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13 July 2009

Mr. Ken Landau, Assistant Executive Officer
Mr. Jim Marshall, Sr. WRCE
Regional Water Quality Control Board
Central Valley Region
11020 Sun Center Drive, Suite 200
Rancho Cordova, CA 95670-6144

VIA: Electronic Submission
Hardcopy if Requested

RE: Tentative Order Amending Waste Discharge Requirements Order No. R5-2007-0031 (NPDES No. CA0085201) for City of Angels Wastewater Treatment Plant, Calaveras County

Dear Messrs. Landau and Marshall;

The California Sportfishing Protection Alliance (CSPA) submitted comments on the initial Tentative Order amending Waste Discharge Requirements (NPDES No. CA0085201) for the City of Angels Wastewater Treatment Plant (Tentative Order, Permit, Amendment) and submits the following comments on the revised Tentative Order. As you know, CSPA has an appeal of Order No. R5-2007-0031 in abeyance before the State Water Resources Control Board. Now, the Regional Board proposes to further relax the inadequate provisions it adopted in May 2007. We remind you that new dischargers are required to be in compliance upon initiation of discharge.

1. The proposed Amendment to relax Effluent Limitations by applying a mixing zone for a "new" NPDES discharger is contrary to State Policy, *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (SIP) and Federal Regulations, California Toxics Rule, 40 CFR 131, Implementation.

The City of Angels WWTP is a "new" discharge as defined in NPDES permit Order No. R5-2007-0031 (NPDES No. CA0085201) adopted on 3 May 2007. A "new" discharge is required to be fully compliant upon initiation of discharge according to the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (SIP), Section 2.1.

Federal Regulations, the California Toxics Rule, 40 CFR 131, Implementation G5, *Schedules of Compliance*, states in part that: "The provision allows compliance schedules only for an "existing discharger" which is defined as any discharger which is not a "new California discharger." The CTR further requires that: "Only "new California dischargers" are required to

comply immediately upon commencement of discharge with effluent limitations derived from the criteria in this rule."

The CTR further states that: "These regulations require that the owner or operator of (1) a new source; (2) a new discharger… shall install and implement all pollution control equipment to meet the conditions of the permit before discharging." Clearly the CTR would not allow for an NPDES permit to contain a "reopener" to relax limitations based on future studies. A "new" Discharger must install and implement all pollution control equipment to meet the conditions of the permit before discharging. (See 40 CFR 131.38 (e))

It was recognized in the NPDES permit for this facility that compliance schedules are not allowed for "new" dischargers by the following Finding:

> **"K. Compliance Schedules and Interim Requirements.** In general, an NPDES permit must include final effluent limitations that are consistent with Clean Water Act section 301 and with 40 CFR 122.44(d). There are exceptions to this general rule. The State Water Board has concluded that where the Regional Water Board's Basin Plan allows for schedules of compliance and the Regional Water Board is newly interpreting a narrative standard, it may include schedules of compliance in the permit to meet effluent limits that implement a narrative standard. See In the Matter of Waste Discharge Requirements for Avon Refinery (State Board Order WQ 2001-06 at pp. 53-55). See also Communities for a Better Environment et al. v. State Water Resources Control Board, 34 Cal.Rptr.3d 396, 410 (2005). The Basin Plan for the Sacramento and San Joaquin Rivers includes a provision that authorizes the use of compliance schedules in NPDES permits for water quality objectives that are adopted after the date of adoption of the Basin Plan, which was September 25, 1995 (See Basin Plan at page IV-16). Consistent with the State Water Board's Order in the CBE matter, the Regional Water Board has the discretion to include compliance schedules in NPDES permits when it is including an effluent limitation that is a "new interpretation" of a narrative water quality objective. This conclusion is also consistent with the United States Environmental Protection Agency policies and administrative decisions. See, e.g., Whole Effluent Toxicity (WET) Control Policy. The Regional Water Board, however, is not required to include a schedule of compliance, but may issue a Time Schedule Order pursuant to Water Code section 13300 or a Cease and Desist Order pursuant to Water Code section 13301 where it finds that the discharger is violating or threatening to violate the permit. The Regional Water Board will consider the merits of each case in determining whether it is appropriate to include a compliance schedule in a permit, and, consistent with the Basin Plan, should consider feasibility of achieving compliance, and must impose a schedule that is as short as practicable to achieve compliance with the objectives, criteria, or effluent limit based on the objective or criteria. For CTR constituents, Section 2.1 of the SIP provides that, based on a Discharger's request and demonstration that it is infeasible for an existing Discharger to achieve immediate compliance with an effluent limitation derived from a CTR criterion, compliance schedules may be allowed in an NPDES permit. Unless an exception has been granted under section 5.3 of the SIP, a compliance schedule may not exceed 5 years from the date that the permit is issued or reissued, nor may it extend beyond 10 years

> from the effective date of the SIP (or May 18, 2010) to establish and comply with CTR criterion-based effluent limitations. Where a compliance schedule for a final effluent limitation that exceeds 1 year, the Order must include interim numeric limitations for that constituent or parameter. Where allowed by the Basin Plan, compliance schedules and interim effluent limitations or discharge specifications may also be granted to allow time to implement a new or revised water quality objective. However, this Order being a new NPDES for a new discharge to surface waters, compliance schedules and interim effluent limitations are not allowed in this permit." (Emphasis added)

Both the SIP and Federal regulation requires immediate compliance with CTR based effluent Limitations for "new" wastewater dischargers. The proposed amendment to relax Effluent Limitations for a new discharge two years following adoption of the NPDES permit can only mean that the Discharger has not complied as is required by the SIP and the CTR. The proposed Permit amendment would relax Effluent Limitations for Ammonia, Bis(2-chloroethyl)ether, Dichlorobromomethane, copper, Lead and Zinc, all of which are CTR constituents except for ammonia. The Regional Board's proposal to reopen and relax CTR based Effluent Limitations clearing violates the requirements of both the SIP and the CTR that a "new" Discharger be fully compliant upon initiation of discharge. The Regional Board may not relax the CTR based Effluent Limitations for the "new" discharger but instead should be pursuing appropriate enforcement action.

