The total surface area of the OLSB, for both cells in operation, is 22,816 ft^2 (248 ft x 46 ft for each cell). Settling velocity for lighter particles must be < 0.0015 ft / sec.

Given the above,

Q = 22,816 ft^2 x 0.0015 ft / sec = 34.22 ft^3 / s

This number is reduced by 25 % for real- world conditions: 25.66 ft^3 / s (11,506.7 gpm). Given the allowable flow rate for the OLSB, the maximum number of raceways that can be cleaned at once should be calculated for the raceway water flow rate.

Avg. gpm / raceway	**Max. number of raceways to clean simultaneously**
1,000	12
2,000	6
3,000	4

The above figures only reflect what we believe the OLSB system can handle. It would be highly unusual for our personnel to clean twelve raceways (1,000 gpm each) simultaneously because that would likely create problems with oxygen debt for the fish in the bottom deck of raceways. As a general rule, no more than 4 raceways are directed to the OLSB at one time.

b. After cleaning a raceway and before re-installing the full standpipe, any remaining solid waste is directed to the OLSB. This is accomplished by either of the following procedures:
    i. A short standpipe is used to direct any residual solid waste in the quiescent zone to the OLSB. Do not re-install the full standpipe until these solids have exited the quiescent zone through the pipe leading to the off-line settling basin.
    ii. Replace the full standpipe and allow the raceway to partially refill. Then go back and remove the standpipe, flush out the solid waste, and replace the full standpipe.

c. Pressure wash raceway screens on screen washing pad (constructed July 2008) by the Trout Raceways which divert solids to OLSB.

d. End-of-season headbox and tailrace maintenance:

    i. Top deck headbox: After distribution is complete and all the top deck ponds have been scrubbed, the headbox is cleaned in a manner that does

not allow sediment to escape to Riley Creek.

(1) Remove headbox damboards from a couple of raceways to evacuate as much water as possible from the headbox.
(2) Install sump and pump system.
(3) Pump sediment and water into OLSB via raceway standpipe or land apply in pasture area across the road to avoid sediment deposition in OLSB conveyance pipe.

ii. Bottom deck tailrace: After all the raceways have been cleaned at the end of the season, the bottom deck tailrace is cleaned in a manner that does not allow waste water to escape to Riley Creek.

(1) Ensure damboards at the downstream end of the tailrace (by R81) are high enough to contain tailrace water. Add boards if necessary.
(2) Shunt as much material as possible into the OLSB system via the raceway standpipes of 81-84.
(3) Place trash pump intake in the downstream end of the tailrace (at the lowest elevation point possible).
(4) Place the pump=s effluent hose inside a raceway standpipe to direct the effluent to the OLSB. Start the pump.
(5) Use a pond scraper to clean the tailrace beginning from below R102 and working towards R81.
(6) Check the intake hose frequently for clogging caused by algae.

2. Hatchery Buildings

There are 60 tanks available for fish rearing in two hatchery buildings.

a. Hatchery 1: Hatchery 1 was completed in December 2001 and houses 40 fish rearing tanks with dual effluent ports.

i. The port on the left (looking towards the head end of the tank) holds a short standpipe through which effluent passes during normal operations. This effluent flows directly into Riley Creek.
ii. The port on the right holds a tall standpipe. This tall standpipe is removed during daily tank cleaning, directing cleaning effluents to the OLSB system.
iii. A self-cleaning pipe (a manifold running parallel to the length of the tank through which influent water passes) can be installed in each tank to minimize accumulation of solid waste at the upper end of the tank.

b. Hatchery 2: All effluent from Hatchery 2 is passed through the OLSB system when fish are present in these tanks. Self-cleaning pipes are installed after the

fish have transitioned to post-starter feeds, allowing the continuous removal of solid waste.

D. Other Information

Water inflow measurements are taken on a weekly basis as legal documentation of water rights and for practical purposes. The measurements involve readings from staff gages, weirs, flumes, and various flow meters at 17 sites and converting them to GPM, CFS, and Acre Feet via an Excel spreadsheet. Weirs and flumes are brushed as needed to control weed growth and maintain accuracy. Water measuring sites are described in Hatchery files and on the Standard Operating Procedures intranet website.

Live fish are prevented from entering raceway quiescent zones and the OLSB. This is accomplished by utilizing screens on intakes and discharges. Screens are cleaned daily and nightly to prevent clogging and potential overflow. Any fish that escape to quiescent zones or the OLSB are removed as soon as practicable.

All drug and pesticide use is done according to label directions. Any INAD and extra-label use must be prescribed by a qualified veterinarian from the Idaho Fish Health Center or equivalent. If copper is used, it is limited to one raceway at a time.

