CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER NO. R5-2004-0120

NPDES NO. CA0080055

WASTE DISCHARGE REQUIREMENTS FOR STATE OF CALIFORNIA DEPARTMENT OF FISH AND GAME AND MERCED IRRIGATION DISTRICT MERCED RIVER FISH HATCHERY MERCED COUNTY

The California Regional Water Quality Control Board, Central Valley Region, (hereafter Regional Board) finds that:

1. The State of California, Department of Fish and Game (DFG) and the Merced Irrigation District (MID) submitted a Report of Waste Discharge dated 28 January 2002 and applied for a renewal of its permit to discharge under the National Pollutant Discharge Elimination System (NPDES) from the Merced River Fish Hatchery (Facility). The MID, which owns the property, and the DFG, which owns the site improvements and operates the hatchery, a cold-water, flow-through hatchery, are hereafter jointly referred to as the Discharger.

2. The discharge of treated flow-through process wastewater to the Merced River was previously regulated by Waste Discharge Requirements (WDRs) Order No. 96-163 (NPDES No. CA0080055), adopted by the Regional Board on 21 June 1996.

3. The hatchery is approximately 4 miles east of Snelling in Section 7, Township 5 South, Range 15 East, MDB&M, as shown on Attachment A, a part of this Order. Facilities consist of an office and maintenance building, one hatchery building, two 500 foot-long concrete raceways, one spawning channel, a spawning building, an ultraviolet treatment building, one freezer building, a full-flow settling basin, two outfalls, and a fish ladder. The hatchery discharges treated wastewater to the Merced River, a water of the United States, between McSwain Reservoir and the San Joaquin River.

4. The United States Environmental Protection Agency (USEPA) and the Regional Board have classified this discharge as a minor discharge.

5. The hatchery rears Chinook Salmon from eggs to fingerlings and yearling size for release to the Merced River. In Report of Waste Discharge the Discharger reports annual production of 18,000 pounds from its smolt program and 100,000 pounds from its smolt/yearling program. During September, the month of maximum feeding, 22,000 pounds of food are used to feed the fish.

6. The Discharger receives raw water from the Merced River at the Crocker-Hoffman Dam. Water is diverted through a 24-inch pipe at the Crocker-Hoffman Diversion Dam and conveyed to the hatchery. Under MID's Federal Energy Regulatory Commission (FERC) license, the minimum release through the diversion dam to the Merced River is 15 cubic feet per second (cfs) or 9.7 million gallons per day (mgd). Due to the downstream location of MID's gauging station, the discharge from the fish hatchery is included as part of the recorded flows.

7. As reported in Report of Waste Discharge, average and maximum daily flows through the raceway portion of the hatchery are 5.1 and 5.2 million gallons per day (mgd), respectively; and average and maximum daily flows through the hatchery/nursery portions of the facility are 0.6 and 0.7 mgd, respectively. A maximum of 7.8 mgd of treated flow-through process wastewater may be discharged during hatchery operations.

8. A settling basin with a capacity of 561,000 gallons treats the full flow of the facility before discharging via an overflow control gate through Outfall No. 001 to the Merced River. At a flow of 5.7 mgd, retention time in the settling basin is approximately 2.4 hours. When fish are being released directly to the Merced River, discharge from the raceways is through Outfall No. 002. The settling basin is constructed in permeable gravels, which also allow the discharge of wastewater through the pond embankments to shallow groundwater adjacent to the Merced River. During the first eight months of 2003, the daily average discharge to the Merced River through the control gate was reported as 4.22 mgd, meaning that approximately 1.5 mgd or 26 percent of the total reported flow through the Facility likely percolates into shallow groundwater adjacent to the river. A flow schematic of the facility is shown in Attachment B, a part of this Order.

9. Wastewater is discharged from the hatchery at two outfalls as described below.

   Outfall 001 – All flow from the hatchery incubators, tanks, and raceways enter the settling basin, from which wastewater is discharged to the Merced River by overflowing to the river or percolating/seeping into shallow groundwater adjacent to the river. The outfall is in Section 7, T 5 S, R 15 E, MDB&M at latitude 37° 30’ 55” North and longitude 120° 22’ 20” West. Discharges typically occur for nine months of the year between November and July.

   Outfall 002 - Water is occasionally discharged directly from either of the two 500-foot raceways, bypassing the settling basin, when fish are released to the Merced River. This discharge may contain fecal material and unconsumed fish food. During the fall salmon spawning season live trout are returned to the Merced River in this manner; however, salmon die during the spawning process, and fish spawning wastes such as fish eggs, fish blood, and small portions of fish carcasses can potentially be discharged to the Merced River. This outfall is in Section 7, T 5 S, R 15 E, MDB&M

at latitude 37° 30' 58" North and longitude 120° 22' 23" West.

10. According to monthly self-monitoring reports between February 1999 and August 2003 influent water quality has the following characteristics.

Constituent	Units	Range
Temperature	°C	9.0 – 14.5
Total Suspended Solids (TSS)	mg/L	< 1.0 – 6.4
PH	Standard units	6.3 – 8.1
Conductivity	µmhos/cm	30 – 65
Turbidity	NTUs	0.4 – 9.5

11. Based on data from monthly self-monitoring reports between February 1999 and August 2003, the following effluent characteristics describe the discharge from Outfall 001:

Constituent	Units	Min	Max	Avg
BOD	mg/L	< 2.0	2.6	< 2.0
TSS	mg/L	< 1.0	5.3	1.6
Settleable Solids	ml/L	< 0.1	< 0.1	< 0.1
Conductivity	µmhos/cm	31	65	50
Turbidity	NTUs	0.5	7.7	1.8

12. Wastes generated at the Facility include fish fecal material, unconsumed fish food, nutrients, algae, silt, chemicals, and therapeutic agents used to treat fish and control disease.

13. Aquaculture drugs and chemicals are used at the Facility to treat fish directly for parasites, fungi, and bacteria, as well as to clean rearing raceways in order to reduce the spread of disease among the confined fish population. Drugs and chemicals currently used, used in the past, or proposed for future use at the Facility include: copper sulfate, formalin (as a 37% formaldehyde, methanol-free solution), sodium chloride (salt), potassium permanganate, hydrogen peroxide, acetic acid, PVP iodine, Tricane methanesulfonate (MS-222), carbon dioxide, and antibiotics such as oxytetracycline (Terramycin®) and florfenicol as feed additives and penicillin G and oxytetracycline as immersive bath treatments during periods of disease outbreak. The Facility uses alternate means of disposal for solutions containing PVP iodine, MS-222, and carbon dioxide; therefore these constituents currently are not discharged in the Facility's effluent.

14. The Discharger confirmed in communication with the Regional Board, dated 23 April 2004, the potential use of the following additional aquaculture drugs and chemicals in the future: chloramine-T, Aqui-S®, Romet-30® (sulfadimethoxine-ormetoprim), erythromycin, amoxycillin, sodium bicarbonate, vibrio vaccine, and enteric redmouth bacertin.

15. Merced County regulates the discharge of the domestic wastewater from the office and hatchery buildings to an on-site septic tank/leach field system.

APPLICABLE LAWS, REGULATIONS, POLICIES, AND PLANS

16. A cold-water concentrated aquatic animal production (CAAP) facility is defined in Title 40 of the Code of Federal Regulations (40 CFR 122.24) as a fish hatchery, fish farm, or other facility which contains, grows, or holds cold-water fish species or other cold water aquatic animals including, but not limited to, the Salmonidae family of fish (e.g. trout and salmon) in ponds, raceways, or other similar structures. In addition, the facility must discharge at least 30 calendar days per year, produce at least 20,000 pounds harvest weight (9,090 kilograms) of aquatic animals per year, and feed at least 5,000 pounds (2,272 kilograms) of food during the calendar month of maximum feeding. A facility that does not meet the above criteria may also be designated a cold water CAAP facility upon a determination that the facility is a significant contributor of pollution to waters of the United States [40 CFR 122.24(c)]. Cold-water, flow-through CAAP facilities are designed to allow the continuous flow of fresh water through tanks and raceways used to produce aquatic animals (typically cold-water fish species). Flows from CAAP facilities ultimately are discharged to waters of the United States and of the State. 40 CFR 122.24 specifies that CAAP facilities are point sources subject to the National Pollutant Discharge Elimination System (NPDES) program. The Discharger's facility meets the definition of a cold-water, flow-through CAAP.

17. The operation of CAAP facilities may introduce a variety of pollutants into receiving waters. USEPA identifies three classes of pollutants: (1) conventional pollutants (i.e., total suspended solids (TSS), oil and grease (O&G), biochemical oxygen demand (BOD), fecal coliforms, and pH); (2) toxic pollutants (e.g., metals such as copper, lead, nickel, and zinc and other toxic pollutants; and (3) non-conventional pollutants (e.g., ammonia-N, Formalin, and phosphorus). Some of the most significant pollutants discharged from CAAP facilities are solids from uneaten feed and fish feces that settle to the bottom of the raceways. Both of these types of solids are primarily composed of organic matter including BOD, organic nitrogen, and organic phosphorus.

18. Fish raised in CAAP facilities may become vulnerable to disease and parasite infestations. Various aquaculture drugs and chemicals are used periodically at CAAP facilities to ensure the health and productivity of the confined fish population, as well as to maintain production efficiency. Aquaculture drugs and chemicals are used to clean raceways and to treat fish for parasites, fungal growths and bacterial infections. Aquaculture drugs and chemicals are sometimes used to anesthetize fish prior to spawning or "tagging" processes. As a result of these operations and practices, drugs and chemicals may be present in discharges to waters of the United States or waters of the State.

19. In August 2004, USEPA promulgated Effluent Limitation Guidelines and New Source Performance Standards for the Concentrated Aquatic Animal Production Point Source Category (hereafter "ELG"). The ELG regulation establishes national technology-based effluent discharge requirements for flow-through and recirculating systems and for net pens based on Best Practicable Control Technology Currently Available (BPT); Best Control Technology for Conventional Pollutants (BCT); Best Available Technology Economically Achievable (BAT); and New Source Performance Standards (NSPS). In its proposed rule, published on 12 September 2002, USEPA proposed to establish numeric limitations for a single constituent – total suspended solids (TSS) – while controlling the discharge of other constituents through narrative requirements. In the final rule, however, USEPA determined that, for a nationally applicable regulation, it would be more appropriate to promulgate qualitative TSS limitations in the form of solids control best management practices (BMP) requirements. Furthermore, the final ELG does not include numeric effluent limitations for non-conventional and toxic constituents, such as aquaculture drugs and chemicals, but also relies on narrative limitations to address these constituents.

20. The Regional Board adopted a *Water Quality Control Plan*, *Fourth Edition, for the Sacramento and San Joaquin River Basins* (hereafter Basin Plan). The Basin Plan designates beneficial uses, establishes water quality objectives, and describes an implementation program and policies to achieve water quality objectives for all waters of the Basin. This includes plans and policies adopted by the State Water Resources Control Board (SWRCB) and incorporated by reference, such as Resolution No. 68-16, "Statement of Policy with Respect to Maintaining High Quality of Waters in California" (Resolution No. 68-16). These requirements implement the Basin Plan. The Basin Plans, as amended, designate beneficial uses, establish water quality objectives, and contain implementation plans and policies for waters of the Basins. Pursuant to the California Water Code §13263(a), waste discharge requirements must implement the Basin Plans.

21. USEPA adopted the *National Toxics Rule* (NTR) on 22 December 1992, which was amended on 4 May 1995 and 9 November 1999, and the *California Toxics Rule* (CTR) on 18 May 2000, which was amended on 13 February 2001. These Rules contain water quality standards applicable to this discharge. The SWRCB adopted the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (known as the State Implementation Policy or SIP) on 2 March 2000, which contains policies and procedures for implementation of the NTR and the CTR.

22. Resolution No. 68-16 requires the Regional Board, in regulating discharges of waste, to maintain high quality waters of the State until it is demonstrated that any change in water quality will be consistent with the maximum benefit to the people of the State, will not unreasonably affect beneficial uses, and will not result in water quality less than that

described in the Regional Board's policies (e.g., water quality constituents in concentrations that exceed water quality objectives). Resolution 68-16 requires that discharges be regulated to meet best practicable treatment or control in order to assure that pollution or nuisance will not occur; and the highest water quality be consistently maintained for the maximum benefit to the people of the State. The Board has considered Resolution 68-16 and Federal antidegradation regulations at 40 CFR 131.12 and compliance with these requirements will result in the use of best practicable treatment or control of the discharge. The impact on existing water quality will be insignificant.

23. Section 303(d) of the CWA requires states to identify waters for which implementation of technology-based effluent limitations have not been stringent enough to attain water quality standards for those waters. On July 25, 2003, the USEPA approved the State's updated list of 303 (d) impaired waters, which lists the lower Merced River between McSwain Reservoir and the San Joaquin River as impaired for chlorpyrifos, diazinon, and the Group A pesticides (aldrin, dieldrin, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexane, endosulfan, and toxaphene). None of these constituents are expected in the discharge from the Merced River Fish Hatchery.

BENEFICIAL USES

24. The beneficial uses of the Merced River from McSwain Reservoir to the San Joaquin River, as identified in Table II-1 of the Basin Plan, are municipal and domestic supply (MUN); stock watering (AGR); industrial process, service, and power supply (PROC, IND, and POW); water contact recreation (including canoeing and rafting) (REC-1); non-contact water recreation (REC-2); warm and cold freshwater habitat (WARM and COLD); warm and cold water fish migration habitat (MIGR); warm and cold water spawning habitat (SPWN); and wildlife habitat (WILD).

25. Beneficial uses of the underlying groundwater are municipal and domestic supply (MUN), agricultural supply irrigation (AGR), industrial service supply (IND) and industrial process supply (PRO).

REASONABLE POTENTIAL AND EFFLUENT LIMITATIONS

26. Federal regulations at 40 CFR 122.44 require NPDES permits to contain effluent limitations, including technology-based and water quality-based limitations for specific constituents and limitations based on toxicity.

TECHNOLOGY-BASED EFFLUENT LIMITATIONS

27. USEPA's final ELG for the aquaculture industry does not include numeric effluent limitations on any conventional, non-conventional, or toxic constituents. Rather, USEPA

promulgated qualitative limitations in the form of BMP requirements. Technology-based requirements in this Order are based on a combination of application of the ELG for BMP requirements and case-by-case numeric limitations developed using best professional judgment (BPJ) and carried over from the previous Order 96-163. These effluent limitations are 5.0 mg/L net TSS as an average monthly limitation and 15 mg/L net TSS as a maximum daily limitation; and 0.1 ml/L settleable solids as an average monthly limitation and 0.2 ml/L settleable solids as a maximum daily limitation. Section 402(o) of the CWA prohibits backsliding of effluent limitations that are based on BPJ to reflect a subsequently promulgated ELG which is less stringent. Removal of these numeric limitations for TSS and settleable solids would constitute backsliding under CWA Section 402(o). The Regional Board has determined that these numeric effluent limitations for TSS and settleable solids continue to be applicable to the Facility and that backsliding is not appropriate. These limitations are established as a means of controlling the discharge of solids from algae, silt, fish feces and uneaten feed. Previous Orders for hatcheries have expressed effluent limitations for TSS in terms of a net limitation. The Regional Board finds the use of a net TSS effluent limitation is an appropriate measure of performance and a correct interpretation of this limitation, and does not constitute backsliding (40 CFR 122.44(l)(2)(i)(B)(2)). Results of monitoring indicate the Discharger is capable of meeting these limitations. This Order does not include mass effluent limitations for TSS because there are no standards that specifically require a mass-based effluent limitation, mass of the pollutant discharged is not specifically related to a measure of operation (40 CFR 122.45(f)(iii)), and, in addition, mass-based effluent limitations for TSS are not necessary because this Order includes both concentration-based limitations and a maximum flow limitation. These changes are consistent with Federal anti-backsliding provisions of 40 CFR 122.44(l)(1) and 122.62(a)(2).

28. Order 96-163 included technology-based effluent limitations for BOD based upon BPJ. This Order does not include limitations for BOD, as the control of TSS and settleable solids in the discharge and implementation of a Best Management Practices Plan will effectively control levels of BOD in the discharge. This determination is based, in part, on findings USEPA Region 10 presented in its General NPDES Permit (No. ID-G13-0000) for Aquaculture Facilities in Idaho and the accompanying Fact Sheet, as well as observation and analysis of monitoring data from aquaculture facilities throughout the Central Valley Region. In addition, USEPA's proposed ELG for CAAP facilities (12 September 2002) stated that controlling TSS discharges from flow-through, CAAP facilities will effectively control BOD and nutrients. The final ELG also correlates TSS removal and BOD removal. Furthermore, the maximum reported BOD concentration in the Facility's effluent between February 1999 and August 2003 was 2.6 mg/L, well below both the maximum daily and average monthly limitations of 15 mg/L and 5 mg/L respectively. Based on this new information that has become available since adoption of Order No. 96-163, the Regional Board has determined that it is appropriate to remove the

BOD limitations from this Order. This change is consistent with the Federal anti-backsliding provisions of 40 CFR 122.44(l)(1) and 122.62(a)(2).

WATER QUALITY-BASED EFFLUENT LIMITATIONS (WQBELs)

29. The federal regulations at 40 CFR 122.44(d)(1) require effluent limitations for all pollutants that are or may be discharged at a level that will cause, have the reasonable potential to cause, or contribute to an in-stream excursion above a numeric water quality criterion (such as CTR criterion) or a narrative water quality criterion within a State water quality standard. These regulations also set forth a methodology for establishing effluent limitations based on narrative state water quality criteria [40 CFR 122.44(d)(1)(vi)(A-C)].

30. The USEPA, SWRCB, and Regional Board have adopted or published standards that are used to implement 40 CFR 122.44. The USEPA has promulgated the CTR and NTR that established water quality criteria. The SWRCB has adopted the SIP that implements the CTR and NTR. The USEPA also has published recommended ambient water quality criteria and the Basin Plan contains numeric and narrative water quality objectives. The Basin Plan contains an Implementation Policy ("Policy for Application of Water Quality Objectives") that, in part, sets forth a process for translating narrative water quality objectives into numeric effluent limitations. The USEPA ambient water quality criteria, results of toxicity studies conducted by the California Department of Fish and Game, and the Basin Plan "Policy of Application of Water Quality Objectives" have been used to implement 40 CFR 122.44(d)(1)(v).

31. On 27 February 2001, the Discharger was issued a letter pursuant to CWC Section 13267 requesting receiving water and effluent monitoring data to perform a reasonable potential analysis for the CTR pollutants. Effluent and receiving water samples collected on 5 March 2002, and analyzed for volatile and semi-volatile substances, metals, asbestos, 2,3,7,8-TCDD, and sixteen dioxin congeners showed that none of the CTR priority pollutants were present in the discharge at levels that would cause or contribute to an in-stream excursion above a numeric water quality objective from the CTR. As described below, however, projections by DFG of the potential use of copper sulfate at the Facility and the estimated resulting concentration of copper in the discharge do indicate that there is a reasonable potential that copper may be discharged at a concentration that would cause, have the reasonable potential to cause, or contribute to an excursion of the CTR (acute and chronic) criteria for copper in the receiving water.