2. The proposed Permit contains an allowance for a mixing zone that does not comply with the requirements of the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (SIP) or the Basin Plan.

The receiving stream, Angels Creek, is a small 16 to 8 foot wide foothills ephemeral stream. Cold water aquatic life is a designated and confirmed beneficial use. The receiving stream flows to a reservoir, downstream. The proposal presented by the Regional Board is to allow a mixing zone for toxic and human health based pollutants to a small ephemeral stream. The proposed mixing zone would allow for concentrations of:

- Ammonia at up to 56 mg/l as a daily maximum and 23 mg/l as a monthly average. Based on the Regional Board's calculations, Fact Sheet page F-22, ammonia is toxic to aquatic life at 5.2 mg/l (acute), 2.3 mg/l (chronic) and 5.71 mg/l (4-day average). For raw sewage Metcalf and Eddy *Wastewater Engineering Treatment and Reuse,* Table 3-15 rates a wastewater as "high strength" if it exceeds 45 mg/l. Other Engineering Texts state that it is unusual for ammonia concentration in raw sewage to exceed 60 mg/l. The proposed Permit, page F-42, states that the wastewater treatment plant nitrifies and denitrifies; converts ammonia to nitrite and nitrate and removes nitrate. With an allowance to discharge ammonia up to 56 mg/l one doubts that any nitrification and denitrification is occurring.

- Copper up to 18 ug/l as a daily maximum and 9.2 ug/l as a monthly average. The CTR chronic criterion for copper is 2.8 ug/l and copper was measured in the receiving stream

at 1.1 ug/l. The upstream lowest observed hardness (16 mg/l) was not used to calculate the presented CTR criteria; instead the Regional Board used a hardness of 18.3.

- Lead up to 4.9 ug/l as a daily maximum and copper up to 18 ug/l as a daily maximum. The additive toxicity of copper and zinc were not considered as required by the Basin Plan, page IV 18.00.

As is detailed below, both the SIP and Federal Regulation (Table 3 and CTR, 40 CFR 131.38 (c) Applicability 2(ii) Table 4, respectively) require that equations regarding ten-year flow rate and harmonic mean flows be utilized in granting any mixing zone. SIP Table 3 and CTR Table 4 requires that aquatic life acute criteria be based on 1 Q 10 flows, aquatic life chronic criteria be based on 7 Q 10 flows and human health criteria be based on the harmonic mean flow. The Regional Board ignores the regulatory requirements of the SIP and Federal Regulations in establishing this mixing zone in an ephemeral stream. This is done because for ephemeral streams the low flow conditions go to zero, indicating the legislative intent that mixing zones not be granted for ephemeral streams.

Confirming the Regional Board's lack of knowledge of the impacts and quality of the discharge, each constituent for which mixing is being granted contains the following statement: "There is currently insufficient effluent data to determine if the Facility can meet more stringent performance-based effluent limitations for ammonia. In future permit renewals, the effluent limitations may be reduced (i.e. made more stringent) based on Facility performance. This will ensure that an over allocation of the assimilative capacity is not allowed and ensures compliance with state and federal antidegradation requirements." The Regional Board cannot reliably calculate a mixing zone without the knowledge of the capabilities of the wastewater treatment system. The Regional Board cannot state that a mixing zone is as small as is practicable without the knowledge of the capabilities of the wastewater treatment system.

"A mixing zone is an area where an effluent discharge undergoes initial dilution and is extended to cover the secondary mixing in the ambient waterbody. A mixing zone is an allocated impact zone where water quality criteria can be exceeded as long as acutely toxic conditions are prevented" according to EPA's *Technical Support Document for Water Quality-based Toxics Control* (TSD) (USEPA, 1991), (Water quality criteria must be met at the edge of a mixing zone.) Mixing zones are regions within public waters adjacent to point source discharges where pollutants are diluted and dispersed at concentrations that routinely exceed human health and aquatic life water quality standards (the maximum levels of pollutants that can be tolerated without endangering people, aquatic life, and wildlife.) Mixing zone policies allow a discharger's point of compliance with state and federal water quality standards to be moved from the "end of the pipe" to the outer boundaries of a dilution zone. The CWA was adopted to minimize and eventually eliminate the release of pollutants into public waters because fish were dying and people were getting sick. The CWA requires water quality standards (WQS) be met in all waters to prohibit concentrations of pollutants at levels assumed to cause harm. Since WQS criteria are routinely exceeded in mixing zones it is likely that in some locations harm is occurring. The general public is rarely aware that local waters are being degraded within these mixing zones, the location of mixing zones within a waterbody, the nature and quantities of

pollutants being diluted, the effects the pollutants might be having on human health or aquatic life, or the uses that may be harmed or eliminated by the discharge. Standing waist deep at a favorite fishing hole, a fisherman has no idea that he is in the middle of a mixing zone for pathogens for a sewage discharger that has not been required to adequately treat their waste.

In 1972, backed by overwhelming public support, Congress overrode President Nixon's veto and passed the Clean Water Act. Under the CWA, states are required to classify surface waters by *uses* – the beneficial purposes provided by the waterbody. For example, a waterbody may be designated as a drinking water source, or for supporting the growth and propagation of aquatic life, or for allowing contact recreation, or as a water source for industrial activities, or all of the above. States must then adopt *criteria* – numeric and narrative limits on pollution, sufficient to protect the uses assigned to the waterbody. *Uses + Criteria = Water Quality Standards (WQS).* WQS are regulations adopted by each state to protect the waters under their jurisdiction. If a waterbody is classified for more than one use, the applicable WQS are the criteria that would protect the most sensitive use.

All wastewater dischargers to surface waters must apply for and receive a permit to discharge pollutants under the National Pollutant Discharge Elimination System (NPDES.) Every NPDES permit is required to list every pollutant the discharger anticipates will be released, and establish effluent limits for these pollutants to ensure the discharger will achieve WQS. NPDES permits also delineate relevant control measures, waste management procedures, and monitoring and reporting schedules.

It is during the process of assigning effluent limits in NPDES permits that variances such as mixing zones alter the permit limits for pollutants by multiplying the scientifically derived water quality criteria by dilution factors. The question of whether mixing zones are legal has never been argued in federal court.