Chlorine used for disinfection of tanks, hauling trucks, and marking trailers is treated with Sodium thiosulfate for neutralization before discharge to receiving waters. Standard Operating Procedures prescribe 200 ppm of chlorine for 30 minutes for disinfection. Sodium thiosulfate is added at 5.67 grams per gallon of 200 ppm solution to neutralize the chlorine after 30 minutes.

E. Solids Control

1. Feeding

The Hagerman NFH annually feeds approximately 335,000 lbs of fish food with an overall conversion of 1.0 to 1.2. Feed composition charts are attached, and include information on feeds supplied by our current sources, Rangen and Silver Cup. The specific feeds used are highlighted. Frequency of hand feeding tanks and raceways is dependent upon fish size, and can range from as low as once per day (larger fingerlings) to as high as twelve times per day (first feeding fry). In both the Trout and Steelhead Raceways, two demand feeders per raceway are used when the fish have attained a size large enough to consume a 3.5 mm pellet. Demand feeders are supplied with automated cable-vey systems on each raceway deck. Feeding is conducted to minimize the discharge of unconsumed feed from the rearing units:

a. When hand feeding raceways (using floating feed), minimal feeding occurs below the lowest demand feeder to prevent the discharge of uneaten feed from the raceway.
b. When changing feed size, and when feeding behavior becomes aggressive, demand feeders are adjusted to minimize excessive release of feed.
c. Feeding fish in the hatchery tanks is done to minimize feed waste. Because 100% of

the effluent from Hatchery 2 is directed to the OLSB, the escape of excess feed particles to Riley Creek from tank feeding operations is less of an issue there. However, Hatchery 1 effluent is normally directly released into Riley Creek, with only cleaning effluents being directed to the OLSB system. Therefore, care is taken to avoid feeding too close to the tailscreens, to minimize loss of feed particles to Riley Creek.

d. Feed is purchased from reputable feed manufacturers that employ good manufacturing practices to avoid contaminants such as PCB's.

2. OLSB System

As stated above, we estimate that the OLSB system can handle a flow of approximately 11,507 gpm. Wastewater enters the ponds from a single gravity flow pipe that splits to supply each pond. Water spills over the downstream end of the ponds into a channel which is connected to Riley Creek by a pipe. Flows are measured on Permit sampling days with a flow meter (sensor installed in the pipe leading to Riley Creek).

After all steelhead have been outplanted, one pond is taken out of service for harvest of accumulated biosolids. A floating pump platform is used to pump the water from the first pond into the head end of the other pond (which is still in use). It is best to do this when the weather is hot so it dries quickly. Slow drying time can result in the sediment becoming foul. The dried sludge is collected and stored in an area on the northwest end of the Hatchery property. The dried sludge is then composted with leaf and grass clipping material before eventual land application. The amount of sludge removed is documented in the sampling log book and reported in the Annual Report of Operations Log. All procedures are done within accordance with IDAPA 58.01.02, Department of Environmental Quality, Water Quality Standards.

Frequency for cleaning OLSB: Page 32 of Idaho Waste Management Guidelines for Aquaculture Operations recommends Aminimum harvest frequency for OLS ponds should be every six months.@ However, just prior to this statement, the authors say that OLS ponds are typically 3.5 feet deep, although many are deeper. They go on to say that depth is not required for settling efficiency, but is required to provide storage for solids; A3.5 feet provides adequate storage for OLS ponds in which solids are removed monthly.@ Since the OLSB cells at Hagerman National Fish Hatchery are 6 feet deep, and our cleaning effluent is much more dilute than that of many commercial operations, we will clean our OLSB cells *at least* once every two years (one cell will be cleaned in odd numbered years, the other in even numbered years, if not more frequently).

OLSB skimmers at the tail ends are maintained to prevent overflow or bypass of floating, suspended, or submerged matter.

3. Mortality

Mortality from both the hatchery buildings and the raceways is recorded and normally sent to the OLSB system for disposal. During disease outbreaks in which there is high mortality, the carcasses are buried in two mort pits at the southwest side (April 2008) of the hatchery property. The mort pits are 10 feet deep and above the water table and are buried with 3 feet of earth after they are filled. The mort pits are in compliance with Idaho Code IDAPA 02.04.17 and are located:

a. At least 100 yards from any wells, surface water intake structures, and public or private drinking water supply lakes or springs
b. At least 100 yards from any existing residences;
c. At least 50 feet from property lines;
d. At least 100 feet from public roadways;
e. At least 200 feet from any body of surface water such as a river, stream, lake, pond, intermittent stream, or sinkhole;
f. Not located in low-lying areas subject to flooding, or in areas with a high water table where the seasonal high water level may contact the burial pit.