32. Based on information submitted as part of the Report of Waste Discharge, in annual and monthly monitoring reports, in studies performed by and correspondence with DFG, and in independent studies, the Regional Board has found that the discharge may cause, have the reasonable potential to cause, or contribute to in-stream excursions of applicable numeric water quality criteria or water quality objectives or narrative water quality

objectives for the following constituents: copper, pH, and formaldehyde. Effluent limitations for these parameters are being established without benefit of dilution. The Regional Board is not obligated to delegate the assimilative capacity of receiving waters to a Discharger. The downstream minimum flow of 9.7 mgd in the Merced River includes the flow from the Facility, which averages 5.1 mgd. Further, the copper and formaldehyde limitations are based protection of aquatic life from acute effects. Therefore, it is appropriate calculate effluent limitations with no dilution allowance.

CTR Constituents

33. Copper, primarily in the forms of copper sulfate and chelated copper compounds, is used in fish hatcheries to control algae and other vegetation that is susceptible to the toxic effects of copper uptake, and it is used to control the growth of external parasites and bacteria on fish. Copper sulfate may be used at the Facility at a rate of up to 0.5 pounds copper sulfate per 1 cfs in raceways. Based on this application rate in a single raceway, DFG estimates that copper may be discharged at 0.2 mg/L or 200 µg/L.

34. Copper is identified as a priority pollutant in the NTR and CTR. The CTR includes the Ambient Water Quality Criteria for the Protection of Aquatic Life for copper. The Criterion Maximum Concentration (CMC), a 1-hour average, and Criterion Continuous Concentration (CCC), a 4-day average, are hardness dependent. The criteria are expressed in terms of the dissolved fraction of the metal in the water column and are calculated from the total recoverable values by applying a conversion factor. The conversion factor in the CTR is 0.96 for both acute (CMC) and chronic (CCC) criteria. Because effluent limitations are calculated without benefit of dilution, the applicable criteria will be based on the hardness of the effluent rather than the receiving water. The Discharger did not report on hardness when submitting the results of its analysis of effluent concentrations of copper. Water quality criteria for copper for the protection of aquatic life, as established by the CTR are 2.7 and 3.6 µg/L – chronic and acute criteria for dissolved copper (2.9 and 3.8 total recoverable) at 25 mg/L hardness. With a hardness of 50 mg/L, chronic and acute criteria for dissolved copper are 5.0 and 7.0 µg/L (5.2 and 7.3 µg/L total recoverable), respectively, and with a hardness of 100 mg/L, chronic and acute criteria for dissolved copper are 8.9 and 13.4 µg/L (9.3 and 14.0 µg/L total recoverable), respectively. Based on DFG's estimates of potential application rates and flows, there is reasonable potential for copper to be present in the discharge at levels exceeding water quality criteria for the protection of aquatic life from the CTR. Accordingly, this Order includes WQBELs for copper.

35. Effluent limitations for copper must be expressed as a total recoverable concentration. Since a site-specific translator has not been developed for copper as described in the SIP Section 1.4.1, the USEPA conversion factor for copper of 0.960 was used for translating the dissolved copper criterion into a total recoverable effluent concentration allowance (ECA) with no dilution. The Regional Board established both an Average Monthly

Effluent Limitation (AMEL) and Maximum Daily Effluent Limitation (MDEL) for copper based on procedures outlined in the SIP and as shown in Attachment C.

36. Section 2.1 of the SIP provides that: "*Based on an existing discharger's request and demonstration that it is infeasible for the discharger to achieve immediate compliance with a CTR criterion, or with an effluent limitation based on a CTR criterion, the RWQCB may establish a compliance schedule in an NPDES permit*." Although the effluent limitations for copper are new requirements in this Order, the use of copper sulfate and subsequent discharge resulting from this use is a controllable water quality condition. The Discharger has not reported using copper sulfate at the facility in recent years and should be able to manage use of copper sulfate to comply with the new effluent limitations; therefore, a compliance schedule for effluent copper limitations is not included in this Order.

Non-CTR Constituents

37. The Basin Plan includes a numeric water quality objective for pH in the form of a range of acceptable pH values (measured in standard units). Influent pH has been measured as low as 6.3 standard units. In the current Order, the Regional Board established effluent limitations in the form of an acceptable range of pH between 6.5 and 8.5 standard units for discharges to the Merced River based on the Basin Plan objective. This existing pH limitation is carried over to this Order.

38. A 37 percent formaldehyde solution (Formalin) is periodically used at hatcheries as a fungicide treatment on fish eggs and fish in the raceways. Although the Discharger no longer uses Formalin on a routine basis, DFG reports that it may be used in emergencies. Formalin (also known by the trade names Formalin-F®, Paracide-F®, PARASITE-S®) is approved through FDA's New Animal Drug Application (NADA) program for use in controlling external protozoa and monogenetic trematodes on fish, and for controlling fungi of the family *Saprolegniacae* in food-producing aquatic species (including trout and salmon). For control of other fungi, formalin may be used under an Investigational New Animal Drug (INAD) exemption. Formalin is used as a "drip" treatment to control fungus on fish eggs at a concentration of 1,000 to 2,000 ppm for 15 minutes, or as a "flush" treatment in raceways of 1-8 hours in duration at a concentration of 170 to 250 ppm for 1-hour or, based on DFG use assumptions, at 25 ppm for 8-hours. According to DFG estimates, at a maximum usage of 167 ppm formalin for one hour in one raceway, the maximum calculated concentration in the discharge from the settling basin would be 18.4 mg/L as formalin or 6.8 mg/L formaldehyde. DFG's calculations assume the flow from the raceways mixes completely with the volume of water in the settling basin and is discharged with no further concentration, breakdown, or dilution of formaldehyde. Using the same flow assumptions and a 25 mg/L concentration of Formalin for an eight hour treatment period, the discharge level from the settling pond would be 2.75 ppm Formalin or 1.0 ppm formaldehyde for the eight hours.

The Basin Plan contains a narrative water quality objective for toxicity that states in part that "[a]*ll waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life*" (narrative toxicity objective). Aquatic habitat is a beneficial use of the Merced River. The DFG Pesticide Unit conducted biotoxicity studies to determine the aquatic toxicity of Formalin using *Pimephales promelas* and *Ceriodaphnia dubia* in accordance with the analytical methods specified in EPA600/4-91-002, *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*. These "short-term chronic tests" measure effects such as reduced growth of the organism, reduced reproduction rates, or lethality. Results were reported as a No Observed Effect Concentration (NOEC) and a Lowest Observed Effect Concentration (LOEC). The DFG Pesticide Unit also conducted acute toxicity tests using *Ceriodaphnia dubia* in accordance with methods specified in EPA600/4-90/027, *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms.* Acute toxicity test results typically are reported as the No Observed Adverse Effect Level (NOAEL), Lowest Observed Adverse Effect Level (LOAEL), and $LC_{50.}$ Results of both acute and chronic aquatic life toxicity testing conducted by the DFG Pesticide Unit were considered along with the Basin Plan narrative toxicity objective when determining whether water quality-based effluent limitations for formalin as formaldehyde were necessary.

Results of 7-day chronic toxicity tests indicated *Ceriodaphnia dubia* was the most sensitive species, with a 7-day NOEC value of 1.3 mg/l formaldehyde for survival and <1.3 mg/l for reproduction (the Regional Board used an NOEC of 1.3 mg/L). Acute toxicity tests conducted using *Ceriodaphnia dubia* showed a 96-hour NOAEL of 1.3 mg/l formaldehyde. Additional acute toxicity tests with *Ceriodaphnia dubia* were conducted using only an 8-hour exposure, resulting in a 96-hour NOAEL concentration of 6.7 mg/L formaldehyde. Based on the results of these toxicity tests and DFG estimates of potential discharges of formaldehyde from the facility, if formalin is used at this Facility in the future at the DFG estimated dose rate, formaldehyde may be discharged at levels that cause, have the reasonable potential to cause, or contribute to an excursion of the narrative water quality objective for toxicity from the Basin Plan. Accordingly, this Order includes water quality-based effluent limitations for formaldehyde. Effluent concentrations of formaldehyde may persist because of potential application procedures (e.g., successive raceway treatments, drip treatments for eggs) and due to retention of effluent in the settling basin. Therefore, as shown in the Information Sheet, both an average monthly effluent limitation of 0.65 mg/L and a maximum daily effluent limitation of 1.3 mg/L were calculated based on the 96-hour NOAEL value and using the procedure in USEPA's TSD for calculating water quality-based effluent limitations. These effluent limitations are include in this Order and have been established for protection of aquatic life against toxic effects from exposure to formaldehyde in the discharge.

39. DFG reports that sodium chloride (salt) is used at the Facility at a rate of up to 400 lbs per 3-hour flush treatment in the raceways as a fish-cleansing agent to control the spread of fish disease and to reduce stress among the confined fish population. Sodium chloride is also used at a rate of 35 lbs in a 600 gallon tank in the hatchery building Application of salt in a single raceway and the hatchery building simultaneously at these application rates would result in an estimated concentration of approximately 46 mg/L sodium chloride in the discharge from the Facility. These calculations assume the flow from the raceways mixes completely with the volume of the settling basin mixes completely with the volume of the settling basin. FDA considers sodium chloride an unapproved new animal drug of low regulatory priority (LRP drug) for use in aquaculture. Consequently, FDA is unlikely to take regulatory action if an appropriate grade is used, good management practices are followed, and local environmental requirements are met. The Regional Board has determined that the discharge of sodium chloride from the Facility from sodium chloride application rates as described by DFG will not cause, have a reasonable potential to cause, or contribute to an in-stream excursion of applicable water quality criteria or objectives. Monitoring of conductivity and chloride is required and monthly use of sodium chloride must be reported as specified in the Monitoring and Reporting Program.

40. Hydrogen peroxide (35 % H_2O_2) may be used by the Discharger as a short-term immersion bath treatment in holding tanks, or as a raceway flush treatment. FDA considers hydrogen peroxide to be an LRP drug when used to control fungi on fish at all life stages, including eggs. Hydrogen peroxide may also be used under an INAD exemption to control bacterial gill disease in various fish, fungal infections, external bacterial infections, and external parasites. DFG reports that a 35% hydrogen peroxide solution would be used as a one-hour treatment of 100 ppm (mg/L) in only one raceway at a time resulting in an estimated discharge concentration of 11 mg/L. DFG's calculations assume the flow from the raceways mixes completely with the volume of water in the settling basin and is discharged with no further concentration, breakdown, or dilution of hydrogen peroxide. Hydrogen peroxide is a strong oxidizer that breaks down into water and oxygen; however, it exhibits toxicity to aquatic life during the oxidation process. Results of a single acute toxicity test conducted by the DFG Pesticide Unit using *C. dubia* showed a 96-hour NOAEL of 1.3 mg/L. Since there is limited toxicity information available at this time and no information regarding actual discharge concentrations of hydrogen peroxide, this Order does not include water quality-based effluent limitations for hydrogen peroxide. However, use and monitoring of hydrogen peroxide must be reported as specified in the attached Monitoring and Reporting Program and results of additional toxicity tests must be submitted as specified in Provision No. 6. The Regional Board will review this information, and other information as it becomes available and this Order may be reopened to establish effluent limitations based on additional use and toxicity information.

41. Potassium permanganate (also known by the trade name Cairox^{TM}) may be used to control gill disease as a 1-hour flush treatment in a single raceway at up to 5 mg/L resulting in an estimated discharge of 0.55 mg/L potassium permanganate. DFG's calculations assume the flow from the raceways mixes completely with the volume of water in the settling basin and is discharged with no further concentration, breakdown, or dilution of potassium permanganate. Potassium permanganate has a low estimated lifetime in the environment, being readily converted by oxidizable materials to insoluble manganese dioxide (MNO_2). In non-reducing and non-acidic environments, MNO_2 is insoluble and has a very low bioaccumulative potential. Potassium permanganate is not approved for use in aquaculture under FDA's NADA program and should therefore be used in accordance with an INAD exemption granted by FDA. Potassium permanganate is typically applied in a single, short-term treatment, or as a series of closely-spaced, short-term treatments. Results of a single acute toxicity test conducted by the DFG Pesticide Unit using *C. dubia* showed a 96-hour NOAEL of 0.25 mg/L for potassium permanganate. Since there is limited toxicity information available at this time and no information regarding actual discharge concentrations of potassium permanganate, this Order does not include water quality-based effluent limitations for potassium permanganate. However, use and monitoring of potassium permanganate must be reported as specified in the attached Monitoring and Reporting Program and results of additional toxicity tests must be submitted as specified in Provision No. 6. The Regional Board will review this information, and other information as it becomes available and this Order may be reopened to establish effluent limitations based on additional use and toxicity information

42. PVP Iodine, a solution composed of 10% PVP Iodine Complex and 90% inert ingredients, is used at the Facility as a fish egg disinfectant (fungicide) from approximately 25 October through 15 February. DFG estimates a maximum usage of 0.63 gallons of PVP Iodine Complex (600mls x 4 stacks/hour) one time during a 24-hour period. Assuming a one-hour flow-through time, the maximum calculated concentration of PVP Iodine in the discharge from the settling basins would be 0.8 mg/L or 0.08 mg/L PVP Iodine Complex. These calculations assume the flow from the raceways mixes completely with the volume of water in the settling basin and is discharged with no further concentration, breakdown, or dilution of PVP Iodine. FDA considers PVP iodine an LRP drug for use in aquaculture. Because PVP Iodine typically is applied in short-term treatments of 1-hour or less, results of acute aquatic life toxicity testing conducted by the DFG Pesticide Unit were considered when determining whether water quality-based effluent limitations for PVP Iodine were necessary in this Order. Results of a single acute toxicity test with *Ceriodaphnia dubia* showed a 96-hour NOAEL of 0.86 mg/L. The estimated discharge concentration of PVP Iodine does not exceed the NOAEL value; furthermore, there is limited toxicity information and no information on actual discharge concentrations of PVP Iodine. The Discharger has used alternative means of disposal for waters containing PVP Iodine (e.g., disposal on the ground at the Facility). Based the estimated concentration of PVP Iodine in the discharge, the use of

alternative disposal methods, and the fact that toxicity information is limited, PVP Iodine is not discharged at levels that cause, have the reasonable potential to cause, or contribute to an excursion of a narrative water quality objective for toxicity from the Basin Plan. This Order does not include water quality-based effluent limitations for PVP Iodine. However, use and monitoring of PVP Iodine must be reported as specified in the attached Monitoring and Reporting Program and results of additional toxicity tests must be submitted as specified in Provision No. 6. The Regional Board will review existing information, and other information as it becomes available, and this Order may be reopened to establish effluent limitations for PVP Iodine based on additional use and toxicity information. Furthermore, this Order includes a requirement that all aquaculture drugs and chemicals not discharged to receiving waters be disposed of in an environmentally safe manner according to label guidelines, Material Safety Data Sheet guidelines, and BMPs. Any other form of disposal requires approval from the Executive Officer.

43. Chloramine-T is not currently used but may be used by the Discharger in the future as a possible replacement of copper and formalin. Chloramine-T is available for use in accordance with an INAD exemption by FDA. DFG reports that chloramine-T may be used at a rate of 10 ppm for one-hour flush treatment in a single raceway resulting in an estimated maximum concentration in the discharge of 1.1 mg/L. DFG's calculations assume the flow from the raceways mixes completely with the volume of water in the settling basin and is discharged with no further concentration, breakdown, or dilution of chloramine-T. Chloramine-T breaks down into para-toluenesulfonamide (p-TSA) and unlike other chlorine based disinfectants does not form harmful chlorinated compounds. The Discharger has not conducted biotoxicity tests using chloramine-T, however results of toxicity testing from other sources show a 96-hour LC_{50} for rainbow trout of 2.8 mg/L. The 48-hour NOEC for *Daphnia magna* was reported as 1.8 mg/L. The DFG Pesticide Unit is proposing to conduct additional toxicity testing on chloramine-T to determine NOAEL concentrations. Since there is limited toxicity information available and no information regarding actual discharge concentrations of chloramine-T, this Order does not include water quality-based effluent limitations for chloramine-T. However, use and monitoring of chloramine-T must be reported as specified in the attached Monitoring and Reporting Program and results of additional toxicity tests must be submitted as specified in Provision No. 6. The Regional Board will review this information, and other information as it becomes available and this Order may be reopened to establish effluent limitations based on additional use and toxicity information.

44. The Discharger uses the anesthetic Tricaine methanesulfonate, commonly known as MS-222 (with trade names of Finquel® or Tricaine-S®). MS-222 has been approved by FDA for use as an anesthetic for Salmonidae. It is intended for the temporary immobilization of fish, amphibians and other aquatic, cold-blooded animals. It has been recognized as a valuable tool for the proper handling of these animals during manual spawning (fish stripping), weighing, measuring, marking, surgical operations, transport, photography,

and research. Currently, the Discharger disposes of water containing MS-222 on the ground at the Facility. In the future, the Discharger may use the anesthetic Aqui-S®. Aqui-S® is a water dispersible liquid anaesthetic for fin fish, crustacea and shell fish and is used in the US under an INAD exemption. The Regional Board does not have specific toxicity information for MS-222 or Aqui-S®or estimates of potential discharge concentrations of MS-222 and Aqui-S®at this Facility. Since there is limited toxicity information available at this time and no information regarding actual discharge concentrations of MS-222 or Aqui-S®, this Order does not include water quality-based effluent limitations for MS-222 or Aqui-S®. However, use and monitoring of MS-222 and Aqui-S® must be reported as specified in the attached Monitoring and Reporting Program and results of additional toxicity tests must be submitted as specified in Provision No. 6. The Regional Board will review this information, and other information as it becomes available and this Order may be reopened to establish effluent limitations based on additional use and toxicity information. Furthermore, this Order includes a requirement that all aquaculture drugs and chemicals not discharged to receiving waters be disposed of in an environmentally safe manner according to label guidelines, Material Safety Data Sheet guidelines, and BMPs. Any other form of disposal requires approval from the Executive Officer.

45. The hatchery may periodically use the antibiotics oxytetracycline and penicillin G as therapeutic agents in bath treatments to control fish diseases. The bath treatments are used to treat small fish in 600 gallon tanks. The estimated concentrations of oxytetracycline and penicillin G discharged from the facility are calculated as 0.2 mg/L and 0.1 mg/L respectively.

Oxytetracycline, also known by the brand name Terramycin®, is an antibiotic approved through FDA's NADA program for use in controlling ulcer disease, furunculosis, bacterial hemorrhagic septicemia, and pseudomonas disease in salmonids. Oxytetracycline is most commonly used at CAAP facilities as a feed additive. However, oxytetracycline may also be used as an extra-label use under a veterinarian's prescription in an immersion bath of approximately six to eight hours in duration. Because oxytetracycline may be applied in an immersion bath for up to eight hours at a time, the Regional Board considered the results of acute and chronic aquatic life toxicity testing conducted by the DFG Pesticide Unit when determining whether water quality-based effluent limitations for oxytetracycline used in an immersion bath treatment were necessary in this Order. Results of acute toxicity tests using *C. dubia* showed a 96-hour NOAEL of 40.4 mg/L. Results of chronic toxicity tests using *C. dubia* showed a 7-day NOEC for reproduction of 48 mg/L. The estimated discharge concentration of 0.2 mg/L of oxytetracycline is well below the lowest NOEC and NOAEL. Therefore, at this time, oxytetracycline, when used in an immersion bath treatment, is not discharged at levels that cause, have the reasonable potential to cause, or contribute to an excursion of a narrative water quality objective for toxicity from the Basin Plans. Accordingly, this Order does not include an effluent limitation for oxytetracycline. However, monthly use

of oxytetracycline must be reported as specified in the attached Monitoring and Reporting Program. The Regional Board will review this information, and other information as it becomes available, and this Order may be reopened to establish effluent limitations based on additional use and toxicity information.