Mixing zones are never mentioned or sanctioned in the CWA. To the contrary, the CWA appears to speak against such a notion: "whenever…the discharges of pollutants from a point source…would interfere with the attainment or maintenance of that water quality…which shall assure protection of public health, public water supplies, agricultural and industrial uses, and the protection and propagation of a balanced population of shellfish, fish and wildlife, and allow recreational activities in and on the water, effluent limitations…shall be established which can reasonably be expected to contribute to the attainment or maintenance of such water quality." A plain reading of the above paragraph calls for the application of effluent limitations whenever necessary to assure that *WQS will be met in all waters*. Despite the language of the Clean Water Act; US EPA adopted 40 CFR 131.13, General policies, that allows States to, at their discretion, include in their State standards, policies generally affecting their application and implementation, such as mixing zones, low flows and variances. According to EPA; (EPA, Policy and Guidance on Mixing Zones, 63 Fed Reg. 36,788 (July 7, 1998)) as long as mixing zones do not eliminate beneficial uses in the whole waterbody, they do not violate federal regulation or law. California has mixing zone policies included in individual Water Quality Control Plans (Basin Plans) and the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays,*

and Estuaries of California (2005) permitting pollutants to be diluted before being measured for compliance with the state's WQS.

Federal Antidegradation regulations at 40 CFR 131.12 require that states protect waters at their present level of quality and that all beneficial uses remain protected. The corresponding State Antidegradation Policy, Resolution 68-16, requires that any degradation of water quality not unreasonably affect present and anticipated beneficial uses. Resolution 68-16 further requires that: "Any activity which produces or may produce or increase volume or concentration of waste and which discharges or proposes to discharge to existing high quality waters will be required to meet waste discharge requirements which will result in the best practicable treatment or control of the discharge necessary to assure that (a) a pollution or nuisance will not occur and (b) the highest water quality consistent with the maximum benefit to the people of the State will be maintained."

Pollution is defined in the California Water Code as an alteration of water quality to a degree that unreasonably affects beneficial uses. In California, Water Quality Control Plans (Basin Plans) contain water quality standards and objectives that are necessary to protect beneficial uses. The Basin Plan for California's Central Valley Regional Water Board states that: "According to Section 13050 of the California Water Code, Basin Plans consist of a designation or establishment for the waters within a specified area of beneficial uses to be protected, water quality objectives to protect those uses, and a program of implementation needed for achieving the objectives. State law also requires that Basin Plans conform to the policies set forth in the Water Code beginning with Section 13000 and any state policy for water quality control. Since beneficial uses, together with their corresponding water quality objectives, can be defined per federal regulations as water quality standards, the Basin Plans are regulatory references for meeting the state and federal requirements for water quality control (40 CFR 131.20)." Nuisance is defined in the California Water Code as anything that is injurious to health, indecent, offensive or an obstruction of the free use of property, which affects an entire community and occurs as a result of the treatment or disposal of waste.

The Antidegradation Policy (Resolution 68-16) allows water quality to be lowered as long as beneficial uses are protected (pollution or nuisance will not occur), best practicable treatment and control (BPTC) of the discharge is provided, and the degradation is in the best interest of the people of California. Water quality objectives were developed as the maximum concentration of a pollutant necessary to protect beneficial uses and levels above this concentration would be considered pollution. The Antidegradation Policy does not allow water quality standards and objectives to be exceeded. Mixing zone are regions within public waters adjacent to point source discharges where pollutants are diluted and dispersed at concentrations that routinely exceed water quality standards.

The Antidegradation Policy (Resolution 68-16) requires that best practicable treatment or control (BPTC) of the discharge be provided. Mixing zones have been allowed in lieu of treatment to meet water quality standards at the end-of-the-pipe prior to discharge. To comply with the Antidegradation Policy, the trade of receiving water beneficial uses for lower utility rates must be in the best interest of the people of the state and must also pass the test that the Discharger is

providing BPTC. By routinely permitting excessive levels of pollutants to be legally discharged, mixing zones act as an economic disincentive to Dischargers who might otherwise have to design and implement better treatment mechanisms. Although the use of mixing zones may lead to individual, short-term cost savings for the discharger, significant long-term health and economic costs may be placed on the rest of society. An assessment of BPTC, and therefore compliance with the Antidegradation Policy, must assess whether treatment of the wastestream can be accomplished, is feasible, and not simply the additional costs of compliance with water quality standards. A BPTC case can be made for the benefits of prohibiting mixing zones and requiring technologies that provide superior waste treatment and reuse of the wastestream. EPA's Water Quality Standards Handbook states that: "It is not always necessary to meet all water quality criteria within the discharge pipe to protect the integrity of the waterbody as a whole." The primary mixing area is commonly referred to as the zone of initial dilution, or ZID. Within the ZID acute aquatic life criteria are exceeded. To satisfy the CWA prohibition against the discharge of toxic pollutants in toxic amounts, regulators assume that if the ZID is small, significant numbers of aquatic organisms will not be present in the ZID long enough to encounter acutely toxic conditions. EPA recommends that a ZID not be located in an area populated by non-motile or sessile organisms, which presumably would be unable to leave the primary mixing area in time to avoid serious contamination.

Determining the impacts and risks to an ecosystem from mixing pollutants with receiving waters at levels that exceed WQS is extremely complex. The range of effects pollutants have on different organisms and the influence those organisms have on each other further compromises the ability of regulators to assess or ensure "acceptable" short and long-term impacts from the use of mixing zones. Few if any mixing zones are examined prior to the onset of discharging for the potential effects on impacted biota (as opposed to the physical and chemical fate of pollutants in the water column). Biological modeling is especially challenging – while severely toxic discharges may produce immediately observable effects, long-term impacts to the ecosystem can be far more difficult to ascertain. The effects of a mixing zone can be insidious; impacts to species diversity and abundance may be impossible to detect until it is too late for reversal or mitigation.