F. Material Storage

1. Chemical Storage

All drugs, disinfectants, and chemicals used at the Hagerman NFH are used and stored according to label directions.

a. Procedures described in Spill Prevention, Control, and Countermeasure plan are followed for storing disinfectant or other chemicals and petroleum products.
b. Material Safety Data Sheets (MSDS) are kept in three ring binders in the Hatchery 1 lab/office and Shop Building.
c. All drugs and chemicals are properly stored on the containment pallet in the Chiller Building to prevent spills that may result in discharge to waters of the United States.
d. Any spilled materials are contained, cleaned, and disposed of using the spill containment kit in the Chiller Building according to the Spill Prevention, Control, and Countermeasure plan. Any spills that result in accidental discharges to Riley Creek are reported within 24 hours to EPA, 206-553-1846, and if the spill endangers listed Snake River snail Species, to the USFWS, 208-378-5243.

2. Feed Storage

a. Bulk feeds are stored in cable-vey bins located near the raceways or in the bins near the shop and inside the feed truck.
b. Bagged feeds are stored in the cool room of the Hatchery 1 building and in the dry storage area of the Hatchery 2 building.
c. We use the Afirst in / first out@ rule for feed storage and use.

G. Maintenance

The Hatchery regularly inspects fish culture units daily during fish culture activities and nightly during routine security inspections. Inspections include cleaning screen intakes to prevent overflowing the facility. Demand feeders are adjusted as necessary to ensure proper feed delivery and maximize FCRs. In addition:

a. Raceways, tanks, and OLSBs are inspected annually for damage.

b. Raceways, tanks, and OLSBs are regularly maintained to ensure their proper function. This includes annual resetting of damboards and routine damboard replacement as needed.

c. Maintenance activities do not use paint or caulk manufactured before the banned manufacture of PCB's in 1977.

H. Record Keeping

a. Maintain records for aquatic animal rearing units documenting fed amounts and number and weight of aquatic animals.

The Hatchery maintains production records of fish feed on a daily basis. In addition, estimates of number and weight of fish are recorded monthly. Records are available upon request to the Hatchery Manager.

b. Keep records documenting the frequency of cleaning and maintenance.

Cleaning frequency is recorded on daily mortality sheets. Cleaning is designated by circling the raceways that have been cleaned on the day. Any maintenance or other notes are also recorded on the daily mortality records.

c. Record data collection for DMR reports.

Data collection for DMR reports is recorded in the EPA sample log book. All waste removed from OLSBs is also recorded in this log book. The log book is available for review upon request.

d. Remain in compliance with IDAPA 13.01.10.100.

Secure permits for importation and transportation of live fish or non-native fish from the Idaho Department of Fish and Game.

I. Training Requirements

a. Train personnel in spill prevention and response.

Personnel are trained on spill prevention and response according to the Spill Prevention, Control, and Countermeasure plan. This plan is accessible to all employees and is available for review.

b. Train personnel on proper operation and cleaning of rearing units and OLSB ponds and feeding procedures.

All new personnel are trained to follow the Standard Operating Procedures regarding raceway cleaning and feeding procedures. Employees involved with OLSB pond cleanout have additional Standard Operating Procedures to follow.

c. Train personnel on BMP plan implementation.

All personnel review the current BMP plan and are expected to follow its guidelines.

J. Diagram or Map

A diagram/map of the facility is attached to this BMP plan to illustrate the layout of the operation.

K. Review and Endorsement of the BMP Plan

Certification of Completion and Implementation
of the Best Management Practices Plan

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This BMP plan has been written, reviewed and is being implemented at the Hagerman National Fish Hatchery. The BMP plan is available to employees and IDEQ and EPA upon request.

We, the Hatchery Manager and the individuals responsible for implementing the BMP plan, have reviewed and endorsed this BMP plan.

_____		_____	
Bryan Kenworthy Project Leader	Date	Brian Clifford Motor Vehicle Operator	Date
_____		_____	
Nathan Wiese Assistant Project Leader	Date	Eric Willet Motor Vehicle Operator	Date
_____		_____	
Jeremy Trimpey Fish Biologist	Date	Adam Leija Animal Caretaker	Date
_____		_____	
Andy Eiman Animal Caretaker	Date	Miles Mullenix College of Southern Idaho Intern	Date

BMP Plan Draft Dates:

developed	August 2000	sixth modification	January 2007
first modification	November 2000	seventh modification	December 2007
second modification	February 2003	eighth modification	January 2009
third modification	January 2004	ninth modification	January 2010
fourth modification	January 2005		
fifth modification	July 2006		