Penicillin G, also known as Pen-G, is an antibiotic used in a six to eight hour immersion bath treatment to control acute disease outbreaks. Penicillin G is not approved under FDA's NADA program and its' extra-label use in aquaculture requires a veterinarian's prescription. Due to the length of treatment time (up to eight hours), the Regional Board considered the results of acute and chronic aquatic life toxicity testing conducted by the DFG Pesticide Unit when determining whether water quality-based effluent limitations for penicillin G were necessary in this Order. Results of acute toxicity tests using *C. dubia* showed a 96-hour NOAEL of 890 mg/L. Results of 7-day chronic toxicity testing using *Pimephales promelas* showed 7-day NOEC for survival of 350 mg/L. The estimated discharge concentration of 0.1 mg/L of penicillin G is well below the lowest NOEC and NOAEL. Therefore, at this time, penicillin G, when used in an immersion bath treatment, is not discharged at levels that cause, have the reasonable potential to cause, or contribute to an excursion of a narrative water quality objective for toxicity from the Basin Plans. Accordingly, this Order does not include an effluent limitation for penicillin G. However, monthly use of penicillin G must be reported as specified in the attached Monitoring and Reporting Program. The Regional Board will review this information, and other information as it becomes available, and this Order may be reopened to establish effluent limitations based on additional use and toxicity information.

46. The antibiotics oxytetracycline, Romet-30® (sulfadimethoxine, ormetoprim), and florfenicol may potentially be used by the Discharger in feed formulations to control acute disease outbreaks. Erythromycin (injected or used in feed formulations) and amoxycillin (injected) also are antibiotics that may be used in the future to control disease. These antibiotics must be used under conditions in the NADA approval (oxytetracycline and Romet-30®) or an INAD exemption or a veterinarian's prescription for extra-label use. In the NPDES General Permit for Aquaculture Facilities in Idaho (Idaho General Permit), USEPA Region 10 distinguishes between antibiotics applied in feed formulations and antibiotics applied in immersion baths. The Idaho General Permit concludes that drugs or chemicals administered via feed, and ingested by fish, pose little threat to aquatic life or beneficial uses because a majority of the drug is utilized by the fish, though some literature suggests otherwise. As stated in the Idaho General Permit, "USEPA believes that disease control drugs and other chemicals provided for ingestion by fish do not pose a risk of harm or degradation to aquatic life or other beneficial uses." Based on similar conclusions as those drawn by USEPA for the Idaho General Permit, the Regional Board has determined that oxytetracycline, Romet-30®, and florfenicol, (when used in feed formulations), erythromycin (when injected or used in feed formulations) and amoxycillin (when injected) are used in a manner that reduces the

likelihood of direct discharge to waters of the United States or waters of the State, particularly when Dischargers implement BMPs, as required by this Order. Therefore, oxytetracycline, Romet-30®, and florfenicol, (when used in feed formulations), erythromycin (when injected or used in feed formulations) and amoxycillin (when injected) are not likely to be discharged from the Facility at levels that would cause, have the reasonable potential to cause, or contribute to an excursion of Basin Plan narrative water quality objectives for toxicity. Accordingly, this Order does not include water quality-based effluent limitations for these substances; however, it does require reporting use as specified in the attached Monitoring and Reporting Program. If, in the future, additional information becomes available regarding the use or toxicity of any of these substances, the Regional Board will re-evaluate whether its discharge may cause, have the reasonable potential to cause, or contribute to an excursion of Basin Plan objectives for toxicity and, if necessary, re-open this Order to include numeric effluent limitations.

47. Carbon dioxide gas is used to anesthetize fish prior to spawning. Sodium bicarbonate, or baking soda, also is used as a means of introducing carbon dioxide into the water to anesthetize fish. Acetic acid may be used for the control of external parasites. These substances are discharged or may be discharged from the Facility in the future. FDA considers these substances LRP drugs for use in aquaculture. Based upon available information regarding the use of these substances at CAAP facilities in the Region, the Regional Board does not believe that carbon dioxide gas, sodium bicarbonate, or acetic acid will be discharged at levels that cause, have the reasonable potential to cause, or contribute to an excursion of Basin Plan narrative water quality objectives for toxicity. Accordingly, this Order does not include water quality-based effluent limitations for any of these substances; however, their use must be reported as specified in the attached Monitoring and Reporting Program. In the future, as additional information becomes available regarding the use or toxicity of carbon dioxide gas, sodium bicarbonate, or acetic acid, the Regional Board will re-evaluate whether the discharge of any of these substances to receiving waters may cause, have the reasonable potential to cause, or contribute to an excursion of the Basin Plan objectives for toxicity and, if necessary, re-open this Order to include numeric effluent limitations.

48. The Discharger has indicated that it may use a vibrio vaccine and an enteric redmouth bacertin in the future. Vibrio vaccine may be used as an immersion or an injectable vaccine and helps protect salmonid species from vibriosis disease caused by Vibrio anguillarum serotype I and Vibrio ordalii. Vibrio vaccine stimulates the fish's immune system to produce protective antibodies, helping the animal defend itself against vibriosis. Enteric redmouth (or yersiniosis) bacertins are formulated from inactivated Yersinia ruckeri bacteria and may also be used as an immersion or vaccine to help protect salmonid species from enteric redmouth disease caused by Yersinia ruckeri. These bacertins stimulate the fish's immune system to produce protective antibodies. These veterinary biologics are licensed for use by the US Department of Agriculture's (USDA's) Center for Veterinary Biologics. Veterinarians should be consulted before

beginning an immunization program. According to USDA, most biologics leave no chemical residues in animals and most disease organisms do not develop resistance to the immune response by a veterinary biologic. Based upon available information regarding the use of these substances at CAAP facilities, the Regional Board does not believe that vibrio vaccine or enteric redmouth bacertins, when used according to label and veterinarian instructions, are discharged at levels that cause, have the reasonable potential to cause, or contribute to an excursion of Basin Plan narrative water quality objectives for toxicity. Accordingly, this Order does not include water quality-based effluent limitations for these substances; however, use of these substances must be reported as specified in the attached Monitoring and Reporting Program. In the future, as additional information becomes available regarding the use or toxicity of these biologics, the Regional Board will re-evaluate whether the discharge of any of these substances to receiving waters may cause, have the reasonable potential to cause, or contribute to an excursion of the Basin Plan objectives for toxicity and, if necessary, re-open this Order to include numeric effluent limitations.

OTHER CONSIDERATIONS

49. CWC Section 13267 states, in part, "*(a) A Regional Board, in establishing…waste discharge requirements… may investigate the quality of any waters of the state within its region"* and *"(b) (1) In conducting an investigation… the Regional Board may require that any person who… discharges… waste…that could affect the quality of waters within its region shall furnish, under penalty of perjury, technical or monitoring program reports which the Regional Board requires.*" CWC Section 13383 states in part, "a regional board may establish monitoring, inspection, entry, reporting, and record keeping requirements . . . for any person who discharges pollutants . . . to navigable waters." The attached Monitoring and Reporting Program No. R5-2004-0120 is necessary to assure compliance with waste discharge requirements and is incorporated by reference herein. The attached Monitoring and Reporting Program is established pursuant to CWC Sections 13267 and 13383.

50. Effluent limitations, and toxic and pretreatment effluent standards established pursuant to Sections 301 (Effluent Limitations), 302 (Water Quality Related Effluent Limitations), 304 (Information and Guidelines), and 307 (Toxic and Pretreatment Effluent Standards) of the Clean Water Act (CWA) and amendments thereto are applicable to the discharge.

51. Best Management Practices plan requirements are established based on requirements in Effluent Limitations Guidelines and New Source Performance Standards for the Concentrated Aquatic Animal Production Point Source Category at 40 CFR Part 451.

52. The Regional Board has considered the information in the attached Information Sheet in developing the findings in this Order. The attached Information Sheet is part of this

Order.

53. The action to adopt an NPDES permit is exempt from the provisions of the California Environmental Quality Act (CEQA), Public Resources Code Section 21000, et seq., in accordance with Section 13389 of the CWC.

54. The Regional Board has notified the Discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for this discharge and has provided them with an opportunity for a public hearing and an opportunity to submit their written views and recommendations.

55. The Regional Board, in a public meeting, heard and considered all comments pertaining to the discharge.

56. This Order shall serve as an NPDES permit pursuant to Section 402 of the CWA, and amendments thereto, and shall take effect upon the date of hearing, provided USEPA has no objections.

IT IS HEREBY ORDERED that Order No. 96-163 is rescinded and that the California Department of Fish and Game and the Merced River Irrigation District, their agents, successors and assigns, in order to meet the provisions contained in Division 7 of the California Water Code and regulations adopted thereunder, and the provisions of the Clean Water Act and regulations and guidelines adopted thereunder, shall comply with the following requirements, when discharging from the Merced River Fish Hatchery:

A. Discharge Prohibitions

1. Discharge of wastewater at a location or in a manner different from that described by this Order is prohibited.

2. The by-pass or overflow of untreated wastewater or wastes into any surface water or surface water drainage course is prohibited, except as allowed by Standard Provision A.13. Discharges from Outfall 002 directly to the Merced River in accordance with the terms of this Order are not considered a by-pass or overflow of untreated wastewater.

3. Discharge of waste classified as "hazardous" as defined in §2521(a) of Title 23, California Code of Regulations (CCR), §2510, et seq., (hereafter Chapter 15), or "designated", as defined in §13173 of the CWC, is prohibited.

4. Practices that allow accumulated sludge, grit, and solid residues to be discharged to surface waters or surface water drainage courses are prohibited.

5. The discharge of chlorpyrifos, diazinon, and the pesticides - aldrin, dieldrin, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexane, endosulfan, and toxaphene, is prohibited.

B. Effluent Limitations – Outfall 001 and Outfall 002

1. The monthly average discharge of flow-through wastewater from Outfall 001 and Outfall 002 (total) shall not exceed 7.8 million gallons per day (mgd).

2. Effluent discharged into a surface water from Outfall 001 or Outfall 002 shall not have a pH less than 6.5 nor greater than 8.5 standard units. If the effluent pH is less than 6.5, it shall not be less than the concurrent influent pH. If the effluent pH is greater than 8.5, it shall not be greater than the concurrent influent pH.

3. Effluent discharges shall not exceed the following limitations at Outfall 001 and Outfall 002:

Constituent	**Units**	**Average Monthly Limitation**	**Maximum Daily Limitation**
Total Suspended Solids (TSS) (net) [1]	mg/L	5.0	15.0
Settleable Solids	ml/L	0.1	0.2
Formaldehyde	mg/L	0.65	1.3
Copper (Total Recoverable)[2]	µg/L	**Calculate Limit based on Attachment C**	

[1] Effluent limitations for total suspended solids are net values.
(Net TSS concentration = Effluent TSS concentration – Influent TSS concentration)

[2] A daily maximum or monthly average total recoverable copper concentration shall be considered non-compliant with the applicable effluent limitation only if it exceeds the appropriate effluent limitation and the reported minimum level (ML). The highest acceptable ML for calibration purposes is 0.5 µg/l. Effluent hardness and pH must be measured concurrently with effluent copper concentration.

C. Discharge Specifications

1. The discharge shall not cause the degradation of any water supply or ground water.

2. Neither the treatment nor the discharge shall cause a nuisance or conditions of pollution as defined by California Water Code §13050.

3. Domestic sewage shall be maintained within the designated disposal area at all times, and there shall be no direct discharge to surface waters or surface water drainage courses.

D. Best Management Practices (BMP) Plan

Within 12 months of adoption of this Order, the Discharger shall certify in writing to the Regional Board that it has developed a Best Management Practices (BMP) plan. The Discharger shall develop and implement the BMP plan to prevent or minimize the generation and discharge of wastes and pollutants to the waters of the United States and waters of the State. The Discharger shall develop and implement a BMP plan consistent with the following objectives:

1. Solids Management

    a. Conduct fish feeding in raceways in a manner that limits feed input to the minimum amount reasonably necessary to achieve production goals and sustain targeted rates of aquatic animal growth and minimizes the discharge of unconsumed food and waste products to surface waters.

    b. Clean raceways using procedures and at frequencies that minimize the disturbance and subsequent discharge of accumulated solids during routine activities such as inventorying, grading, and harvesting.

    c. Report the final disposition of all other solids and liquids, including aquaculture drugs and chemicals, not discharged to surface waters in the effluent.

    d. Collect, store, and dispose of fish mortalities and other solids in an environmentally safe manner and in manner so as to minimize discharge to waters of the United States or waters of the State.

2. Operations and Maintenance

    a. Maintain in-system production and wastewater treatment technologies to prevent the overflow of any floating matter or bypassing of treatment technologies.

    b. Inspect the production system and the wastewater treatment system on a routine basis in order to identify and promptly repair any damage.

    c. Ensure storage and containment of drugs, chemicals, fuel, waste oil, or other materials to prevent spillage or release into the aquatic animal production Facility, waters of the United States, or waters of the State.

d. Implement procedures for properly containing, cleaning, and disposing of any spilled material.

e. Prevent fish from being released within the FDA-required withdrawal time of any drug or chemical with which they have been treated.

3. Training

a. Adequately train all relevant facility personnel in spill prevention and how to respond in the event of a spill in order to ensure the proper clean-up and disposal of spilled material.

b. Train staff on the proper operation and cleaning of production and wastewater treatment systems, including training in feeding procedures and proper use of equipment.

The Discharger shall ensure that its operations staff are familiar with the BMP Plan and have been adequately trained in the specific procedures it requires.

E. Waste Disposal

1. Collected screenings, sludges, and other solids, including fish carcasses, shall be disposed of in a manner approved by the Executive Officer and consistent with *Consolidated Regulations for Treatment, Storage, Processing, or Disposal of Solid Waste*, as set forth in Title 27, CCR, Division 2, Subdivision 1, Section 20005, et seq.

2. All aquaculture drugs and chemicals not discharged to receiving waters in accordance with the provisions of this Order shall be disposed of in an environmentally safe manner, according to label guidelines, Material Safety Data Sheet guidelines and BMPs. Any other form of disposal requires approval from the Executive Officer.

3. Any proposed change in disposal practices, shall be reported to the Executive Officer at least **90 days** in advance of the change.

F. Receiving Water Limitations for the Merced River

Receiving water limitations are site-specific interpretations of water quality objectives contained in the Basin Plan. As such, they are a required part of this Order. However, a receiving water condition not in conformance with the limitation is not necessarily a violation of this Order. The Regional Board may require an investigation to determine

cause and culpability prior to asserting a violation has occurred. The discharge shall not cause the following in the Merced River:

1. Fecal coliform concentrations, based on a minimum of not less than five samples for any 30-day period, to exceed a geometric mean of 200/100 ml or more than ten percent of the total number of samples taken during any 30-day period to exceed 400/100 ml.

2. Biostimulatory substances to be present which promote aquatic growths that cause nuisance or adversely affect beneficial uses.

3. Discoloration that causes nuisance or adversely affects beneficial uses.

4. Dissolved oxygen concentrations to fall below 8.0 mg/L, the monthly median of the mean daily dissolved oxygen concentration to fall below 85 percent of saturation in the main water mass or the 95^{th} percentile concentration of dissolved oxygen to fall below 75 percent of saturation.

5. Floating material in amounts that cause nuisance or adversely affect beneficial uses.

6. Oils, greases, waxes, or other materials that result in a visible film or coating on the water surface or on objects in the water.

7. The normal ambient pH to fall below 6.5, exceed 8.5, or change by more than 0.5 units.

8. Pesticides to be present in concentrations in the receiving water, bottom sediments, or aquatic life in concentrations that adversely affect beneficial uses or in concentrations that exceed the lowest levels technically and economically achievable.

9. Radionuclides to be present in concentrations that exceed maximum contaminant levels specified in the California Code of Regulations, Title 22; that harm human, plant, animal or aquatic life; or that result in the accumulation of radionuclides in the food web to an extent that presents a hazard to human, plant, animal, or aquatic life.

10. Suspended sediment load and suspended sediment discharge rates to be altered in such a manner as to cause nuisance or adversely affect beneficial uses.

11. Deposition of material that causes nuisance or adversely affects beneficial uses.

12. Suspended material in concentrations that adversely affect beneficial uses.

13. Taste or odor-producing substances to impart undesirable tastes or odors to fish flesh or other edible products of aquatic origin, or to cause nuisance or adversely affect beneficial uses.

14. An increase in the normal ambient temperature of waters by more than 5ºF (3ºC).

15. Toxic pollutants to be present in concentrations that adversely affect beneficial uses or that produce detrimental physiological responses in human, plant, animal, or aquatic life.

16. The turbidity of receiving waters to increase over background levels by more than:

    a. 1 NTU when background turbidity is between 0 and 5 NTUs;

    b. 20 percent when background turbidity is between 5 and 50 NTUs;

    c. 10 NTUs when background turbidity is between 50 and 100 NTUs; and

    d. 10 percent when background turbidity is greater than 100 NTUs.

    In determining compliance with the above limitations, appropriate averaging periods may be applied upon approval by the Executive Officer.

17. Aquatic communities and populations, including vertebrate, invertebrate, and plant species, to be degraded.

18. Violation of any applicable water quality standard for receiving waters adopted by the Regional Board or the SWRCB pursuant to the CWA and regulations adopted thereunder.

G. Provisions

1. The Discharger shall comply with the attached Monitoring and Reporting Program No. R5-2004-0120, which is part of this Order, and any revisions thereto, as ordered by the Executive Officer. If sufficient information is collected and indicates that the discharge causes, has the reasonable potential to cause, or contributes to an in-stream excursion above a narrative or numerical water quality standard, then this Order may be reopened to include effluent limitation(s) to achieve water quality standards. Additionally, if pollutants are detected in discharges from the Discharger's Facility, but insufficient information exists to establish an effluent limitation or determine if an effluent limitation is necessary,

then the Discharger may be required to conduct additional monitoring to provide sufficient information.

When requested by USEPA, the Discharger shall complete and submit additional Discharge Monitoring Reports. The submittal date shall be no later than the submittal date specified in the Monitoring and Reporting Program for Discharge Self-Monitoring Reports.

2. The Discharger shall comply with all the items of the "Standard Provisions and Reporting Requirements for Waste Discharge Requirements (NPDES)", dated February 2004, which are part of this Order. This attachment and its individual paragraphs are referred to as "Standard Provisions."

3. The Discharger shall comply with the standards contained in the Health and Safety Code, Chapter 6.67, Aboveground Storage of Petroleum.