The *CALIFORNIA CONSTITUTION, ARTICLE 10, WATER, SEC. 2* states that: "It is hereby declared that because of the conditions prevailing in this State the general welfare requires that the water resources of the State be put to beneficial use to the fullest extent of which they are capable, and that the waste or unreasonable use or unreasonable method of use of water be prevented, and that the conservation of such waters is to be exercised with a view to the reasonable and beneficial use thereof in the interest of the people and for the public welfare. The right to water or to the use or flow of water in or from any natural stream or water course in this State is and shall be limited to such water as shall be reasonably required for the beneficial use to be served, and such right does not and shall not extend to the waste or unreasonable use or unreasonable method of use or unreasonable method of diversion of water. Riparian rights in a stream or water course attach to, but to no more than so much of the flow thereof as may be required or used consistently with this section, for the purposes for which such lands are, or may be made adaptable, in view of such reasonable and beneficial uses; provided, however, that nothing herein contained shall be construed as depriving any riparian owner of the reasonable

use of water of the stream to which the owner's land is riparian under reasonable methods of diversion and use, or as depriving any appropriator of water to which the appropriator is lawfully entitled. This section shall be self-executing, and the Legislature may also enact laws in the furtherance of the policy in this section contained." The granting of a mixing zone is an unreasonable use of water when proper treatment of the wastestream can be accomplished to meet end-of-pipe limitations. Also contrary to the California Constitution, a mixing zone does not *serve the beneficial use;* to the contrary, beneficial uses are degraded within the mixing zone.

The Central Valley Regional Water Quality Control Board's Basin Plan, page IV-16.00, requires the Regional Board use EPA's *Technical Support Document for Water Quality Based Toxics Control (TSD)* in assessing mixing zones. The TSD, page 70, defines a first stage of mixing, close to the point of discharge, where complete mixing is determined by the momentum and buoyancy of the discharge. The second stage is defined by the TSD where the initial momentum and buoyancy of the discharge are diminished and waste is mixed by ambient turbulence. The TSD goes on to state that in large rivers this second stage mixing may extend for miles. The TSD, Section 4.4, requires that if complete mix does not occur in a short distance mixing zone monitoring and modeling must be undertaken.

The State's *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays and Estuaries of California* (SIP), Section 1.4.2.2, contains requirements for a mixing zone study which must be analyzed before a mixing zone is allowed for a wastewater discharge. Properly adopted state Policy requirements are not optional. The proposed Effluent Limitations in the proposed Permit are not supported by the scientific investigation that is required by the SIP and the Basin Plan.

SIP Section 1.4.2.2 requires that a mixing zone shall not:

1. Compromise the integrity of the entire waterbody.
2. Cause acutely toxic conditions to aquatic life.
3. Restrict the passage of aquatic life.
4. Adversely impact biologically sensitive habitats.
5. Produce undesirable aquatic life.
6. Result in floating debris.
7. Produce objectionable color, odor, taste or turbidity.
8. Cause objectionable bottom deposits.
9. Cause Nuisance.
10. Dominate the receiving water body or overlap a different mixing zone.
11. Be allowed at or near any drinking water intake.

- The Regional Board states that: "Angels Creek is 18 feet wide at the location of the diffuser. Dye measurements were collected at a transect 36 feet downstream of the diffuser (i.e. 2 stream widths). The study indicated that the discharge was at least 95% mixed across the transect, which demonstrates that the discharge was completely-mixed." The Regional Board takes great liberty in interpreting very specific definitions, specifically the definition of complete mixed conditions as defined in the SIP, Appendix 1, is: "Completely-Mixed

Discharge condition means not more than a 5 percent difference, accounting for analytical variability, in the concentration of a pollutant exists across a transect of the water body at a point two stream/river widths from the point of discharge." It does not appear that the Discharger actually sampled their dye concentrations across the stream transect. The Regional Board states the discharge is 95% mixed two stream widths from the point of discharge – not that there is less than a 5% variability of a pollutant concentration across the transect. The two statements have dramatic different meanings. Either the Regional Board has used inappropriate language to state the discharge is completely mixed or the discharge is as is stated "95% mixed". If the discharge is "95% mixed" it is not completely mixed as required by the SIP.

- The Regional Board states that: "For completely-mixed discharges, the SIP states that, "…the amount of receiving water available to dilute the effluent shall be determined by calculating the dilution ratio (i.e., the critical receiving water flow divided by the effluent flow) using the appropriate flows in Table 3." This Order includes Discharge Prohibition III.E. that prohibits the discharge from May 16 through November 14 and unless Angels Creek flows provide a downstream flow ratio greater than or equal to 20:1 (Angels Creek flow: effluent) as a daily average. Since the discharge is seasonal and a 20:1 flow ratio is required, it is not appropriate to use the flows in Table 3 of the SIP. Rather, the dilution credits can be allowed up to 20:1, based on the discharge prohibition, because there is always at least a flow ratio of 20:1 (Angels Creek: Effluent)."

- The use of SIP Table 3 is not discretionary; but is a requirement of the SIP to determine the minimum flow rates that may be used in determining mixing zones and dilution credits. The Regional Board uses a different approach because the flows in Table 3 go to zero; there is no dilution available, for ephemeral streams. Confirming the "requirement" to utilize the flows from SIP Table 3 one must look to the basis for the SIP requirement; the California Toxics Rule (CTR). The CTR, 40 CFR 131.38 (c) Applicability 2(ii), states that: "The State shall not use a flow value which numeric standards can be exceeded less stringent than the flows in Table 4 to paragraph (c)(2) of this section for streams and rivers." Table 4 to paragraph (c)(2) is the same as SIP Table 3. The CTR allows States to apply to US EPA for a variance to the flow rules in Table 4 and lays out the process in the regulation. The Regional Board's attempt to apply different flow rates than specified in the SIP and the CTR flagrantly violates the State Policy and the Federal Regulation.

- The Regional Board states that: "For human health criteria, and acute and chronic aquatic toxicity criteria, a dilution credit of 19 has been allowed." SIP Table 3 and CTR Table 4 requires that aquatic life acute criteria be based on 1 Q 10 flows, aquatic life chronic criteria be based on 7 Q 10 flows and human health criteria be based on the harmonic mean flow. The definition of these flow rates is presented in both the SIP and the CTR. As is stated in the above comment, use of these specified flow rates are not discretionary. The CTR 40 CFR 131.38 (c)(v) sets out a procedure for changing the rule and allowing for different flow rates, but the Regional Board has not applied for any such modification. It appears by the CTR requirements to use the flow requirements of 1 Q 10, 7 Q 10 and harmonic mean that EPA

intended that mixing zones in ephemeral stream would not be allowed.