4. In accordance with the requirements in Section D. – Best Management Practices (BMP) Plan, of this Order, the Discharger shall develop and implement a BMP Plan which achieves the objectives and the specific requirements outlined in that section of the Order. Through implementation of a BMP Plan, the Discharger shall prevent or minimize the generation and discharge of wastes and pollutants from the Facility to the waters of the United States. In the BMP Plan, each component of the Facility shall be evaluated by the Discharger for its waste minimization opportunities and its potential for causing a release of significant amounts of pollutants to receiving waters due to the failure or improper operation of equipment. The examination shall include all normal operations, including raw material and product storage areas, feeding of fish, internal movement of fish, cleaning of rearing/holding units and settling systems, processing and product handling areas, loading or unloading operations, spillage or leaks from the processing floor and dock, and sludge and waste disposal. The BMP Plan shall contain an explicit quantification of the inputs and outputs of the Facility, including fish, feed, feed components, mortalities due to predation and disease, dissolved and solid pollutants, and water. The BMP Plan shall contain a description of specific management practices and standard operating procedures used to achieve the above objectives, including, for example, schedules for solids removal from each waste collection component including what procedures will be used to determine when cleaning is necessary to prevent accumulated solids from being discharged. The BMP Plan shall contain a statement that the BMP Plan has been reviewed and endorsed by the Facility Manager and the individuals responsible for implementation of the BMP operating plan. The Discharger shall ensure that its operations staff is familiar with the BMP Plan and have been adequately trained in the specific procedures which it requires. The Discharger

shall maintain a copy of the BMP Plan at the Facility and shall make the plan available upon request to representatives of the Regional Board.

5. This Order authorizes the discharge of formalin (formaldehyde), sodium chloride, hydrogen peroxide, potassium permanganate, PVP iodine, chloramine-T, MS-222, Aqui-S®, oxytetracycline, penicillin G, Romet-30®, florfenicol, erythromycin, amoxycillin, carbon dioxide, sodium bicarbonate, acetic acid, vibrio vaccine, and enteric redmouth bacertin to the Merced River in accordance with the effluent limitations and other conditions herein. The Discharger shall submit to the Regional Board in writing the following information prior to the use of any other chemical or aquaculture drug that may enter the wastewater discharge:

   a. The common name(s) and active ingredient(s) of the drug or chemical proposed for use and discharge.
   b. The purpose for the proposed use of the drug or chemical (i.e. list the specific disease for treatment and specific species for treatment).
   c. The amount proposed for use and the resulting calculated estimate of concentration in the discharge.
   d. The duration and frequency of the proposed use.
   e. Material Safety Data Sheets and available toxicity information.
   f. Any related Investigational New Animal Drug (INAD), New Animal Drug Application (NADA) information, extra-label use requirements and/or veterinarian prescriptions.

   Prior to discharging the chemical or aquaculture drug, the Discharger also shall conduct and/or submit the results of acute toxicity test information on any new chemical or drug in accordance with *EPA-821-R-02-012,* Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms*, Fifth Edition, October 2002*, using *C. dubia,* to determine the NOAEL, and LOAEL.

   If the toxicity testing, or above listed information submitted to the Regional Board indicates that the drug or chemical is, or may be discharged at a level that will cause, have the reasonable potential to cause, or contribute to an in-stream excursion above any chemical-specific water quality criteria, narrative water quality objective for chemical constituents from the Basin Plan, or narrative water quality objective for toxicity from the Basin Plan, this Order may be reopened to established effluent limitations.

6. The Discharger shall conduct short term toxicity studies in accordance with methods specified in *EPA-821-R-02-012*, to determine the NOAEL, and LOAEL for hydrogen peroxide, potassium permanganate, PVP iodine, chloramine-T, MS-222, and Aqui-S® to reflect concentrations and exposure times that are applicable

to this facility. The results shall be submitted to the Regional Board **within 12 months of adoption of this Order**. The Regional Board will review this information and this permit may be reopened to establish effluent limits based on additional use and toxicity information.

7. The Discharger may conduct studies pertaining to Facility operations, the effluent discharge, and the receiving water. For example, such studies may include a mixing zone and dilution study. The Regional Board will review such studies and, if warranted, will reopen this Order to make appropriate changes.

8. **Adoption of new Minimum Level's (ML's)**: Where an approved laboratory analytical method and associated ML cannot, at this time, determine whether a CTR or NTR constituent is present in the discharge above the applicable criteria, the Discharger shall resample for these constituents if new ML's are adopted by the SWRCB.

9. The Discharger shall report promptly to the Regional Board any material change or proposed change in the character, location, or volume of the discharge.

10. A copy of this Order shall be kept at the discharge Facility for reference by operating personnel. Key operating personnel shall be familiar with its contents.

11. This Order expires on **1 September 2009** and the Discharger must file a Report of Waste Discharge in accordance with Title 23, CCR, not later than **180 days** in advance of such date an application for renewal of waste discharge requirements if it wishes to continue the discharge.

12. The Merced Irrigation District, as owner of the real property at which the discharge will occur, is ultimately responsible for ensuring compliance with these requirements. The Department of Fish and Game retains primary responsibility for compliance with these requirements, including day-to-day operations and monitoring. Enforcement actions will be taken against Merced Irrigation District only in the event that enforcement actions against the Department of Fish and Game are ineffective or have been futile, or that enforcement is necessary to protect public health or the environment.

13. In the event of any change in control or ownership of land or waste discharge facilities presently owned or controlled by the Discharger, the Discharger shall notify the succeeding owner or operator of the existence of this Order by letter, a copy of which shall be immediately forwarded to this office.

    To assume operation under this Order, the succeeding owner or operator must apply in writing to the Executive Officer requesting transfer of the Order. The

request must contain the requesting entity's full legal name, the State of Incorporation if a corporation, the name, address, and the telephone number of the persons responsible for contact with the Regional Board, and a statement. The statement shall comply with the signatory paragraph of Standard Provision D.6. and state that the new owner or operator assumes full responsibility for compliance with this Order. Failure to submit the request shall be considered a discharge without requirements, a violation of the California Water Code. Transfer shall be approved or disapproved in writing by the Executive Officer.

I, THOMAS R. PINKOS, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Regional Board, Central Valley Region on 10 September 2004.

_____
THOMAS R. PINKOS, Executive Officer

Tt:JME

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM NO. R5-2004-0120
NPDES NO. CA0080055

FOR
STATE OF CALIFORNIA – DEPARTMENT OF FISH AND GAME
AND
MERCED IRRIGATION DISTRICT
MERCED RIVER FISH HATCHERY
MERCED COUNTY

INTRODUCTION

This Monitoring and Reporting Program is issued pursuant to California Water Code Section 13383 and includes: influent monitoring of raw water supply, effluent monitoring of discharges to waters of the United States and waters of the State, and receiving water monitoring. All water quality samples shall be representative of the volume and nature of the discharge, or representative of the matrix of material sampled. The time, date, and location of sample collection shall be recorded on a chain of custody (COC) form. COC forms shall be completed for each sample collected and copies provided to the Regional Board with the monthly monitoring reports.

Water quality samples do not need to be taken during months when there are no pollutant discharges to surface waters resulting from aquaculture operations, or associated on-site fish processing (e.g. no monitoring is required if no fish are being held at the facility, monitoring for specific chemicals or drugs only when being used and discharged to surface waters). However, monitoring forms are still required to be submitted on a monthly basis during these periods documenting no discharge.

All water quality sampling and analyses shall be performed in accordance with the Monitoring and Reporting Requirements as outlined in Section C of the Standard Provisions of this Order. Water quality sample collection, storage, and analyses shall be performed according to 40 CFR Part 136, or other methods approved and specified by the Executive Officer. Water and waste analyses shall be performed by a laboratory approved for these analyses by the State Department of Health Services (DHS).

INFLUENT MONITORING

A sampling station shall be established and located where representative samples of the raw water supply can be obtained. Samples shall be collected at approximately the same time as effluent samples. Influent monitoring shall include at least the following:

Constituent	Unit	Type of Sample	Sampling Frequency
Influent flow	cfs	Calibrated meter, weir, or other approved method	Recorded weekly
Total Suspended Solids (TSS)	mg/L	Grab	1/Month

EFFLUENT MONITORING – Outfall 001 and Outfall 002

Effluent samples shall be collected from the pond overflow weir or from the discharge end of the settling pond when there is no pond overflow (Outfall 001). Effluent samples also shall be collected from the two, 500-foot long raceways when discharging directly to the Merced River (Outfall 002). Effluent samples shall be representative of the volume and quality of the discharge. Effluent samples shall be collected during or immediately following raceway cleaning or administration of drug or chemical treatments and must be representative of the volume and quality of the discharge at the time when representative levels of solids, drugs, chemicals, or other pollutants are present in the discharge. Time of collection of samples shall be recorded. Effluent monitoring shall include the following:

Constituent	Units	Type of Sample	Sampling Frequency
Effluent Flow	cfs	Calibrated meter, weir, or other approved method	Recorded weekly
Total suspended solids (TSS)	mg/L	Grab	1/Month
Net TSS (Effluent – Influent)	mg/L	Calculation	1/Month
Settleable solids	ml/L	Grab	1/Month
Conductivity @ 25°C (Specific Conductance)[1]	µmhos/cm	Grab	1/Month
Chloride[1]	mg/L	Grab	1/Month
Formaldehyde[2]	mg/L	Grab	1/Month during use
Copper (Total Recoverable)[3]	µg/L	Grab	1/Month during use
pH[3]	standard units	Grab	1/Month[4]
Hardness[3]	mg/L	Grab	1/Month
PVP Iodine[5]	mg/L	Grab	1/Month during use
Hydrogen peroxide[5]	mg/L	Grab	1/Month during use
Potassium permanganate[5]	mg/L	Grab	1/Month during use
Chloramine-T[5]	mg/L	Grab	1/Month during use
MS-222[5]	mg/L	Grab	1/Month during use
Aqui-S®[5]	mg/L	Grab	1/Month during use

[1] In months when sodium chloride is added to waters of the Facility, conductivity and chloride concentration shall be measured during sodium chloride use.

[2] In months when Formalin is added to the waters of the Facility, formaldehyde concentration shall be measured during Formalin use.

[3] In months when copper sulfate is added to the waters of the Facility, total recoverable copper concentration shall be measured during copper sulfate use. A daily maximum or monthly average copper concentration shall be considered non-compliant with the applicable effluent limitation only if it exceeds the effluent limitation and the reported minimum level (ML). The highest acceptable ML for calibration purposes is 0.5 µg/l. The sample shall be collected during the time of peak discharge of copper, at least one hour after start of treatment. Effluent hardness and pH shall be measured at the same time as total recoverable copper.

[4] Daily during copper (e.g., copper sulfate) treatments only.

[5] The analytical method used for PVP iodine, hydrogen peroxide, potassium permanganate, MS-222, Aqui-S®, and Chloramine-T shall be approved by the Executive Officer. If no approved methods are available effluent concentrations may be determined by calculation as approved by the Executive Officer.

RECEIVING WATER MONITORING IN THE MERCED RIVER

Receiving water samples shall be collected monthly when fish are being held at the Facility. All receiving water samples shall be grab samples collected at a depth of 6 to 12 inches below the surface. Receiving water monitoring shall include at least the following:

R-1	At the entrance to the intake pipe.
R-2	50 feet below Outfall 002.

Constituent	Unit	Station	Sampling Frequency
Flow	Cfs	R-1	1/Month
PH	Units	R-1, R-2	1/Month
Temperature	ºC	R-1, R-2	1/Month
Dissolved Oxygen	mg/L	R-1, R-2	1/Month
Conductivity @ 25°C (Specific Conductance)[1]	µmhos/cm	R-1, R-2	1/Month (Concurrent with salt use)
Turbidity	NTU	R-1, R-2	1/Quarter

[1] In months when sodium chloride is added to waters of the Facility, conductivity shall be measured during sodium chloride use.

In conducting the receiving water sampling, a log shall be kept of the receiving water conditions throughout the reach bounded by Stations R-1 through R-2. Attention shall be given to the presence or absence of:

a. Floating or suspended matter
b. Discoloration
c. Bottom deposits
d. Aquatic life
e. Visible films, sheens, or coatings
f. Fungi, slimes, or objectionable growths
g. Potential nuisance conditions

Notes on receiving water conditions shall be summarized in the monitoring report.

MONTHLY DRUG AND CHEMICAL USE REPORT

Order R5-2004-0120 prohibits the discharge of aquaculture chemicals and drugs unless the Regional Board has received prior notice in accordance with Provision G.5. of Order R5-2004-0120, the following information shall be submitted for all aquaculture drugs or chemicals used at the Facility. This information shall be reported at **monthly** intervals using the appropriate Monthly Discharge Monitoring Reports:

a. The name(s) and active ingredient(s) of the drug or chemical.

b. The date(s) of application.

c. The purpose(s) for the application.

d. The method of application (e.g., immersion bath, administered in feed), duration of treatment, whether the treatment was static or flush (for drugs or chemicals applied directly to water), amount in gallons or pounds used, treatment concentration(s), and the flow in cubic feet per second (cfs) in the treatment units.

e. The total flow through the facility in cubic feet per second (cfs) to the Merced River after mixing with the treated water.

f. For drugs and chemicals applied directly to water (i.e., immersion bath, flush treatment) and for which effluent monitoring is not otherwise required, the estimated concentration in the effluent at the point of discharge to the Merced River.

g. The method of disposal for drugs or chemicals used but not discharged in the effluent.

Calculation of Concentration:

For drugs or chemicals used in an immersion bath, “drip” treatment, or in other direct application to waters at the facility, use the following formula to calculate concentration (C) at the point of discharge.

C = concentration of chemical or drug at the point of discharge

C = (treatment concentration) x (volume of water through treatment area during treatment time)
÷ (volume of water through facility during treatment time + volume of settling basin)

Example: Oxytetracycline concentration

C = 100.0 mg/L (oxytetracycline) x 1800 gallons of water in treatment area during 1-hour treatment
191,568 gallons of water through facility in 1-hour + 561,000 gallons of water in settling basin

C = 0.2 mg/L oxytetracycline at the point of discharge

This information shall be submitted monthly. If the analysis of this chemical use data compared with any toxicity testing results or other available information for the therapeutic agent, chemical or anesthetic indicates that the discharge may cause, have the reasonable potential to cause, or contribute to an excursion of a numeric or narrative water quality criterion or objective, the Executive Officer may require site specific whole effluent toxicity (WET) tests using *C. dubia* or reopen this Order to include an effluent limitation based on that objective.

SEPTIC TANK MONITORING AND INSPECTIONS

Septic tank maintenance inspections (including tank sludge level measurement) shall be performed at least once per year. Information concerning inspections and maintenance activities (including, but not limited to, pumping, replacement, and repairs) shall be included in the monitoring reports submitted to the Regional Board and the Annual Report.

LEACHFIELD MONITORING

The Discharger shall inspect leachfield areas weekly and submit the results in the monthly monitoring report. Monitoring shall include any observations of seeps, erosion, field saturation, ponding liquid, the presence of nuisance and other field conditions.

PRIORITY POLLUTANT METALS MONITORING

The State Water Resources Control Board (SWRCB) adopted the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (known as the State Implementation Policy or SIP). The SIP states that the Regional Boards will require periodic monitoring (at least once prior to issuance and reissuance of a permit) for pollutants for which criteria or objectives apply and for which no effluent limitations have been established.

The Regional Board has determined that, based on priority pollutant data collected from this and similar facilities, discharge of priority pollutants other than metals is unlikely. Accordingly, the Regional Board is requiring, as part of this Monitoring and Reporting Program, that the Discharger monitor effluent and receiving water (at a receiving water station R-1, upstream of the point of

discharge) and analyze the sample for priority pollutant metals **one time at least 180 days but no more than 365 days prior to expiration of this Order.**

The Discharger must analyze pH and hardness of the effluent and receiving water at the same time as priority pollutant metals. The priority pollutant metals for which this one-time analysis is required are as follows:

- Antimony
- Arsenic
- Beryllium
- Cadmium
- Chromium (III)
- Chromium (IV)
- Copper
- Lead
- Mercury
- Nickel
- Selenium
- Silver
- Thallium
- Zinc

Metals shall be analyzed by the USEPA methods listed below. Alternative analytical procedures may be used with approval by the Regional Board if the alternative method has the same or better detection level than the method listed.

Method Description	EPA Method	Constituents
Inductively Coupled Plasma/Mass Spectrometry (ICP/MS)	1638	Antimony, Beryllium, Cadmium, Copper, Lead, Nickel, Selenium, Silver, Thallium, Total Chromium, Zinc
Cold Vapor Atomic Absorption (CVAA)	1631	Mercury
Gaseous Hydride Atomic Absorption (HYDRIDE)	206.3	Arsenic
Flame Atomic Absorption (FAA)	218.4	Chromium VI

All priority pollutant metal analyses shall be performed at a laboratory certified by the California Department of Health Services. The laboratory is required to submit the Minimum Level (ML) and the Method Detection Limit (MDL) with the reported results for each constituent. The MDL should be as close as practicable to the USEPA MDL determined by the procedure found in 40 CFR Part 136. The results of analytical determinations for the presence of chemical constituents in a sample shall use the following reporting protocols:

a. Sample results greater than or equal to the reported ML shall be reported as measured by the laboratory.

b. Sample results less than the reported ML, but greater than or equal to the laboratory's MDL, shall be reported as "Detected but Not Quantified," or DNQ. The estimated chemical concentration of the sample shall also be reported.
c. For the purposes of data collection, the laboratory shall write the estimated chemical concentration next to DNQ as well as the words "Estimated Concentration." Numerical estimates of data quality may be by percent accuracy (+ or – a percentage of the reported value), numerical ranges (low to high), or any other means considered appropriate by the laboratory.
d. Sample results that are less than the laboratory's MDL shall be reported as "Not Detected" or ND.

GENERAL REPORTING REQUIREMENTS

The Discharger shall implement this monitoring program on the first day of the month following adoption of the Order. The Discharger shall submit monthly Discharge Monitoring Reports to the Regional Board by the **first day of the second month** following sample collection. Annual monitoring reports shall be submitted by **30 January** each year. All reports submitted in response to this Order shall comply with signatory requirements of Standard Provision D.6.

By **30 January of each year**, the Discharger shall submit a written Annual Report to the Executive Officer containing the following information:

1. A tabulation by month of the pounds of fish produced during the previous year including dates of operation and species and amount (lbs.) of fish harvested, processed, or released per month.

2. A summary of information on monthly land application and land disposal of solids and wastewater during the previous year including the type and amount of solids and wastewater that are land-applied or land disposed.

3. A summary of all feeding practices used at the facility on a monthly basis including:
    a. The name(s), type(s) and amount(s) of feed(s) used.
    b. The percent of phosphorus in the feed(s) used (as available).
    c. The method and frequency of feeding.

4. Septic tank inspection and maintenance report.

5. Monthly records documenting cleaning, inspections, maintenance, and repairs of all production and wastewater treatment systems.

In the event that there is failure in or damage to the structure of an aquatic animal containment system that results in an unanticipated material discharge of pollutants to waters of the United States or waters of the State, the Discharger shall provide an oral report within 24 hours describing the

cause of the failure or damage and identifying the materials that have been released to the environment as a result of the failure or damage. Within 7 days of discovery of the failure or damage, the Discharger shall provide a written report documenting the cause, the estimated time elapsed until the failure or damage was repaired, and steps being taken to prevent a recurrence.

In the event the Discharger becomes aware of a violation of the prohibitions, specifications, or limitations of this Order, the Discharger shall notify the Board by telephone within 24 hours of having knowledge of such noncompliance, and shall confirm this notification in writing within 5 days.

If the Discharger monitors any pollutant more frequently than is required by this Order, the results of such monitoring shall be included in the calculation of the values required in the monthly monitoring report. Such increased frequency also shall be indicated on the monthly monitoring report.

Ordered by: _____
THOMAS R. PINKOS, Executive Officer

10 September 2004
(Date)

Tt:JME

INFORMATION SHEET

FACILITY DESCRIPTION

The California Department of Fish and Game (DFG) operates the Merced River Fish Hatchery on land owned by the Merced Irrigation District at 4998 Robinson Road, Snelling, Merced County, California. The facility raises Chinook salmon from eggs to fingerlings and, at times, to yearlings, for mitigation and enhancement of the Merced River and other rivers in the Region. Incoming water is taken from the Merced River at the Crocker-Hoffman Dam and is distributed through the facility, which includes a hatchery building; two parallel, 500-foot concrete raceways; a spawning channel, a fish ladder, and a full flow-settling basin. Fish typically are raised from early November through April, May, or June, when they are released. The facility may be inactive all or part of the time from June through early November. Discharges from the facility occur through Outfall 001 from the 561,000 gallon settling basin to the Merced River or occasionally from Outfall 002, a direct discharge from either raceway, bypassing the settling basin, when fish are released to the Merced River. The discharge of treated flow-through process wastewater to the Merced River was previously regulated by Waste Discharge Requirements (WDRs) Order No. 96-163 (NPDES No. CA0080055) issued to DFG and the Merced Irrigation District (together, the Discharger) and adopted by the Regional Board on 21 June 1996.

In its application to renew WDRs (Report of Waste Discharge) of 24 January 2002, the Discharger reports annual production of 18,000 pounds in its smolt program and 100,000 pounds in its smolt/yearling program. 22,000 pounds of food are fed during the calendar month of maximum feeding. The facility meets the criteria for a concentrated aquatic animal production (CAAP) facility, as established by USEPA at 40 Code of Federal Regulations (CFR) 122.24, as discussed below.

Except during periods of fish release directly from raceways to the Merced River, all flow through the facility passes through the settling basin before discharge to the river. In its Report of Waste Discharge, the Discharger reports average flows of 5.1 million gallons per day (mgd) for a nine month period through the raceways and 0.6 mgd for a four month period through the hatchery/nursery facilities, for a total of 5.7 mgd, and maximum daily flows of 5.2 and 0.7 mgd, for a total of 5.9 mgd, through the same systems. These flows enter the settling basin, which is constructed in permeable gravels and is described by the Discharger as a settling/percolation basin. Overflow from the settling basin occurs through an elevation control gate. During the first eight months of 2003, the daily average discharge through the control gate was reported on discharge monitoring reports as 4.22 mgd, meaning that 1.5 mgd (approximately 26 percent) of the total reported flow through the facility likely percolates into shallow groundwater adjacent to the river. Merced County regulates the discharge of the domestic wastewater from the office and hatchery buildings to an on-site septic tank/leach field system.

Wastes generated at the Facility include fish fecal material, unconsumed fish food, nutrients, algae, silt, chemicals, and therapeutic agents used to treat fish and control disease. Available effluent monitoring data from 1999 through August 2003 are summarized in Table 1 below, which shows

that levels of BOD_5 and suspended and settleable solids in discharges from the facility are consistently very low. These discharges are within the limitations established by Order No. 96-163. In addition, pH is consistently within the range of 6.5 – 8.5 required by the current Order. In Annual Reports and its Report of Waste Discharge, the Discharger reports the use of certain aquaculture drugs and chemicals, specifically Tricaine methanesulfonate (MS-222), carbon dioxide, and povidone iodine (PVP Iodine). Information provided to the Regional Board by DFG on 29 October 2003 also indicates that several other aquaculture drugs and chemicals may have been used in the past or may be used in the future in limited circumstances. These aquaculture drugs and chemicals include copper sulfate, Formalin, acetic acid, sodium chloride (salt), hydrogen peroxide, potassium permanganate, Chloramine-T, and the antibiotics Oxytetracycline, Florfenicol, and Penicillin-G.

APPLICABLE REGULATIONS, POLICIES, AND PLANS

A cold-water concentrated aquatic animal production (CAAP) facility is defined in Title 40 of the Code of Federal Regulations (40 CFR 122.24) as a fish hatchery, fish farm, or other facility which contains, grows, or holds cold-water fish species or other cold water aquatic animals including, but not limited to, the Salmonidae family of fish (e.g. trout and salmon) in ponds, raceways, or other similar structures. In addition, the facility must discharge at least 30 calendar days per year, produce at least 20,000 pounds harvest weight (9,090 kilograms) of aquatic animals per year, and feed at least 5,000 pounds (2,272 kilograms) of food during the calendar month of maximum feeding. A facility that does not meet the above criteria may also be designated a cold water CAAP facility upon a determination that the facility is a significant contributor of pollution to waters of the United States [40 CFR 122.24(c)]. Cold water, flow-through CAAP facilities are designed to allow the continuous flow of fresh water through tanks and raceways used to produce aquatic animals (typically cold-water fish species). Flows from CAAP facilities ultimately are discharged to waters of the United States and of the State. 40 CFR 122.24 specifies that CAAP facilities are point sources subject to the National Pollutant Discharge Elimination System (NPDES) program. The Discharger's facility meets the definition of a cold-water, flow-through CAAP.

The operation of CAAP facilities may introduce a variety of pollutants into receiving waters. The USEPA identifies three classes of pollutants: (1) conventional pollutants (i.e., total suspended solids (TSS), oil and grease (O&G), biochemical oxygen demand (BOD_5), fecal coliforms, and pH); (2) toxic pollutants (e.g., metals such as copper, lead, nickel, and zinc and other toxic pollutants; and (3) non-conventional pollutants (e.g., ammonia-N, Formalin, and phosphorus). The most significant pollutants discharged from CAAP facilities are solids from uneaten feed, as well as fish feces that settles to the bottom of the raceways. Both of these types of solids are primarily composed of organic matter including BOD_5, organic nitrogen, and organic phosphorus. Fish raised in CAAP facilities may become vulnerable to disease and parasite infestations. Various aquaculture drugs and chemicals are used periodically at CAAP facilities to ensure the health and productivity of the confined fish population, as well as to maintain production efficiency. Aquaculture drugs and chemicals are used to clean raceways and to treat fish for parasites, fungal growths and bacterial infections. Aquaculture drugs and chemicals are also used to anesthetize fish prior to spawning or

prior to the annual "tagging" process. As a result of these operations and practices, drugs and chemicals may be present in discharges to waters of the United States or waters of the State.

In August 2004, U.S. EPA promulgated Effluent Limitation Guidelines and New Source Performance Standards for the Concentrated Aquatic Animal Production Point Source Category (hereafter "ELG"). The ELG regulation establishes national technology-based effluent discharge requirements for flow-through and recirculating systems and for net pens based on Best Practicable Control Technology Currently Available (BPT); Best Control Technology for Conventional Pollutants (BCT); Best Available Technology Economically Achievable (BAT); and New Source Performance Standards (NSPS). In its proposed rule, published on 12 September 2002, U.S. EPA proposed to establish numeric limitations for a single constituent – total suspended solids (TSS) – while controlling the discharge of other constituents through narrative requirements. In the final rule, however, U.S. EPA determined that, for a nationally applicable regulation, it would be more appropriate to promulgate qualitative TSS limitations in the form of solids control best management practices (BMP) requirements. Furthermore, the final ELG does not include numeric effluent limitations for non-conventional and toxic constituents, such as aquaculture drugs and chemicals, but also relies on narrative limitations to address these constituents.

The Regional Board adopted a *Water Quality Control Plan*, *Fourth Edition, for the Sacramento and San Joaquin River Basins* (hereafter Basin Plan). The Basin Plan designates beneficial uses, establishes water quality objectives, and describes an implementation program and policies to achieve water quality objectives for all waters of the Basin. This includes plans and policies adopted by the State Water Resources Control Board (SWRCB) and incorporated by reference, such as Resolution No. 68-16, "Statement of Policy with Respect to Maintaining High Quality of Waters in California" (Resolution No. 68-16). These requirements implement the Basin Plan. The Basin Plan, as amended, designates beneficial uses, establishes water quality objectives, and contains implementation plans and policies for waters of the Basin. Pursuant to the California Water Code Section 13263(a), waste discharge requirements must implement the Basin Plan.

USEPA adopted the *National Toxics Rule* (NTR) on 22 December 1992, which was amended on 4 May 1995 and 9 November 1999, and the *California Toxics Rule* (CTR) on 18 May 2000, which was amended on 13 February 2001. These Rules contain water quality standards applicable to this discharge. The SWRCB adopted the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (known as the State Implementation Policy or SIP) on 2 March 2000, which contains policies and procedures for implementation of the NTR and the CTR.

Resolution No. 68-16 requires the Regional Board, in regulating discharges of waste, to maintain high quality waters of the State until it is demonstrated that any change in water quality will be consistent with the maximum benefit to the people of the State, will not unreasonably affect beneficial uses, and will not result in water quality less than that described in the Regional Board's policies (e.g., water quality constituents in concentrations that exceed water quality objectives). Resolution 68-16 requires that discharges be regulated to meet best practicable treatment or control

in order to assure that pollution or nuisance will not occur; and the highest water quality be consistently maintained for the maximum benefit to the people of the State. The Board has considered Resolution 68-16 and Federal antidegradation regulations at 40 CFR 131.12.

Regulation of Aquaculture Drugs and Chemicals

CAAP facilities produce fish and other aquatic animals in greater numbers than natural stream conditions would allow; therefore, system management is important to ensure that fish do not become overly stressed, making them more susceptible to disease outbreaks. The periodic use of various aquaculture drugs and chemicals is needed to ensure the health and productivity of cultured aquatic stocks and to maintain production efficiency.

CAAP facilities may legally obtain and use aquaculture drugs in one of several ways. Some aquaculture drugs and chemicals used at CAAP facilities in the Region are approved by the U.S. Food and Drug Administration (FDA) for certain aquaculture uses on certain aquatic species. Others have an exemption from this approval process when used under certain specified conditions. Still others are not approved for use in aquaculture, but are considered to be of "low regulatory priority" by FDA (hereafter "LRP drug"). FDA is unlikely to take regulatory action related to the use of a LRP drug if an appropriate grade of the chemical or drug is used, good management practices are followed, and local environmental requirements are met (including NPDES permit requirements). Finally, some drugs and chemicals may be used for purposes, or in a manner not listed on their label (i.e., "extra-label" use) under the direction of licensed veterinarians for the treatment of specific fish diseases diagnosed by fish pathologists. It is assumed that veterinarian-prescribed aquaculture drugs are used only for *short periods of duration* during acute disease outbreaks. Each of these methods of obtaining and using aquaculture drugs is discussed in further detail below.

It is the responsibility of those using, prescribing, or recommending the use of these products to know which aquaculture drugs and chemicals may be used in CAAP facilities in the Region under all applicable federal, State, and local regulations and which aquaculture drugs and chemicals may be discharged to waters of the United States and waters of the State in accordance with this permit. A summary of regulatory authorities related to aquaculture drugs and chemicals is outlined below.

Summary of Regulatory Authorities

FDA is responsible for ensuring the safety, wholesomeness, and proper labeling of food products; ensuring the safety and effectiveness of both human and animal drugs; and ensuring compliance with existing laws governing these drugs. The Federal Food, Drug, and Cosmetic Act (FFDCA), the basic food and drug law of the United States, includes provisions for regulating the manufacture, distribution, and the use of, among other things, new animal drugs and animal feed. FDA's enforcement activities include correction and prevention of violations, removing illegal products or goods from the market, and punishing offenders. Part of this enforcement includes testing domestic and imported aquacultural products for drug and pesticide residues.

FDA's Center for Veterinary Medicine (CVM) regulates the manufacture, distribution, and use of animal drugs. CVM is responsible for ensuring that drugs used in food-producing animals are safe and effective and that food products derived from treated animals are free from potentially harmful residues. CVM approves the use of new animal drugs based on data provided by a sponsor (usually a drug company). To be approved by CVM, an animal drug must be effective for the claim on the label) and safe when used as directed for (1) treated animals; (2) persons administering the treatment; (3) the environment, including non-target organisms; and (4) consumers. CVM establishes tolerances and animal withdrawal periods as needed for all drugs approved for use in food-producing animals. CVM has the authority to grant investigational new animal drug (INAD) exemptions so that data can be generated to support the approval of a new animal drug.

There are several options for CAAP facilities to legally obtain and use aquaculture drugs. Aquaculture drugs and chemicals can be divided into four categories as outlined below: approved drugs, investigational drugs, unapproved drugs of low regulatory priority, and extra-label use drugs.

- ***FDA approved new animal drugs***

Approved new animal drugs have been screened by the FDA to determine whether they cause significant adverse public health or environmental impacts when used in accordance with label instructions. Currently, there are six new animal drugs approved by FDA for use in food-producing aquatic species. These six FDA-approved new animal drugs are:

1. Chorionic gonadrotropin (Chlorulun®), used for spawning;
2. Oxytetracycline (Terramycin®), an antibiotic;
3. Sulfadimethoxine-ormetoprim (Romet-30®), an antibiotic;
4. Tricaine methanesulfonate (MS-222, Finquel® and Tricaine-S), an anesthetic;
5. Formalin (Formalin-F®, Paracide F® and PARASITE-S®), used as a fungus and parasite treatment; and
6. Sulfamerazine, an antibiotic.

Each aquaculture drug in this category is approved by FDA for use on specific fish species, for specific disease conditions, for specific dosages, and with specific withdrawal times. Product withdrawal times must be observed to ensure that any product used on aquatic animals at a CAAP facility does not exceed legal tolerance levels in the animal tissue. Observance of the proper withdrawal time helps ensure that products reaching consumers are safe and wholesome.

FDA-approved new animal drugs that are added to aquaculture feed must be specifically approved for use in aquaculture feed. Drugs approved by FDA for use in feed must be found safe and effective. Approved new animal drugs may be mixed in feed for uses and at levels that are specified in FDA medicated-feed regulations only. It is unlawful to add drugs to feed unless the drugs are approved for feed use. For example, producers may not top-dress feed with a water-soluble, over-the-counter antibiotic product. Some medicated feeds, such as Romet-30®, may be

manufactured only after the FDA has approved a medicated-feed application (FDA Form 1900) submitted by the feed manufacturer.

- ***FDA Investigational New Animal Drugs (INAD)***

Aquaculture drugs in this category can only be used under an investigational new animal drug or "INAD" exemption. INAD exemptions are granted by FDA CVM to permit the purchase, shipment and use of an unapproved new animal drug for investigational purposes. INAD exemptions are granted by FDA CVM with the expectation that meaningful data will be generated to support the approval of a new animal drug by FDA in the future. Numerous FDA requirements must be met for the establishment and maintenance of aquaculture INADs.

There are two types of INADs: standard and compassionate. Aquaculture INADs, most of which are compassionate, consist of two types: routine and emergency. A compassionate INAD exemption is used in cases in which the aquatic animal's health is of primary concern. In certain situations, producers can use unapproved drugs for clinical investigations (under a compassionate INAD exemption) subject to FDA approval. In these cases, CAAP facilities are used to conduct closely monitored clinical field trials. FDA reviews test protocols, authorizes specific conditions of use, and closely monitors any drug use under an INAD exemption. An application to renew an INAD exemption is required each year. Data recording and reporting are required under the INAD exemption in order to support the approval of a new animal drug or an extension of approval for new uses of the drug.

- ***FDA Unapproved new animal drugs of low regulatory priority (LRP drugs)***

LRP drugs do not require a new animal drug application (NADA) or INAD exemptions from FDA. Further regulatory action is unlikely to be taken by FDA on LRP drugs as long as an appropriate grade of the drug or chemical is used, good management practices are followed, and local environmental requirements are met (such as NPDES permit requirements contained in this Permit). LRP drugs commonly used at CAAP facilities in the Region include the following:

1. Acetic acid, used as a dip at a concentration of 1,000-2,000 mg/L for 1-10 minutes as a parasiticide for fish.
2. Carbon dioxide gas, used for anesthetic purposes in cold, cool and warm water fish.
3. Hydrogen peroxide, used at 250-500 mg/L to control fungi on all species and life stages of fish, including eggs.
4. Povidone iodine (PVP) compounds, used as a fish egg disinfectant at rates of 50 mg/L for 30 minutes during egg hardening and 100 mg/L solution for 10 minutes after water hardening.
5. Sodium bicarbonate (baking soda), used at 142-642 mg/L for 5 minutes as a means of introducing carbon dioxide into the water to anesthetize fish.

6. Sodium chloride (salt), used at 0.5-1% solution for an indefinite period as an osmoregulatory aid for the relief of stress and prevention of shock. Used as 3% solution for 10-30 minutes as a parasiticide.

FDA is unlikely to object at present to the use of these LRP drugs if the following conditions are met:

1. The aquaculture drugs are used for the prescribed indications, including species and life stages where specified.
2. The aquaculture drugs are used at the prescribed dosages (as listed above).
3. The aquaculture drugs are used according to good management practices.
4. The product is of an appropriate grade for use in food animals.
5. An adverse effect on the environment is unlikely.

FDA's enforcement position on the use of these substances should be considered neither an approval nor an affirmation of their safety and effectiveness. Based on information available in the future, FDA may take a different position on their use. In addition, FDA notes that classification of substances as new animal drugs of LRP does not exempt CAAP facilities from complying with all other federal, state and local environmental requirements, including compliance with this Permit

- ***Extra-label use of an approved new animal drug***

Extra-label drug use is the actual or intended use of an approved new animal drug in a manner that is not in accordance with the approved label directions. This includes, but is not limited to, use on species or for indications not listed on the label. Only a licensed veterinarian may prescribe extra-label drugs under FDA CVM's extra-label drug use policy. CVM's extra-label use drug policy (CVM Compliance Policy Guide 7125.06) states that licensed veterinarians may consider extra-label drug use in treating food-producing animals if the health of the animals is immediately threatened and if further suffering or death would result from failure to treat the affected animals. CVM's extra-label drug use policy does not allow the use of drugs to prevent diseases (prophylactic use), improve growth rates, or enhance reproduction or fertility. Spawning hormones cannot be used under the extra-label policy. In addition, the veterinarian assumes the responsibility for drug safety and efficacy and for potential residues in the aquatic animals.

RECEIVING WATER BENEFICIAL USES

Within the Basin Plan the Regional Board states that protection and enhancement of existing and potential beneficial uses are primary goals of water quality planning, and that disposal of wastewaters is not a prohibited use of waters of the State but merely a use that cannot be satisfied to the detriment of beneficial uses. Existing and potential beneficial uses that apply to surface waters of the Region are presented in Figure II-1 and Table II-1 of the Basin Plan. The beneficial uses of the Merced River from McSwain Reservoir to the San Joaquin River, as identified in Table II-1 of the Basin Plan, are municipal and domestic supply (MUN); stock watering (AGR); industrial

process, service, and power supply (PROC, IND, and POW); water contact recreation (including canoeing and rafting) (REC-1); non-contact water recreation (REC-2); warm and cold freshwater habitat (WARM and COLD); warm and cold water fish migration habitat (MIGR); warm and cold water spawning habitat (SPWN); and wildlife habitat (WILD).

Beneficial uses of the underlying groundwater are municipal and domestic supply (MUN), agricultural supply irrigation (AGR), industrial service supply (IND) and industrial process supply (PRO).