- The SIP requires that a mixing zone not "dominate the receiving water body…" The Regional Board's permit had required the installation of a cross-stream diffuser in this 18-foot wide creek; now the Discharger's reports state, "if a diffuser is installed." By definition a cross-stream diffuser crosses the stream width and therefore dominates the entire waterbody.

- The SIP requires that a mixing zone not "restrict the passage of aquatic life". There is no "zone of passage" for aquatic life around a cross-stream diffuser in an 18-foot wide stream. At this stage the Regional Board and the City do not know what type if any diffuser will be constructed at the site. The infield mixing zone study did not appear to take transect samples to determine whether there is any zone of passage under any of the different diffuser tests. Actually the City's mixing zone study appears to completely misunderstand the concept of a zone of passage saying the mixing zone is short in length. The receiving stream is only 8 feet wide immediately downstream of the point of discharge; it is hard to believe that the wastewater flow hugs the bank sufficiently to allow for a zone of passage. There is no analysis of how far acutely toxic constituents exist at toxic levels within the mixing zone. There is no analysis of whether this toxic "zone of death" exists from bank to bank, a non-zone of passage. Cleary the term "zone of passage" is misunderstood in the mixing zone analysis. Therefore it can only be concluded the proposed mixing zone restricts the passage of aquatic life.

- The Regional Board states that: "The discharge will not cause acutely toxic conditions to aquatic life passing through the mixing zone, because the exposure periods will be very short and rapid mixing occurs. Angels Creek is a fast moving stream at the proposed point of discharge, so floating organisms will be exposed for a very short time. Furthermore, the discharge is rapidly mixed with the receiving water, so organisms will not be exposed to elevated concentrations of toxic pollutants unless they are holding right at the diffuser ports, which is highly unlikely. There are no obstructions that will limit the passage of aquatic life. Effluent will be discharged through a multi-port diffuser mounted on the downstream side of a low concrete stem wall to be installed in the streambed. The low cascade created by the stem wall is smaller than natural cascades in the creek, and therefore should pose no significant barrier to aquatic life movement in the creek."

  There is no documentation to support the statements that "…the exposure periods will be very short" and "…so organisms will not be exposed to elevated concentrations of toxic pollutants unless they are holding right at the diffuser ports, which is highly unlikely." US EPA's Ambient Criteria for acute toxicity is based on a one-hour exposure. The City's mixing zone analysis only discusses a 4-day exposure. US EPA's *Technical Support Document for Water Quality Based Toxics Control* (TSD) contains explicit methods for determining aquatic life exposure periods for mixing zones in Section 4.3.3. There is no indication that any of the prescribed TSD procedures were followed. The Regional Board's statements regarding exposure periods are unsupported. To the contrary, it is well documented that fish tend to stack-up and hold for extended periods of time above and below

areas of turbulence as is described here. It is reasonable to assume absent any documentation that a 1-hour acute exposure period is not unreasonable. Floating time has nothing to do with fish movement and is not based on any cited scientific reference.

- The Regional Board's two statements that: "the mixing zone is as small as practicable and the integrity of the water body downstream of the proposed effluent discharge point will not be compromised in any way" are undocumented conclusory statements totally lacking in factual analysis contained in the proposed amendment. There is no analysis of the practicability of the size of the mixing zone. There is no reasonable discussion why the facility cannot nitrify to remove ammonia. The allowed ammonia level at 56 mg/l is the maximum identified by Metcalf an Eddy for raw sewage. Nitrification is a common WWTP process; practically no mixing zone is warranted. There is no analysis or discussion of the beneficial uses of the receiving stream. Confirming the Regional Board's lack of knowledge of the impacts and quality of the discharge, each constituent for which mixing is being granted contains the following statement: "There is currently insufficient effluent data to determine if the Facility can meet more stringent performance-based effluent limitations for ammonia. In future permit renewals, the effluent limitations may be reduced (i.e. made more stringent) based on Facility performance. This will ensure that an over allocation of the assimilative capacity is not allowed and ensures compliance with state and federal antidegradation requirements." The Regional Board cannot reliably calculate a mixing zone without the knowledge of the capabilities of the wastewater treatment system. The Regional Board cannot state that a mixing zone is as small as is practicable without the knowledge of the capabilities of the wastewater treatment system.

  The City's mixing zone analysis states that: "Dye measurements were obtained at three locations: background Angels Creek, surrogate effluent discharge, and cross-sectionally at a location two stream widths downstream of the discharge location. All field measurements were conducted using a calibrated Self-Contained Underwater Fluorescence Apparatus (SCUFA). The SCUFA provides temperature corrected fluorescence (TCF) readings, water temperature, and water turbidity." There was no sampling to determine whether a zone of passage exists or whether the mixing zone dominates the water body. The mixing zone author does not acknowledge or address that both of these parameters are a cross sectional analysis of the receiving water and the mixing zone. The stream width within the mixing zone goes from 18 feet to 8 feet; an 8-foot width creek cannot accommodate a mixing zone while allowing a zone of passage.

- The Regional Board's two statements that: "The discharge will not adversely impact biologically sensitive or critical habitats, including, but not limited to, habitat of species listed under federal or State endangered species laws, because the mixing zone is very small and acutely toxic conditions will not occur in the mixing zone" are undocumented conclusory statements totally lacking in factual analysis contained in the proposed amendment. There is no analysis of biologically sensitive or critical habitats. There is no analysis or discussion of listed or endangered species. Neither the Discharger nor the Regional Board conducted any analysis of the receiving stream for its biological sensitivity or reviewed whether critical

habitat exists.

- The Regional Board's numerous statements that: "The discharge will not produce undesirable or nuisance aquatic life, result in floating debris, oil, or scum, produce objectionable color, odor, taste, or turbidity, cause objectionable bottom deposits, or cause nuisance, because the Order requires tertiary level treated effluent and a discharge rate of a maximum of 1 part effluent to 19 parts receiving water, which is not expected to produce undesirable or nuisance aquatic life. The effluent discharge occurs only in winter/spring, and in an area that is heavily shaded. With these limits and discharge prohibitions, objectionable biostimulation in the area where the effluent mixes into the creek water is not expected" are undocumented conclusory statements totally lacking in factual analysis contained in the proposed amendment. An allowance to discharge up to 56 mg/l of ammonia will contribute to biostimulation regardless of shade. The ammonia will flow downstream to areas of sunlight. Biostimulation is also a process involving phosphorus which is not discussed at all in the proposed amendment. A discussion of biostimulation without discussing phosphorus is at best deficient. Assuming ammonia will stay in shaded areas and that algae cannot grow in the shade is at best conclusory and totally lacking in factual analysis. The only statement in the City's mixing zone analysis is that biostimulation will not occur in the 36 foot mixing zone. There is no reasonable analysis or discussion of undesirable or nuisance aquatic life to support the Regional Board's conclusions.

- The Regional Board states that: "In determining the size of the mixing zone, the Regional Water Board has considered the procedures and guidelines in the EPA's Water Quality Standards Handbook, 2d Edition (updated July 2007), Section 5.1, and Section 2.2.2 of the Technical Support Document for Water Quality-based Toxics Control (TSD). The SIP incorporates the same Guidelines. The mixing zone is limited to a small zone of initial dilution in the immediate vicinity of the discharge. The TSD indicates that this limitation achieves the objectives of preventing lethality to passing organisms and preventing significant human health risks." The Regional Board misquotes the TSD; the TSD goes into a long list of specific scientific methods for preventing lethality to aquatic organisms on pages 71 and 72 in Section 4.3.3. The Regional Board cited section of the TSD presents a generalized discussion of mixing zones whereas the specific technical recommendations are included in the later cited sections. The Regional Board has not followed any of the TSD recommendations for determining if a mixing zone will be acutely toxic to aquatic life.

- The mixing zone analysis states that: "Within SIP, "acutely toxic" means "acutely lethal." The effluent is tested for acute lethality (results included with February 2006 Report of Waste Discharge). Even undiluted effluent does not appear to cause acute lethality over the 4-day test period of an acute bioassay test. With the proposed diffuser design, "worst-case" 100 percent effluent conditions exist only in a very small orifice area at each diffuser port. A fish holding its position in the water column against a diffuser port for a four-day period would not be killed. The risk of any acute lethality is reduced dramatically and quickly from this extreme, near nonsensical example, as a result of initial effluent dilution at the diffuser." The author fails to recognize that acute toxicity is measured by a 1-hour time period, not 4-days (chronic). The mixing zone analysis does not further discuss acutely toxic conditions to

aquatic life.

- The mixing zone analysis states that: "A mixing zone shall not dominate the receiving water body or overlap a mixing zone from different outfalls. The mixing zone is small relative to the surrounding creek. Therefore, the mixing zone will not dominate the receiving water body." The mixing zone author fails to recognize that domination of a receiving water body discusses a cross sectional area of the receiving stream, not only the length. Domination of the water body is not adequately discussed.

Few mixing zones are adequately evaluated to determine whether the modeling exercise was in fact relevant or accurate, or monitored over time to assess the impacts of the mixing zone on the aquatic environment. The sampling of receiving waters often consists of analyzing one or two points where the mixing zone boundary is supposed to be – finding no pollution at the mixing zone boundary is often considered proof that mixing has been "successful" when in fact the sampling protocol might have missed the plume altogether.

3. The proposed Permit contains Effluent Limitations less stringent than the existing permit contrary to the Antibacksliding requirements of the Clean Water Act and Federal Regulations, 40 CFR 122.44 (l)(1).

Under the Clean Water Act (CWA), point source dischargers are required to obtain federal discharge (NPDES) permits and to comply with water quality based effluent limits (WQBELs) in NPDES permits sufficient to make progress toward the achievement of water quality standards or goals. The antibacksliding and antidegradation rules clearly spell out the interest of Congress in achieving the CWA's goal of continued progress toward eliminating all pollutant discharges. Congress clearly chose an overriding environmental interest in clean water through discharge reduction, imposition of technological controls, and adoption of a rule against relaxation of limitations once they are established.

Upon permit reissuance, modification, or renewal, a discharger may seek a relaxation of permit limitations. However, according to the CWA, relaxation of a WQBEL is permissible only if the requirements of the antibacksliding rule are met. The antibacksliding regulations prohibit EPA from reissuing NPDES permits containing interim effluent limitations, standards or conditions less stringent than the final limits contained in the previous permit, with limited exceptions. These regulations also prohibit, with some exceptions, the reissuance of permits originally based on best professional judgment (BPJ) to incorporate the effluent guidelines promulgated under CWA §304(b), which would result in limits less stringent than those in the previous BPJ-based permit. Congress statutorily ratified the general prohibition against backsliding by enacting §§402(o) and 303(d)(4) under the 1987 Amendments to the CWA. The amendments preserve present pollution control levels achieved by dischargers by prohibiting the adoption of less stringent effluent limitations than those already contained in their discharge permits, except in certain narrowly defined circumstances.

When attempting to backslide from WQBELs under either the antidegradation rule or an exception to the antibacksliding rule, relaxed permit limits must not result in a violation of

applicable water quality standards. The general prohibition against backsliding found in §402(o)(1) of the Act contains several exceptions. Specifically, under §402(o)(2), a permit may be renewed, reissued, or modified to contain a less stringent effluent limitation applicable to a pollutant *if*: (A) material and substantial alterations or additions to the permitted facility occurred after permit issuance which justify the application of a less stringent effluent limitation; (B)(i) information is available which was not available at the time of permit issuance (other than revised regulations, guidance, or test methods) and which would have justified the application of a less stringent effluent limitation at the time of permit issuance; or (ii) the Administrator determines that technical mistakes or mistaken interpretations of law were made in issuing the permit under subsection (a)(1)(B) of this section; (C) a less stringent effluent limitation is necessary because of events over which the permittee has no control and for which there is no reasonably available remedy [(e.g., Acts of God)]; (D) the permittee has received a permit modification under section 1311(c), 1311(g), 1311(h), 1311(i), 1311(k), 1311(n), or 1326(a) of this title; or (E) the permittee has installed the treatment facilities required to meet the effluent limitations in the previous permit, and has properly operated and maintained the facilities, but has nevertheless been unable to achieve the previous effluent limitations, in which case the limitations in the reviewed, reissued, or modified permit may reflect the level of pollutant control actually achieved (but shall not be less stringent than required by effluent guidelines in effect at the time of permit renewal, reissuance, or modification).