REASONABLE POTENTIAL ANALYSIS AND EFFLUENT LIMITATIONS

Federal regulations at 40 CFR Section 122.44 require NPDES permits to contain effluent limitations, including technology-based and water quality standards-based limitations and limitations based on toxicity.

The federal regulations at 40 CFR 122.44(d)(1) require effluent limitations for all pollutants that are or may be discharged at a level that will cause, have the reasonable potential to cause, or contribute to an in-stream excursion above a numeric water quality criterion (such as CTR criterion) or a narrative water quality criterion within a State water quality standard. These regulations also set forth a methodology for establishing effluent limitations based on narrative state water quality criteria [40 CFR 122.44(d)(1)(vi)(A-C)].

The USEPA, SWRCB, and Regional Board have adopted or published standards that are used to implement 40 CFR 122.44. The USEPA has promulgated the CTR and NTR that established water quality criteria. The SWRCB has adopted the SIP that implements the CTR and NTR. The USEPA also has published recommended ambient water quality criteria and the Basin Plan contains numeric and narrative water quality objectives. The Basin Plan contains an Implementation Policy ("Policy for Application of Water Quality Objectives") that, in part, sets forth a process for translating narrative water quality objectives into numeric effluent limitations. The USEPA ambient water quality criteria, results of toxicity studies conducted by the California Department of Fish and Game, and the Basin Plan "Policy of Application of Water Quality Objectives" have been used to implement 40 CFR 122.44(d)(1)(v).

TECHNOLOGY-BASED EFFLUENT LIMITATIONS

Total Suspended Solids and Settleable Solids

Based on information submitted as part of the application, in studies, and as directed by monitoring and reporting programs, the Regional Board determined that numeric technology-based effluent limitations for total suspended solids (TSS) and settleable solids are appropriate. In addition, based upon application of the final ELG for CAAP facilities, the Regional Board is establishing requirements for a BMP plan.

Background

As noted above, USEPA's final ELG for the aquaculture industry does not include numeric effluent limitations on any conventional, non-conventional, or toxic constituents. Rather, USEPA promulgated qualitative limitations in the form of BMP requirements. The Regional Board is establishing effluent limitations for discharges of total suspended solids (TSS) and settleable solids from this Facility. Technology-based requirements in this Order are based on a combination of application of the ELG for BMP requirements and case-by-case numeric limitations developed using best professional judgment (BPJ) and carried over from the previous Order No. 96-163. These effluent limitations are 5.0 mg/L net TSS as an average monthly limitation and 15 mg/L net TSS as a maximum daily limitation; and 0.1 ml/L settleable solids as an average monthly limitation and 0.2 ml/L settleable solids as a maximum daily limitation. Removal of these numeric limitations for TSS and settleable solids would constitute backsliding under CWA Section 402(o). The Regional Board has determined that these numeric effluent limitations for TSS and settleable solids continue to be applicable to the Facility and that backsliding is not appropriate. These limitations are established as a means of controlling the discharge of solids from algae, silt, fish feces and uneaten feed. Previous Orders for hatcheries have expressed effluent limitations for TSS in terms of a net limitation. The Regional Board finds the use of a net TSS effluent limitation is an appropriate measure of performance, and correct interpretation of this limitation and does not constitute backsliding (40 CFR 122.44(l)(2)(i)(B)(2)). Results of monitoring indicate the Discharger is capable of meeting these limitations. This Order does not include mass effluent limitations for TSS because there are no standards that specifically require a mass-based effluent limitation, mass of the pollutant discharged is not specifically related to a measure of operation (40 CFR 122.45(f)(iii)), and, in addition, mass-based effluent limitations for TSS are not necessary because this Order includes both concentration-based limitations and a maximum flow limitation. These changes are consistent with Federal anti-backsliding provisions of 40 CFR 122.44(l)(1) and 122.62(a)(2)

Relationship Between Technology-based and Water Quality-based Requirements

In addition to carrying over numeric technology-based requirements based on BPJ, the Regional Board considered the need for water quality-based limitations for TSS and settleable solids. The Regional Board determined that the numeric technology-based TSS and settleable solids limitations, along with the requirement for a BMP plan, are sufficient to ensure attainment of Basin Plan water quality objectives for sediment, settleable material, and suspended material.

BOD_5

Order 96-163 included technology-based effluent limitations for BOD_5 based upon BPJ. This Order does not include limitations for BOD_5, as the control of TSS and settleable solids in the discharge and implementation of a Best Management Practices Plan will effectively control levels of BOD_5 in the discharge. This determination is based, in part, on findings USEPA Region 10 presented in its General NPDES Permit (No. ID-G13-0000) for Aquaculture Facilities in Idaho and the

accompanying Fact Sheet, as well as observation and analysis of monitoring data from aquaculture facilities throughout the Central Valley Region. In addition, USEPA's proposed ELG for CAAP facilities (12 September 2002) stated that controlling TSS discharges from flow-through, CAAP facilities will effectively control BOD_5 and nutrients. The final ELG also correlates TSS removal and BOD_5 removal. Furthermore, the maximum reported BOD_5 concentration in the Facility's effluent between February 1999 and August 2003 was 2.6 mg/L, well below both the maximum daily and average monthly limitations of 15 mg/L and 5 mg/L respectively. Based on this new information that has become available since adoption of Order No. 96-163, the Regional Board has determined that it is appropriate to remove the BOD_5 limitations from this Order. This change is consistent with the Federal anti-backsliding provisions of 40 CFR 122.44(l)(1) and 122.62(a)(2).

WATER QUALITY-BASED EFFLUENT LIMITATIONS (WQBELs)

Based on information submitted as part of the Report of Waste Discharge, in annual and monthly monitoring reports, in studies performed by and correspondence with DFG, and in independent studies, the Regional Board has found that the discharge may cause, have the reasonable potential to cause, or contribute to in-stream excursions of applicable numeric water quality criteria or water quality objectives or narrative water quality objectives for the following constituents: copper, pH, and formaldehyde.

No credit for dilution or assimilative capacity of the receiving water has been allowed by the Regional Board in establishing the proposed WQBELs of the Order. WQBELs are established to meet applicable water quality criteria at the point of discharge. Effluent limitations for these parameters are being established without benefit of dilution. The Regional Board is not obligated to delegate the assimilative capacity of receiving waters to a Discharger. The downstream minimum flow of 9.7 mgd in the Merced River includes the flow from the Facility, which averages 5.1 mgd. Further, the copper and formaldehyde limitations are based protection of aquatic life from acute effects. Therefore, it is appropriate calculate effluent limitations with no dilution allowance.

CTR Constituents

On 27 February 2001, the Discharger was issued a letter pursuant to CWC Section 13267 requesting receiving water and effluent monitoring data to perform a reasonable potential analysis for the CTR pollutants. Effluent and receiving water samples collected on 5 March 2002 and analyzed for volatile and semi-volatile substances, metals, asbestos, 2,3,7,8-TCDD, and sixteen dioxin congeners showed that none of the CTR priority pollutants were present in the discharge at levels that would cause or contribute to an in-stream excursion above a numeric water quality criterion from the CTR. However, in information received from DFG on 29 October 2003 projections of the potential use of copper sulfate at the Facility and the estimated resulting concentration of copper in the discharge indicate that there is a reasonable potential that copper may be discharged at a concentration that would cause, have the reasonable potential to cause, or contribute to an excursion of the CTR criteria for copper in the receiving water.

Copper

Copper, primarily in the forms of copper sulfate and chelated copper compounds, is used in fish hatcheries to control algae and other vegetation that is susceptible to the toxic effects of copper uptake, and it is used to control the growth of external parasites and bacteria on fish. Copper sulfate may be used at the Facility at a rate of up to 0.5 pounds copper sulfate per 1 cfs in raceways. Based on this application rate in a single raceway, DFG estimates that copper sulfate may be discharged at 0.2 mg/L or 200 µg/L.

DFG Flow Assumptions:

The hatchery's settling pond dimensions are 300ft x 50 ft x 5 ft (561,000 gal). The hatchery has 2 raceways, each 500 ft long with a minimum 3 cfs flow, or 161,568 gallons total for both in one hour (80,784 gph).

The hatchery building has a 500 gal/min flow, or 30,000 gal/hr (gph), which also goes to the settling pond.

The total dilution volume for all sources (i.e. 2 raceways and the flow from the hatchery) during a **one hour treatment**, plus the volume of the settling pond is 752,568 gallons.

Estimate of Copper Sulfate and Copper Concentrations:

1.5lbs copper sulfate/(752,568 gallons water x 8.34 pounds/gallon) x 1,000,000

= **0.24 ppm copper sulfate**
= **0.095 ppm or 95 ppb copper**

Copper is identified as a priority pollutant in the NTR and CTR. The CTR includes the Ambient Water Quality Criteria for the Protection of Aquatic Life for copper. The Criterion Maximum Concentration (CMC), a 1-hour average, and Criterion Continuous Concentration (CCC), a 4-day average, are hardness dependent. The criteria are expressed in terms of the dissolved fraction of the metal in the water column and are calculated from the total recoverable values by applying a conversion factor. The conversion factor in the CTR is 0.96 for both acute (CMC) and chronic (CCC) criteria. Because effluent limitations are calculated without benefit of dilution, the applicable criteria will be based on the hardness of the effluent rather than the receiving water. The Discharger did not report on hardness when submitting the results of its analysis of effluent concentrations of copper. Water quality criteria for copper for the protection of aquatic life, as established by the CTR are 2.7 and 3.6 µg/L – chronic and acute criteria for dissolved copper (2.9 and 3.8 total recoverable) at 25 mg/L hardness. With a hardness of 50 mg/L, chronic and acute criteria for dissolved copper are 5.0 and 7.0 µg/L (5.2 and 7.3 µg/L total recoverable), respectively and with a hardness of 100 mg/L, chronic and acute criteria for dissolved copper are 8.9 and

13.4 µg/L (9.3 and 14.0 µg/L total recoverable), respectively. Based on DFG's estimates of potential application rates and flows, there is reasonable potential for copper to be present in the discharge at levels exceeding water quality criteria for the protection of aquatic life from the CTR. Accordingly, this Order includes WQBELs for copper.

Effluent limitations for copper must be expressed as a total recoverable concentration. Since a site-specific translator has not been developed for copper as described in the SIP Section 1.4.1, the USEPA conversion factor for copper of 0.960 was used for translating the dissolved copper criterion into a total recoverable effluent concentration allowance (ECA) with no dilution. The Regional Board established both an Average Monthly Effluent Limitation (AMEL) and Maximum Daily Effluent Limitation (MDEL) for copper based on procedures outlined in the SIP and as shown in Attachment C.

Because the toxicity of several metals increases with decreasing hardness levels in the receiving water, the CTR criteria for some metals, including copper, must be adjusted to account for the hardness of the effluent. The following table shows sample calculations for the CTR criteria for copper (fresh water aquatic life criteria), adjusted to account for varying hardness levels and expressed as total recoverable metal based on the following formulae:

Cu_{acute} (in µg/l) = $e^{(0.9422)(\ln \text{hardness})-1.700}$ $Cu_{chronic}$ (in µg/l) = $e^{(0.8545)(\ln \text{hardness})-1.702}$

Calculations of the acute and chronic freshwater metals criteria and to express the criteria as a total recoverable metal concentrations or dissolved concentrations, are taken from the CTR at 40 CFR 131.38.

Sample Calculations of Aquatic Life Criteria for Copper as Dissolved Metal

	Aquatic Life Criteria (µg/L)	
Effluent Hardness	**Acute**	**Chronic**
20 mg/L $CaCO_3$	3.07	2.36
25 mg/L $CaCO_3$	3.79	2.85
30 mg/L $CaCO_3$	4.50	3.33
35 mg/L $CaCO_3$	5.21	3.80
40 mg/L $CaCO_3$	5.90	4.26
45 mg/L $CaCO_3$	6.60	4.72
50 mg/L $CaCO_3$	7.29	5.16

Once the need for effluent limitations for CTR priority pollutants has been established, the SIP requires the following steps to determine specific limitations.

- For each water quality criterion/objective, an effluent concentration allowance (ECA) is calculated from the following equation to account for dilution, and background levels of each pollutant.

ECA = C + D (C – B), where C is the converted/adjusted water quality criterion, D is the dilution credit, and B is the ambient background concentration.

The SIP permits an allowance for dilution only after characterization of the receiving water flow by the Discharger to determine a dilution ratio and/or whether or not a dilution credit is appropriate. In this Order, no credit is being allowed for dilution, so the ECA equals C.

- For each ECA based on an aquatic life criterion, the long-term average discharge condition (LTA) is determined by multiplying the ECA times a factor (a multiplier) to account for effluent variability. The LTA is a target of treatment performance.

- LTA multipliers are determined based on a coefficient of variation (CV) and on a specified probability of occurrence. The CV is a measure of the variability of a set of data; and in the analysis for this facility, because there were fewer than 10 data points, the CV was set equal to a default value of 0.6. The LTA multipliers are based on the following equations:

$$LTA_a = ECA_a \times \exp\left(0.5\sigma^2 - z\sigma\right)$$
$$LTA_c = ECA_c \times \exp\left(0.5\sigma_4{}^2 - z\sigma_4\right)$$

where

σ = standard deviation
CV = coefficient of variation (where $\sigma^2 = \ln (CV^2 + 1)$)
(CV = 0.6 where less than 10 data points are available)
z = z-statistic for 95th percentile probability and 99th percentile probability
ECA_a = acute effluent concentration allowance
ECA_c = chronic effluent concentration allowance
LTA_a = acute long-term average
LTA_c = chronic long-term average

From Table 1 of the SIP, the ECA multipliers for calculating LTAs at the 99th percentile occurrence probability for copper are 0.321 (acute multiplier) and 0.527 (chronic multiplier). LTAs are calculated as follows:

Sample Calculations of Long-Term Average Concentrations of Copper

	ECA		ECA Multiplier		LTA (µg/L)	
Receiving Water Hardness	**Acute**	**Chronic**	**Acute**	**Chronic**	**Acute**	**Chronic**
20 mg/L $CaCO_3$	3.07	2.36	0.321	0.527	0.985	1.24
25 mg/L $CaCO_3$	3.79	2.85	0.321	0.527	1.22	1.50
30 mg/L $CaCO_3$	4.50	3.33	0.321	0.527	1.44	1.75
35 mg/L $CaCO_3$	5.21	3.80	0.321	0.527	1.67	2.00
40 mg/L $CaCO_3$	5.90	4.26	0.321	0.527	1.89	2.24
45 mg/L $CaCO_3$	6.60	4.72	0.321	0.527	2.12	2.49
50 mg/L $CaCO_3$	7.29	5.16	0.321	0.527	2.34	2.72

- Using the most limiting (the lowest) LTA, water quality based effluent limitations (WQBELs) are calculated. WQBELs include an average monthly effluent limitation (AMEL) and a maximum daily effluent limitation (MDEL). The equations used to calculate these limits are as follows:

$$LTA = \min(LTAa, LTAc)$$
$$AMEL = LTA \times \exp\left(z\sigma_n - 0.5\sigma_n^2\right)$$
$$MDEL = LTA \times \exp\left(z\sigma - 0.5\sigma^2\right)$$

where

LTA_a = acute long-term average
LTA_c = chronic long-term average
LTA = Most stringent long-term average
σ = Standard deviation
CV = coefficient of variation (where $\sigma^2 = \ln(CV^2 + 1)$
(CV = 0.6 where less than 10 data points are available)
z = z-statistic for 95th percentile probability (AMEL) and 99th percentile probability (MDEL)
n = number of samples per month
AMEL = average monthly effluent limitation
MDEL = maximum daily effluent limitation

AMELs and MDELs are calculated by multiplying the most limiting LTA for each pollutant times a multiplier that accounts for averaging periods and exceedance frequencies of the effluent limitations, and for the AMEL, the effluent monitoring frequency. Here, the CV was set equal to the default value of 0.6 (CV = 0.6) and the sampling frequency was set equal to 4 (n = 4). A 99th percentile occurrence probability was used to determine the MDEL multiplier and a 95th percentile occurrence probability was used to determine the AMEL multiplier. From Table 2 of the SIP, the MDEL multiplier is 3.11, and the AMEL multiplier is 1.55. Final WQBELs for copper are determined as follows.

Sample Calculations Effluent Limitations for Copper

Receiving Water Hardness	LTA	MDEL Multiplier	AMEL Multiplier	MDEL (µg/L)	AMEL (µg/L)
20 mg/L $CaCO_3$	0.985	3.11	1.55	3.06	1.53
25 mg/L $CaCO_3$	1.22	3.11	1.55	3.79	1.89
30 mg/L $CaCO_3$	1.44	3.11	1.55	4.48	2.23
35 mg/L $CaCO_3$	1.67	3.11	1.55	5.19	2.59
40 mg/L $CaCO_3$	1.89	3.11	1.55	5.88	2.93
45 mg/L $CaCO_3$	2.12	3.11	1.55	6.59	3.29
50 mg/L $CaCO_3$	2.34	3.11	1.55	7.28	3.63

- Because effluent hardness may vary, the Discharger will determine the effluent hardness and calculate the appropriate effluent limitation each time copper is sampled in the effluent. Attachment C provides the formulae for calculating effluent limitations for copper based on hardness and provides sample calculations.

Section 2.1 of the SIP provides that: "*Based on an existing discharger's request and demonstration that it is infeasible for the discharger to achieve immediate compliance with a CTR criterion, or with an effluent limitation based on a CTR criterion, the RWQCB may establish a compliance schedule in an NPDES permit*." Although the effluent limitations for copper are new requirements in this Order, the use of copper sulfate and subsequent discharge resulting from this use is a controllable water quality condition. The Discharger has not reported using copper sulfate at the facility in recent years and should be able to manage use of copper sulfate to comply with the new effluent limitations; therefore, a compliance schedule for effluent copper limitations is not included in this Order.

Non-CTR Constituents

Acetic Acid and pH

Acetic acid is used for the control of external parasites at a rate 1.5 to 2.2 gallons of glacial acetic acid added as a bolus to the top of a raceway. This treatment would result in an estimated discharge of approximately 55 mg/L of acetic acid in the discharge. There is a taste and odor threshold for drinking water of 97 mg/L acetic acid. Although the discharge is not expected to exceed this threshold, the Basin Plan also includes a numeric water quality objective for pH in the form of a range of acceptable pH values (measured in standard units). Influent pH has been measured as low as 6.3 standard units and the addition of acetic acid will lower the pH of the water. Also, in the current Order, the Regional Board established effluent limitations in the form of an acceptable range of pH between 6.5 and 8.5 standard units for discharges to the Merced River. This existing pH limitation is carried over to this Order. Based on recent self-monitoring reports, the discharge has remained within this acceptable range. Use of acetic acid must be reported as specified in the Monitoring and Reporting Program.