Even if a discharger can meet either the requirements of the antidegradation rule under §303(d)(4) or one of the statutory exceptions listed in §402(o)(2), there are still limitations as to how far a permit may be allowed to backslide. Section 402(o)(3) acts as a floor to restrict the extent to which BPJ and water quality-based permit limitations may be relaxed under the antibacksliding rule. Under this subsection, even if EPA allows a permit to backslide from its previous permit requirements, EPA may never allow the reissued permit to contain effluent limitations which are less stringent than the current effluent limitation guidelines for that pollutant, or which would cause the receiving waters to violate the applicable state water quality standard adopted under the authority of §303.49.

Federal regulations 40 CFR 122.44 (l)(1) have been adopted to implement the antibacksliding requirements of the CWA:

> (l) Reissued permits. (1) Except as provided in paragraph (l)(2) of this section when a permit is renewed or reissued, interim effluent limitations, standards or conditions must be at least as stringent as the final effluent limitations, standards, or conditions in the previous permit (unless the circumstances on which the previous permit was based have materially and substantially changed since the time the permit was issued and would constitute cause for permit modification or revocation and reissuance under Sec. 122.62.)
>
> (2) In the case of effluent limitations established on the basis of Section 402(a)(1)(B) of the CWA, a permit may not be renewed, reissued, or modified on the basis of effluent guidelines promulgated under section 304(b) subsequent to the original

> issuance of such permit, to contain effluent limitations which are less stringent than the comparable effluent limitations in the previous permit.
>
> (i) Exceptions--A permit with respect to which paragraph (l)(2) of this section applies may be renewed, reissued, or modified to contain a less stringent effluent limitation applicable to a pollutant, if:
>
> > (A) Material and substantial alterations or additions to the permitted facility occurred after permit issuance which justify the application of a less stringent effluent limitation;
> > (B)(1) Information is available which was not available at the time of permit issuance (other than revised regulations, guidance, or test methods) and which would have justified the application of a less stringent effluent limitation at the time of permit issuance; or (2) The Administrator determines that technical mistakes or mistaken interpretations of law were made in issuing the permit under section 402(a)(1)(b);
> > (C) A less stringent effluent limitation is necessary because of events over which the permittee has no control and for which there is no reasonably available remedy;
> > (D) The permittee has received a permit modification under section 301(c), 301(g), 301(h), 301(i), 301(k), 301(n), or 316(a); or
> > (E) The permittee has installed the treatment facilities required to meet the effluent limitations in the previous permit and has properly operated and maintained the facilities but has nevertheless been unable to achieve the previous effluent limitations, in which case the limitations in the reviewed, reissued, or modified permit may reflect the level of pollutant control actually achieved (but shall not be less stringent than required by effluent guidelines in effect at the time of permit renewal, reissuance, or modification).
>
> (ii) Limitations. In no event may a permit with respect to which paragraph (l)(2) of this section applies be renewed, reissued, or modified to contain an effluent limitation which is less stringent than required by effluent guidelines in effect at the time the permit is renewed, reissued, or modified. In no event may such a permit to discharge into waters be renewed, issued, or modified to contain a less stringent effluent limitation if the implementation of such limitation would result in a violation of a water quality standard under section 303 applicable to such waters.

The Regional Board states that "new" information is the basis for the allowance to backslide: the "new information being a mixing zone analysis. However, confirming the Regional Board's lack of knowledge of the impacts and quality of the discharge, each constituent for which mixing is being granted contains the following statement: "There is currently insufficient effluent data to determine if the Facility can meet more stringent performance-based effluent limitations for ammonia. In future permit renewals; the effluent limitations may be reduced (i.e. made more

stringent) based on Facility performance. This will ensure that an over allocation of the assimilative capacity is not allowed and ensures compliance with state and federal antidegradation requirements." The Regional Board cannot reliably calculate a mixing zone without the knowledge of the capabilities of the wastewater treatment system. The Regional Board cannot state that a mixing zone is as small as is practicable without the knowledge of the capabilities of the wastewater treatment system. The Regional Board also fails to discuss the requirements of the SIP and Federal Regulation that both require immediate compliance with CTR based effluent Limitations for "new" wastewater dischargers. The proposed amendment to relax Effluent Limitations for a new discharge two years following adoption of the NPDES permit can only mean that the Discharger has not complied as is required by the SIP and the CTR. The proposed Permit amendment would relax Effluent Limitations for Ammonia, Bis(2-chloroethyl)ether, Dichlorobromomethane, copper, Lead and Zinc, all of which are CTR constituents except for ammonia. The Regional Board's proposal to reopen and relax CTR based Effluent Limitations clearing violates the requirements of both the SIP and the CTR that a "new" Discharger be fully compliant upon initiation of discharge.

4. The proposed Permit contains an inadequate Antidegradation analysis that does not comply with the requirements of Section 101(a) of the Clean Water Act, Federal Regulations 40 CFR § 131.12, the State Board's Antidegradation Policy (Resolution 68-16) and California Water Code (CWC) Sections 13146 and 13247.

The Regional Board is proposing to significantly relax Effluent Limitations for numerous constituents by granting a mixing zone to an ephemeral stream. The Regional Board and the Discharger have conducted an incomplete Antidegradation analysis to address the impacts of the proposed mixing zone. CWC Sections 13146 and 13247 require that the Board in carrying out activities which affect water quality shall comply with state policy for water quality control unless otherwise directed by statute, in which case they shall indicate to the State Board in writing their authority for not complying with such policy. The State Board has adopted the Antidegradation Policy (Resolution 68-16), which the Regional Board has incorporated into its Basin Plan. The Regional Board is required by the CWC to comply with the Antidegradation Policy.