Aquaculture Drugs and Chemicals

Numeric water quality criteria, or Basin Plan numeric objectives currently are not available for most of the aquaculture drugs and chemicals used by the Discharger or proposed for use at this facility. Therefore, the Regional Board used the narrative water quality objective for toxicity from the Basin Plan and applied the Policy for "Application of Water Quality Objectives" as a basis for determining "reasonable potential" for discharges of these drugs and chemicals. This objective states, in part: "All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life." The Basin Plan states that compliance with this objective will be determined by several factors, including biotoxicity tests of appropriate duration, or other analytical methods as specified by the Regional Board. (Biotoxicity testing involves measuring the toxic effects of an effluent on specified organisms according to nationally approved protocols). USEPA's TSD specifies two toxicity measurement techniques that can be employed in effluent characterization; the first is Whole Effluent Toxicity (WET) testing, and the second is chemical-specific toxicity analyses. WET testing is used most appropriately when the toxic constituents in an effluent are not completely known; whereas chemical-specific analysis is more appropriately used when an effluent contains only one, or very few, well-known constituents. Due to the nature of operations and chemical treatments at most CAAP facilities in the Region, CAAP facility effluents generally contain only one or two known chemicals at any given a time. Therefore, the Regional Board is using a chemical-specific approach to determine "reasonable potential" for discharges of aquaculture drugs and chemicals from CAAP facilities. The California Department of Fish and Game (DFG) Pesticide Unit has initiated biotoxicity studies to determine the aquatic toxicity of certain aquaculture drugs and chemicals commonly used at their CAAP facilities in the Region; specifically, Formalin, hydrogen peroxide, Oxytetracycline, Penicillin G, potassium permanganate, and PVP Iodine. As noted above, the Discharger reports that it has used, or may use in the future, the certain aquaculture drugs and chemicals, specifically Tricaine methanesulfonate (MS-222), carbon dioxide, povidone iodine (PVP Iodine), copper sulfate, Formalin, acetic acid, sodium chloride (salt), hydrogen peroxide, potassium permanganate, Chloramine-T, and the antibiotics Oxytetracycline, Florfenicol, and Penicillin-G.

Formalin as Formaldehyde

A 37 percent formaldehyde solution (Formalin) is periodically used at hatcheries as a fungicide treatment on fish eggs and fish in the raceways. Although the Discharger no longer uses Formalin on a routine basis, DFG reports that it may be used in emergencies. Formalin (also known by the trade names Formalin-F®, Paracide-F®, PARASITE-S®) is approved through FDA's New Animal Drug Application (NADA) program for use in controlling external protozoa and monogenetic trematodes on fish, and for controlling fungi of the family *Saprolegniacae* in food-producing aquatic species (including trout and salmon). For control of other fungi, Formalin may be used under an Investigational New Animal Drug (INAD) exemption. Formalin is used as a "drip" treatment to control fungus on fish eggs at a concentration of 1,000 to 2,000 ppm for 15 minutes, or as a "flush" treatment in raceways of 1-8 hours in duration at a concentration of 170 to 250 ppm for

1-hour or, based on DFG use assumptions, at 25 ppm for 8-hours. According to DFG estimates, at a maximum usage of 167 ppm Formalin for one hour in one raceway, the maximum calculated concentration in the discharge from the settling basin would be 18.4 mg/L as Formalin or 6.8 mg/L formaldehyde. DFG's calculations assume the flow from the raceways mixes completely with the volume of water in the settling basin and is discharged with no further concentration, breakdown, or dilution of formaldehyde.

DFG Flow Assumptions:

The hatchery's settling pond dimensions are 300ft x 50 ft x 5 ft (561,000 gal). The hatchery has 2 raceways, each 500 ft long with a minimum 3 cfs flow, or 161,568 gallons total for both in one hour (80,784 gph).

The hatchery building has a 500 gal/min flow, or 30,000 gal/hr (gph), which also goes to the settling pond.

The total dilution volume for all sources (i.e. 2 raceways and the flow from the hatchery) during a **one hour treatment**, plus the volume of the settling pond is 752,568 gallons.

Estimate of Formaldehyde Discharge Concentration:

Formalin (37% formaldehyde, methanol-free) may periodically be used as a fungicide treatment on fish eggs and to treat parasites on fish in the raceways. The hatchery no longer uses Formalin on a regular basis, but may use it in emergencies when no other effective therapeutant can be found.

At an application rate of 167 ppm Formalin for one hour in one raceway, the maximum calculated concentration in the discharge from the settling basin would be 18.4 ppm as Formalin (6.8 ppm or 6.8 mg/L as formaldehyde).

Formaldehyde calculation:

One hour treatment $\frac{167 \text{ mg/L X } 80{,}784 \text{ gallons (raceway flow in 1-hour)}}{752{,}568 \text{ gallons total dilution}}$

= 167 mg/L Formalin x 0.11
= 18.4 mg/L Formalin X 0.37 = **6.8 mg/L formaldehyde**

Using the same flow assumptions and a 25 mg/L concentration of Formalin for an eight hour treatment period, the discharge level from the settling pond would be 2.75 ppm Formalin or 1.0 ppm formaldehyde. These calculation are based on the simplifying assumption that Formalin entering the settling pond is flushed every hour and that there is no accumulation or degradation of Formalin in the settling pond. Accumulation of Formalin in the settling pond would lead to higher discharge concentrations, while degradation of Formalin would lead to lower discharge concentrations. A

longer detention time for effluent in the settling pond would mean that Formalin would be discharged over a period of time that exceeds the treatment time.

The State of California Department of Health Services (DHS) does not have a Maximum Containment Level (MCL) for formaldehyde, however the DHS historic Drinking Water Action Level is listed as 0.1 mg/L based on calculation by standard risk assessment methods, with a Modifying Factor = 10. The USEPA Integrated Risk Information System (IRIS) lists a reference dose of 1.4 mg/L as a drinking water level. There are no recommended criteria for formaldehyde for protection of aquatic life.

The Basin Plan contains a narrative water quality objective for toxicity that states in part that "[a]*ll waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life*" (narrative toxicity objective). Aquatic habitat is a beneficial use of the Merced River. The DFG Pesticide Unit conducted biotoxicity studies to determine the aquatic toxicity of Formalin using *Pimephales promelas* and *Ceriodaphnia dubia* in accordance with the analytical methods specified in EPA600/4-91-002, *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*. These "short-term chronic tests" measure effects such as reduced growth of the organism, reduced reproduction rates, or lethality. Results were reported as a No Observed Effect Concentration (NOEC) and a Lowest Observed Effect Concentration (LOEC). The DFG Pesticide Unit also conducted acute toxicity tests using *Ceriodaphnia dubia* in accordance with methods specified in EPA600/4-90/027, *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms*. Acute toxicity test results typically are reported as the No Observed Adverse Effect Level (NOAEL), Lowest Observed Adverse Effect Level (LOAEL), and $LC_{50.}$

Results of chronic toxicity tests submitted by the DFG Pesticide Unit indicated *C. dubia* was the most sensitive species with a 7-day No Observable Effect Concentration (NOEC) value of 1.3 mg/L formaldehyde for survival and reproduction. Acute toxicity tests with *C dubia* showed a 96-hour NOAEL of 1.3 mg/L. A summary of the data submitted follows:

Species	7-day LC50 (mg/L)	LOEC (mg/L)	NOEC (mg/L)	LOAEL (mg/L)	NOAEL (mg/L)
Ceriodaphnia dubia	2.4	5.8[1] 1.3[2]	1.3[1] <1.3[2]	5.8	1.3
Pimephales promelas	23.3	9.09	2.28	--	--
Selenastrum capricornutum	<5.2	--	--	--	--

[1] Survival
[2] Reproduction

Since Formalin treatments are utilized as a batch or flush treatment which result in discharges from three to eight hours, short-term tests were conducted with *C dubia*, exposing the organisms for

2-hour and 8-hour periods, removing them from the chemical, and continuing the observation period for 7 days in clean water. The results were as follows:

Species	7-day LC50 (mg/L)	LOAEL (mg/L)	NOAEL (mg/L)
C. dubia—2-hour exposure	73.65	46.3	20.7
C. dubia—8-hour exposure	13.99	15.3	6.7

Results of both acute and chronic aquatic life toxicity testing conducted by the DFG Pesticide Unit were considered along with the Basin Plan narrative toxicity objective when determining whether water quality-based effluent limitations for Formalin as formaldehyde were necessary. Results of 7-day chronic toxicity tests indicated *Ceriodaphnia dubia* was the most sensitive species, with a 7-day NOEC value of 1.3 mg/l formaldehyde for survival and < 1.3 mg/l for reproduction (the Regional Board used an NOEC of 1.3 mg/L). Acute toxicity tests conducted using *Ceriodaphnia dubia* showed a 96-hour NOAEL of 1.3 mg/l formaldehyde. The additional acute toxicity tests with *Ceriodaphnia dubia* conduct using only an 8-hour exposure, resulted in a 96-hour NOAEL concentration of 6.7 mg/L formaldehyde. Based on the results of these toxicity tests and DFG estimates of potential discharges of formaldehyde from the facility, if Formalin is used at this Facility in the future at the DFG estimated dose rate, formaldehyde may be discharged at levels that cause, have the reasonable potential to cause, or contribute to an excursion of the narrative water quality objective for toxicity from the Basin Plan. Accordingly, this Order includes water quality-based effluent limitations for formaldehyde. Effluent concentrations of formaldehyde may persist because of potential application procedures (e.g., successive raceway treatments, drip treatments for eggs) and due to retention of effluent in the settling basin. Therefore, as shown in the Information Sheet, both an average monthly effluent limitation of 0.65 mg/L and a maximum daily effluent limitation of 1.3 mg/L were calculated based on the 96-hour NOAEL value and using the procedure in USEPA's TSD for calculating water quality-based effluent limitations. These effluent limitations are include in this Order and have been established for protection of aquatic life against toxic effects from exposure to formaldehyde in the discharge.

The Regional Board used USEPA's TSD guidance to calculate the MDEL and AMEL for formaldehyde as follows:

Assuming:

- No in-stream dilution allowance.
- Coefficient of Variation (CV) = 0.6 for the lognormal distribution of pollutant concentrations in effluent.

Effluent Concentration Allowance based on NOAEL (acute toxicity) with no dilution allowance

ECA_a = 1.3 mg/l

Effluent Concentration Allowance based on NOEC (chronic toxicity) with no dilution allowance

ECA_c = 1.3 mg/l

Long Term Average concentration based on acute ECA

LTA_a = 1.3 mg/l X 0.321 = 0.4173 mg/l
(where 0.321 = acute ECA multiplier at 99% occurrence probability and 99% confidence)

Long Term Average concentration based on chronic ECA

LTA_c = 1.3 mg/l X 0.527 = 0.6851 mg/l
(where 0.527 = chronic ECA multiplier at 99% occurrence probability and 99% confidence)

Most Limiting LTA concentration

LTA = 0.4173 mg/l

Average Monthly Effluent Limit

AMEL = LTA x 1.55
(where 1.55 = AMEL multiplier at 95% occurrence probability, 99% confidence, and n = 4)

AMEL = 0.4173 mg/l X 1.55 = **0.65 mg/l**

Maximum Daily Effluent Limit

MDEL = LTA x 3.11
(where 3.11 = MDEL multiplier at 99% occurrence probability and 99% confidence)

MDEL = 0.4173 mg/l X 3.11 = **1.3 mg/l**

PVP Iodine

PVP Iodine, a solution composed of 10% PVP Iodine Complex and 90% inert ingredients, is used at the Facility as a fish egg disinfectant (fungicide) from approximately 25 October through 15 February. DFG estimates a maximum usage of 0.63 gallons of PVP Iodine Complex (600mls x 4 stacks/hour) one time during a 24-hour period. These calculations assume the flow from the raceways mixes completely with the volume of water in the settling basin and is discharged with no further concentration, breakdown, or dilution of PVP Iodine. Assuming a one-hour flow-through time, the maximum calculated concentration of PVP Iodine in the discharge from the settling basins would be 0.8 mg/L or 0.08 mg/L PVP Iodine Complex. FDA considers PVP iodine an LRP drug for use in aquaculture. Because PVP Iodine typically is applied in short-term treatments of 1-hour

or less, results of acute aquatic life toxicity testing conducted by the DFG Pesticide Unit were considered when determining whether water quality-based effluent limitations for PVP Iodine were necessary in this Order. Results of a single acute toxicity test with *Ceriodaphnia dubia* showed a 96-hour NOAEL of 0.86 mg/L. The estimated discharge concentration of PVP Iodine does not exceed the NOAEL value; furthermore, there is limited toxicity information and no information on actual discharge concentrations of PVP iodine. Based the estimated concentration of PVP Iodine in the discharge and the fact that toxicity information is limited, PVP Iodine is not discharged at levels that cause, have the reasonable potential to cause, or contribute to an excursion of a narrative water quality objective for toxicity from the Basin Plan. This Order does not include water quality-based effluent limitations for PVP Iodine. However, use and monitoring of PVP Iodine must be reported as specified in the attached Monitoring and Reporting Program. The Regional Board will review this information, and other information as it becomes available and this Order may be reopened to establish effluent limitations based on additional use and toxicity information.

Anesthetics – MS-222 and Carbon Dioxide Gas

The Discharger uses anesthetics Tricaine methanesulfonate, commonly known as MS-222 (with trade names of Finquel® or Tricaine-S®) and carbon dioxide gas. MS-222 has been approved by FDA for use as an anesthetic for Salmonidae. It is intended for the temporary immobilization of fish, amphibians and other aquatic, cold-blooded animals. Carbon dioxide gas is used to anesthetize fish prior to spawning. FDA considers carbon dioxide gas an LRP drug for use in aquaculture. Although the discharger uses these substances, it does not and is not proposing to discharge them to waters of the United States or waters of the State, but uses other means of disposal (e.g., disposal on the ground at the Facility). Consequently, this Order does not include water quality-based effluent limitations for MS-222 or carbon dioxide gas, but use and means of disposal of these substances must be reported as specified in the attached Monitoring and Reporting Program. This Order includes a provision requiring that all aquaculture drugs and chemicals not discharged to receiving waters be disposed of in an environmentally safe manner, according to label guidelines, Material Safety Data Sheet guidelines and BMPs. Any other form of disposal requires approval from the Executive Officer. Furthermore, prior to disposal on the ground at the Facility, the Discharger is requested to submit related INAD information to the Regional Board regarding INAD requirements for disposal of MS-222.

Aqui-S®

In the future, the Discharger may use the anesthetic Aqui-S®. Aqui-S® is a water dispersible liquid anaesthetic for fin fish, crustacea and shell fish and is used in the US under an INAD exemption. The Regional Board does not have specific toxicity information for Aqui-S® or estimates of potential discharge concentrations of Aqui-S® at this Facility. Since there is limited toxicity information available at this time and no information regarding actual discharge concentrations of Aqui-S®, this Order does not include water quality-based effluent limitations for Aqui-S®. However, use and monitoring of Aqui-S® must be reported as specified in the attached Monitoring and Reporting Program and results of additional toxicity tests must be submitted as specified in a

Provision to this Order. The Regional Board will review this information, and other information as it becomes available and this Order may be reopened to establish effluent limitations based on additional use and toxicity information.

Conductivity, Total Dissolved Solids, and Chloride

DFG reports that sodium chloride (salt) is used at the Facility at a rate of up to 400 lbs per 3-hour flush treatment in the raceways as a fish-cleansing agent to control the spread of fish disease and to reduce stress among the confined fish population. Sodium chloride is also used at a rate of 35 lbs in a 600 gallon tank in the hatchery building Application of salt in a single raceway and the hatchery building simultaneously at these application rates would result in an estimated concentration of approximately 46 mg/L sodium chloride in the discharge from the Facility. These calculations assume the flow from the Facility mixes completely with the volume of the settling basin. FDA considers sodium chloride an unapproved new animal drug of low regulatory priority (LRP drug) for use in aquaculture. Consequently, FDA is unlikely to take regulatory action if an appropriate grade is used, good management practices are followed, and local environmental requirements are met.

There are no numeric water quality objectives for conductivity, TDS, or chloride in the NTR, CTR, or Basin Plan for the Merced River. The Basin Plan does contain a narrative objective for chemical constituents that states, in part, "Waters shall not contain chemical constituents in concentrations that adversely affect beneficial uses." Agricultural irrigation is a beneficial use of the receiving water. *Water Quality for Agriculture, Food and Agriculture Organization of the United Nations—Irrigation and Drainage Paper No. 29, Rev. 1* (R.S. Ayers and D.W. Westcot, Rome, 1985), recommends that the conductivity level in waters used for agricultural irrigation not exceed 700 µmhos/cm (Agricultural Water Quality Goal) because it will reduce crop yield for sensitive plants. The Agricultural Water Quality Goal for TDS is 450 mg/L. USEPA's recommended ambient water quality criteria for chloride for the protection of freshwater aquatic life are 230 mg/l as a one-hour average, and 860 mg/l as a four-day average. The Agricultural Water Quality Goal for chloride is 106 mg/L.

Because dissolved ions in water increase conductivity, the measures of TDS, chloride ion, and conductivity are related. Based on estimated concentrations of sodium chloride in the discharge from the Facility from application rates estimated by DFG, the discharge of sodium chloride from the Facility will not cause, have a reasonable potential to cause, or contribute to an in-stream excursion of applicable water quality criteria or objectives. Monitoring of conductivity and chloride is required and monthly use of sodium chloride must be reported as specified in the Monitoring and Reporting Program.

Hydrogen Peroxide

Hydrogen peroxide (35 % H_20_2) may be used by the Discharger as a short-term immersion bath treatment in holding tanks, or as a raceway flush treatment. FDA considers hydrogen peroxide to

be an LRP drug when used to control fungi on fish at all life stages, including eggs. Hydrogen peroxide may also be used under an INAD exemption to control bacterial gill disease in various fish, fungal infections, external bacterial infections, and external parasites. DFG reports that a 35% hydrogen peroxide solution would be used as a one-hour treatment of 100 ppm (mg/L) in only one raceway at a time resulting in an estimated discharge concentration of 11 mg/L. DFG's calculations assume the flow from the raceways mixes completely with the volume of water in the settling basin and is discharged with no further concentration, breakdown, or dilution of hydrogen peroxide. Hydrogen peroxide is a strong oxidizer that breaks down into water and oxygen; however, it exhibits toxicity to aquatic life during the oxidation process. Results of a single acute toxicity test conducted by the DFG Pesticide Unit using *C. dubia* showed a 96-hour NOAEL of 1.3 mg/L. Since there is limited toxicity information available at this time and no information regarding actual discharge concentrations of hydrogen peroxide, this Order does not include water quality-based effluent limitations for hydrogen peroxide. However, use and monitoring of hydrogen peroxide must be reported as specified in the attached Monitoring and Reporting Program and results of additional toxicity tests must be submitted as specified in Provision No. 6. The Regional Board will review this information, and other information as it becomes available and this Order may be reopened to establish effluent limitations based on additional use and toxicity information.

Potassium Permanganate

Potassium permanganate (also known by the trade name of Cairox^{TM}) may be used to control gill disease as a 1-hour flush treatment in a single raceway at up to 5 mg/L resulting in an estimated discharge of 0.55 mg/L potassium permanganate. DFG's calculations assume the flow from the raceways mixes completely with the volume of water in the settling basin and is discharged with no further concentration, breakdown, or dilution of potassium permanganate. Potassium permanganate has a low estimated lifetime in the environment, being readily converted by oxidizable materials to insoluble manganese dioxide (MNO_2). In non-reducing and non-acidic environments, MNO_2 is insoluble and has a very low bioaccumulative potential. Potassium permanganate is not approved for use in aquaculture under FDA's NADA program and should therefore be used in accordance with an INAD exemption granted by FDA. Potassium permanganate is typically applied in a single, short-term treatment, or as a series of closely-spaced, short-term treatments. Results of a single acute toxicity test conducted by the DFG Pesticide Unit using *C. dubia* showed a 96-hour NOAEL of 0.25 mg/L for potassium permanganate. Since there is limited toxicity information available at this time and no information regarding actual discharge concentrations of potassium permanganate, this Order does not include water quality-based effluent limitations for potassium permanganate. However, use and monitoring of potassium permanganate must be reported as specified in the attached Monitoring and Reporting Program and results of additional toxicity tests must be submitted as specified in Provision No. 6. The Regional Board will review this information, and other information as it becomes available and this Order may be reopened to establish effluent limitations based on additional use and toxicity information.

Chloramine-T

Chloramine-T is not currently used, but may be used by the Discharger in the future as a possible replacement for copper sulfate and Formalin. Chloramine-T is available for use in accordance with an INAD exemption by FDA. DFG reports that Chloramine-T may be used at a rate of 10 ppm for a one-hour flush treatment in a single raceway resulting in an estimated maximum concentration in the discharge of 1.1 mg/L. DFG's calculations assume the flow from the raceways mixes completely with the volume of water in the settling basin and is discharged with no further concentration, breakdown, or dilution of Chloramine-T. Chloramine-T breaks down into para-toluenesulfonamide (p-TSA) and unlike other chlorine based disinfectants does not form harmful chlorinated compounds. The Discharger has not conducted biotoxicity tests using Chloramine-T, however results of toxicity testing from other sources show a 96-hour LC_{50} for rainbow trout of 2.8 mg/L and a 48-hour NOEC for *Daphnia magna* of 1.8 mg/L (Halamid. n.d. *Halamid, Aquaculture*. http://www.halamid.com/aqua.htm). The DFG Pesticide Unit is proposing to conduct additional toxicity testing on Chloramine-T to determine NOAEL concentrations. Since there is limited toxicity information available and no information regarding actual discharge concentrations of Chloramine-T, this Order does not include water quality-based effluent limitations for Chloramine-T. However, use and monitoring of Chloramine-T must be reported as specified in the attached Monitoring and Reporting Program and results of additional toxicity tests must be submitted as specified in Provision No.6. The Regional Board will review this information, and other information as it becomes available and this Order may be reopened to establish effluent limitations based on additional use and toxicity information.

Antibiotics – Oxytetracycline, Penicillin G, Florfenicol

The hatchery may periodically use the antibiotics Oxytetracycline and Penicillin G as therapeutic agents in bath treatments to control fish diseases. The bath treatments are used to treat small fish in 600 gallon tanks. The estimated concentrations of Oxytetracycline and Penicillin G discharged from the facility are calculated as 0.2 mg/L and 0.1 mg/L respectively.

Oxytetracycline, also known by the brand name Terramycin®, is an antibiotic approved through FDA's NADA program for use in controlling ulcer disease, furunculosis, bacterial hemorrhagic septicemia, and pseudomonas disease in salmonids. Oxytetracycline is most commonly used at CAAP facilities as a feed additive. However, Oxytetracycline may also be used as an extra-label use under a veterinarian's prescription in an immersion bath of approximately six to eight hours in duration. Because Oxytetracycline may be applied in an immersion bath for up to eight hours at a time, the Regional Board considered the results of acute and chronic aquatic life toxicity testing conducted by the DFG Pesticide Unit when determining whether water quality-based effluent limitations for Oxytetracycline used in an immersion bath treatment were necessary in this Order. Results of acute toxicity tests using *C. dubia* showed a 96-hour NOAEL of 40.4 mg/L. Results of chronic toxicity tests using *C. dubia* showed a 7-day NOEC for reproduction of 48 mg/L. The estimated discharge concentration of 0.2 mg/L of Oxytetracycline is well below the lowest NOEC

and NOAEL. Therefore, at this time, Oxytetracycline, when used in an immersion bath treatment, is not discharged at levels that cause, have the reasonable potential to cause, or contribute to an excursion of a narrative water quality objective for toxicity from the Basin Plans. Accordingly, this Order does not include an effluent limitation for Oxytetracycline. However, monthly use of Oxytetracycline must be reported as specified in the attached Monitoring and Reporting Program. The Regional Board will review this information, and other information as it becomes available, and this Order may be reopened to establish effluent limitations based on additional use and toxicity information.

Penicillin G, also known as Pen-G, is an antibiotic used in a six to eight hour immersion bath treatment to control acute disease outbreaks. Penicillin G is not approved under FDA's NADA program and its extra-label use in aquaculture requires a veterinarian's prescription. Due to the length of treatment time (up to eight hours), the Regional Board considered the results of acute and chronic aquatic life toxicity testing conducted by the DFG Pesticide Unit when determining whether water quality-based effluent limitations for Penicillin G were necessary in this Order. Results of acute toxicity tests using *C. dubia* showed a 96-hour NOAEL of 890 mg/L. Results of 7-day chronic toxicity testing using *Pimephales promelas* showed 7-day NOEC for survival of 350 mg/L. The estimated discharge concentration of 0.1 mg/L of Penicillin G is well below the lowest NOEC and NOAEL. Therefore, at this time, Penicillin G, when used in an immersion bath treatment, is not discharged at levels that cause, have the reasonable potential to cause, or contribute to an excursion of a narrative water quality objective for toxicity from the Basin Plans. Accordingly, this Order does not include an effluent limitation for Penicillin G. However, monthly use of Penicillin G must be reported as specified in the attached Monitoring and Reporting Program. The Regional Board will review this information, and other information as it becomes available, and this Order may be reopened to establish effluent limitations based on additional use and toxicity information.

Oxytetracycline and Florfenicol are antibiotics that may potentially be used by the Discharger in feed formulations to control acute disease outbreaks. They must be used under an INAD exemption or a veterinarian's prescription for extra-label use. In the NPDES General Permit for Aquaculture Facilities in Idaho (Idaho General Permit), USEPA Region 10 distinguishes between antibiotics applied in feed formulations and antibiotics applied in immersion baths. The Idaho General Permit concludes that drugs or chemicals administered via feed, and ingested by fish, pose little threat to aquatic life or beneficial uses because a majority of the drug is utilized by the fish, though some literature suggests otherwise. As stated in the Idaho General Permit, "USEPA believes that disease control drugs and other chemicals provided for ingestion by fish do not pose a risk of harm or degradation to aquatic life or other beneficial uses." The Regional Board finds that Oxytetracycline and Florfenicol (when used as feed additives) are used in a manner that reduces the likelihood of direct discharge of antibiotics to waters of the United States or waters of the State, particularly when Dischargers implement BMPs as required by this Order. Therefore, Oxytetracycline and Florfenicol are not discharged at levels that cause, have the reasonable potential to cause, or contribute to an excursion of a narrative water quality objective for toxicity from the Basin Plan. Accordingly, this Order does not include water quality-based effluent limitations for these substances, but does require monthly reporting as specified in the attached Monitoring and

Reporting Program. The Regional Board will review this information and this Order may be reopened to establish effluent limitations based on additional use and toxicity information.

BASIS FOR WASTE DISPOSAL PROVISIONS

Solid waste disposal provisions in this Permit are based on the requirements of CCR Title 27 and prevention of unauthorized discharge of solid wastes into waters of the United States or waters of the State.

BASIS FOR BEST MANAGEMENT PRACTICES PROVISIONS

Best Management Practices plan requirements are established based on requirements in Effluent Limitations Guidelines and New Source Performance Standards for the Concentrated Aquatic Animal Production Point Source Category at 40 CFR Part 451.

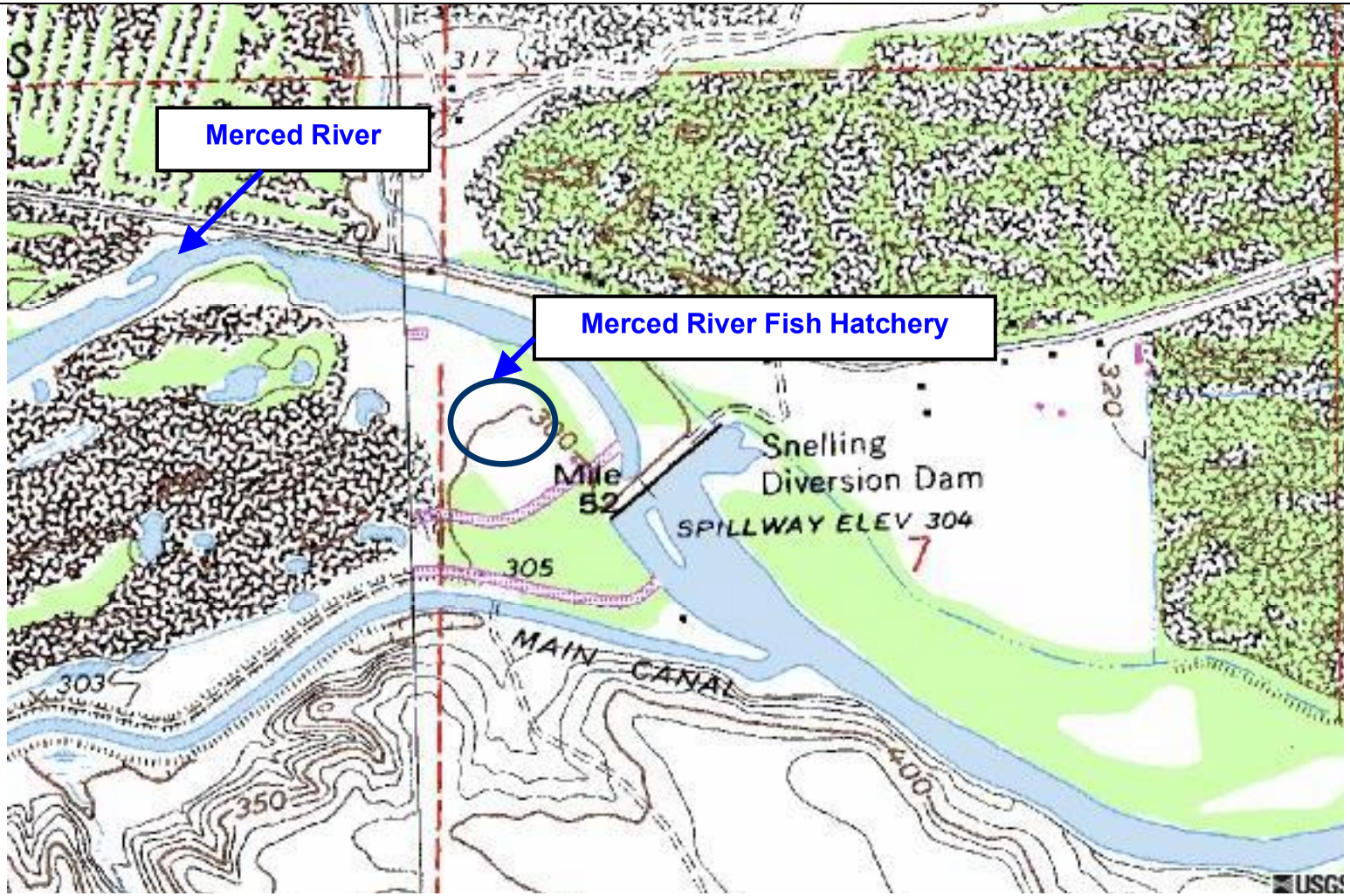
BASIS FOR RECEIVING WATER LIMITATIONS

Receiving water limitations are interpretations of water quality objectives from the Basin Plans. Receiving water limitations in this Permit are included to ensure protection of beneficial uses of receiving waters. A receiving water condition not in conformance with a limitation is not necessarily a violation of the Permit. However, the Regional Board may require an investigation to determine cause and culpability prior to asserting that a violation has occurred.

MONITORING AND REPORTING PROGRAM

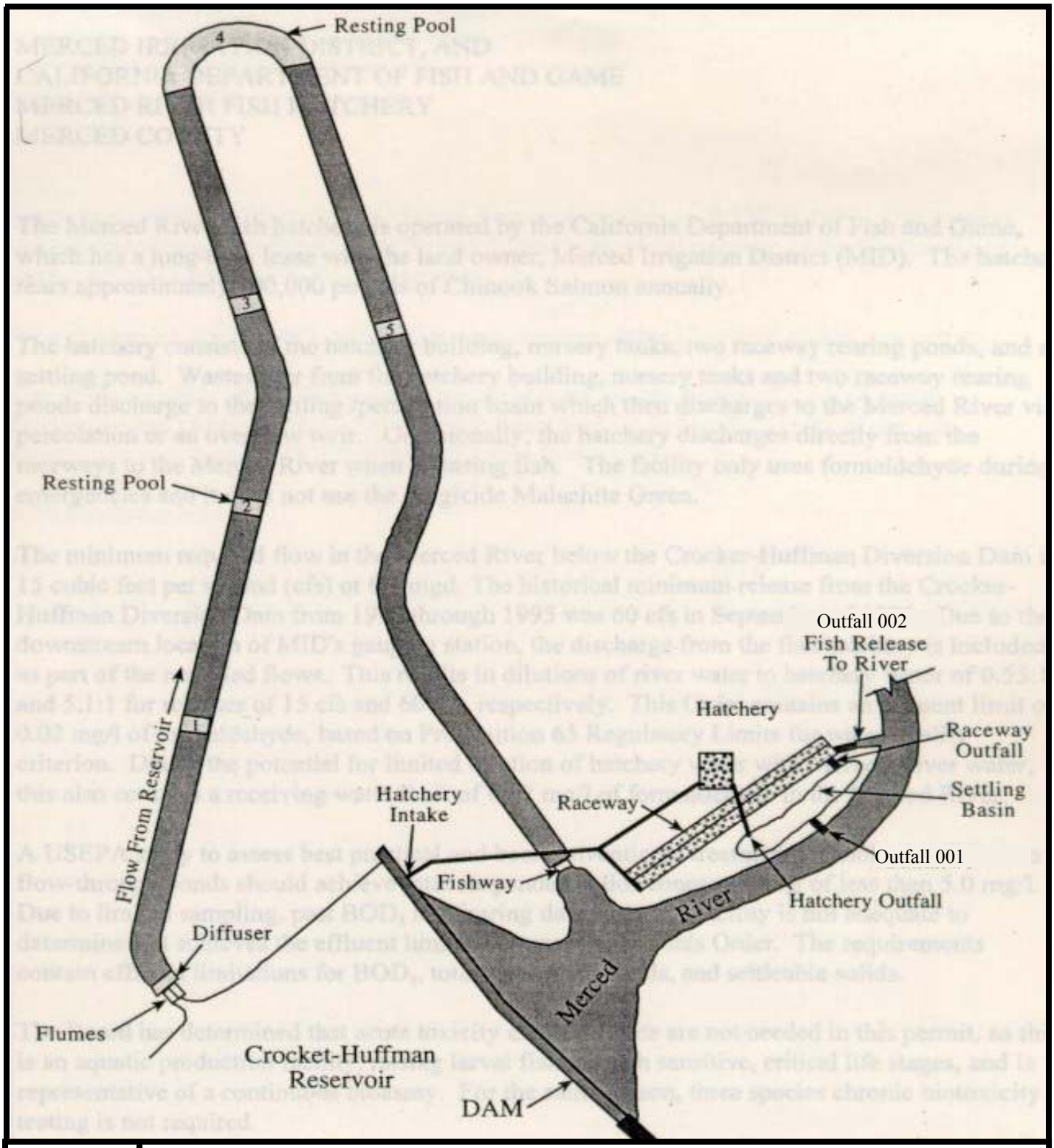
Receiving water monitoring requirements are based on the Basin Plan and authorized by California Water Code Section 13383. Receiving water monitoring requirements are standard requirements in almost all NPDES permits issued by the Regional Board. Upstream receiving water monitoring station R-1 is at the entrance to the intake pipe. Receiving water monitoring station R-2 is 50 feet downstream of Outfall 002.

ATTACHMENT A



Drawing Reference: U.S.G.S TOPOGRAPHIC MAPS 7.5 MINUTE QUADRANGLE	**SITE LOCATION MAP** California Department of Fish and Game and Merced Irrigation District Merced River Fish Hatchery Merced County Section 7, T5S, R15E, MDB&M	N W E S approx. scale 1 in. = 1000 ft.

ATTACHMENT A



N

Not to scale

ATTACHMENT B
Site Map

STATE OF CALIFORNIA, DEPARTMENT OF FISH AND GAME
AND MERCED IRRIGATION DISTRICT
MERCED RIVER FISH HATCHERY

WASTE DISCHARGE REQUIREMENTS ORDER NO. XX
MERCED COUNTY

ATTACHMENT C

Example SIP Section 1.4 Maximum Daily Effluent Limitations (MDEL's) and Average Monthly Effluent Limitations (AMEL's) for total Copper using CTR Water Quality Hardness-Dependent Values of the CCC (Criterion Continuous Concentration) and CMC (Criterion Maximum Concentration) for the Protection of Freshwater Aquatic Life

Where the

Effluent Concentration Allowance (ECA) = The total copper criterion (CCC and CMC- No Dilution Credit)

*The **MDEL** and **AMEL** for total recoverable copper discharged to the Merced River shall be calculated using the Coefficient of Variation (CV) and the multipliers in Tables 1 and 2 of the SIP as shown below:*

WATER QUALITY –BASED MDEL and AMEL- Merced River Discharge	
Copper (Total)	
ECA acute	CMC @ Observed Effluent Hardness as $CaCO_3$
ECA chronic	CCC @ Observed Effluent Hardness as $CaCO_3$
Coefficient of Variation (Default)	0.6
LTA (lowest)	Lowest of: (ECA acute ∗ Table 1 Acute Multiplier) or (ECA chronic ∗ Table 1 Chronic Multiplier)
Sampling Frequency (n)	≤ 4
MDEL	(LTA(lowest) ∗ Table 2 MDEL Multiplier)
AMEL	(LTA(lowest) ∗ Table 2 AMEL Multiplier)

*Examples of calculated **MDEL's** and **AMEL's** for total copper based upon a range of effluent hardness values are shown below:*

Copper expressed as total recoverable, µg/l, Using Coefficient of Variation (CV) of 0.6						
Effluent Hardness (mg/L as $CaCO_3$)	ECAc = CCC[1] 4-Day Avg (µg/L)	ECAa =CMC[2] 1-hr Avg (µg/L)	LTA[3] (chronic) (µg/L)	LTA[4] (acute) (µg/L)	**AMEL**[5] (µg/L)	**MDEL**[6] (µg/L)
<10	Must calculate	Must calculate	Must calculate	Must calculate	Must calculate	
20	2.4	3.1	1.3	1.0	**1.6**	**3.1**
25	2.9	3.8	1.5	1.2	**1.9**	**3.7**
43	4.5	6.3	2.4	2.0	**3.1**	**6.2**
50	5.1	7.3	2.7	2.3	**3.6**	**7.2**
75	7.3	10.7	3.8	3.4	**5.3**	**10.6**
100	9.3	14.0	4.9	4.5	**7.0**	**14.0**

[1]CCC total (4-day average) = exp{0.8545[ln(hardness)] – 1.702}
[2]CMC total (1-hr average) = exp{0.9422[ln(hardness)] – 1.700}
[3]LTA_c (Long-Term Average chronic) = CCC x 0.527
[4]LTA_a (Long-Term Average acute) = CMC x 0.321
[5]AMEL (Average Monthly Effluent Limitation) = LTA (lowest) x 1.55
[6]MDEL (Maximum Daily Effluent Limitation) = LTA (lowest) x 3.11