Section 101(a) of the Clean Water Act (CWA), the basis for the antidegradation policy, states that the objective of the Act is to "restore and maintain the chemical, biological and physical integrity of the nation's waters." Section 303(d)(4) of the CWA carries this further, referring explicitly to the need for states to satisfy the antidegradation regulations at 40 CFR § 131.12 before taking action to lower water quality. These regulations (40 CFR § 131.12(a)) describe the federal antidegradation policy and dictate that states must adopt both a policy at least as stringent as the federal policy as well as implementing procedures.

California's antidegradation policy is composed of both the federal antidegradation policy and the State Board's Resolution 68-16 (State Water Resources Control Board, Water Quality Order 86-17, p. 20 (1986) ("Order 86-17); Memorandum from Chief Counsel William Attwater, SWRCB to Regional Board Executive Officers, "federal Antidegradation Policy," pp. 2, 18 (Oct. 7, 1987) ("State Antidegradation Guidance")). As a state policy, with inclusion in the Water

Quality Control Plan (Basin Plan), the antidegradation policy is binding on all of the Regional Boards (Water Quality Order 86-17, pp. 17-18).

Implementation of the state's antidegradation policy is guided by the State Antidegradation Guidance, SWRCB Administrative Procedures Update 90-004, 2 July 1990 ("APU 90-004") and USEPA Region IX, "Guidance on Implementing the Antidegradation Provisions of 40 CFR 131.12" (3 June 1987) (" Region IX Guidance"), as well as Water Quality Order 86-17.

The Regional Board must apply the antidegradation policy whenever it takes an action that will lower water quality (State Antidegradation Guidance, pp. 3, 5, 18, and Region IX Guidance, p. 1). Application of the policy does not depend on whether the action will actually impair beneficial uses (State Antidegradation Guidance, p. 6). Actions that trigger use of the antidegradation policy include issuance, re-issuance, and modification of NPDES and Section 404 permits and waste discharge requirements, waiver of waste discharge requirements, issuance of variances, relocation of discharges, issuance of cleanup and abatement orders, increases in discharges due to industrial production and/or municipal growth and/other sources, exceptions from otherwise applicable water quality objectives, etc. (State Antidegradation Guidance, pp. 7-10, Region IX Guidance, pp. 2-3). Both the state and federal policies apply to point and nonpoint source pollution (State Antidegradation Guidance p. 6, Region IX Guidance, p. 4).

Even a minimal antidegradation analysis would require an examination of: 1) existing applicable water quality standards; 2) ambient conditions in receiving waters compared to standards; 3) incremental changes in constituent loading, both concentration and mass; 4) treatability; 5) best practicable treatment and control (BPTC); 6) comparison of the proposed increased loadings relative to other sources; 7) an assessment of the significance of changes in ambient water quality and 8) whether the waterbody was a ONRW. A minimal antidegradation analysis must also analyze whether: 1) such degradation is consistent with the maximum benefit to the people of the state; 2) the activity is necessary to accommodate important economic or social development in the area; 3) the highest statutory and regulatory requirements and best management practices for pollution control are achieved; and 4) resulting water quality is adequate to protect and maintain existing beneficial uses. A BPTC technology analysis must be done on an individual constituent basis; while tertiary treatment may provide BPTC for pathogens, dissolved metals may simply pass through.

- The minimal antidegradation analysis discusses costs to ratepayers but provides no information regarding the actual costs to adequately treat the City's sewage.
- There is no information regarding why providing nitrification/denitrification is cost prohibitive. The Antidegradation analysis actually states that the wastewater treatment plant nitrifies and denitrifies, yet the limit for ammonia is established at 56 mg/l the upper range for ammonia in raw sewage. There is no realistic discussion of the impacts of discharging this large volume of nutrients to surface waters. The Dischargers mixing zone study simply states that biostimulation will not occur in the mixing zone.
- The City's Antidegradation analysis states that nitrification/denitrification is severely impacted by wet weather inflow and infiltration (I/I) which is the principal reason they need a mixing zone for ammonia. First, undiluted raw sewage rarely exceeds the

allowable discharge level of 56 mg/l. Second, I/I repairs should be undertaken rather than an allowance to degrade water of California with toxic levels of ammonia. The diluted, I/I laden influent will make each part of the treatment system more difficult to operate and more unreliable. The fact that I/I would dilute the influent concentration is not accounted for in the request to discharge ammonia at 56 mg/l. None of these issues are adequately discussed.

- There is no discussion of the additive effects of zinc and lead, as is required by the Basin Plan.
- There is no analysis of how an allowance of 56 mg/l of ammonia benefits the people of California.
- There is no analysis of how an allowance of 266 ug/l of zinc benefits the people of California.
- There is no analysis of how an allowance of 4.9 ug/l of lead benefits the people of California.
- There is no analysis of how an allowance of 14 ug/l of dichlorobromomethane, a carcinogen, benefits the people of California.
- Footnote No. 7 to Table 1 of the City's antidegradation analysis states that hardness will increase allowing for less toxic conditions for metals. The analysis does not discuss that hardness itself degrades water quality
- The subsequent Tables report that hardness dependent water quality objectives were calculated using the downstream hardness. The analysis does not discuss that the US Fish and Wildlife Service (Service) and the National Marine Fisheries Service (NMFS) made the following comments to US EPA regarding hardness: "The CTR should clearly state that to obtain a site hardness value, samples should be collected upstream of the effluent source(s). Clearly stating this requirement in the CTR would avoid the computation of greater-than-intended site criteria in cases where samples were collected downstream of effluents that raise ambient hardness, but not other important water qualities that affect metal toxicity (e.g., pH, alkalinity, dissolved organic carbon, calcium, sodium, chloride, etc.). Clearly, it is inappropriate to use downstream site water quality variables for input into criteria formulas because they may be greatly altered by the effluent under regulation. Alterations in receiving water chemistry by a discharger (e.g., abrupt elevation of hardness, changes in pH, exhaustion of alkalinity, abrupt increases in organic matter etc.) should not result, through application of hardness in criteria formulas, in increased allowable discharges of toxic metals. If the use of downstream site water quality variables were allowed, discharges that alter the existing, naturally-occurring water composition would be encouraged rather than discouraged. Discharges should not change water chemistry even if the alterations do not result in toxicity, because the aquatic communities present in a water body may prefer the unaltered environment over the discharge-affected environment. Biological criteria may be necessary to detect adverse ecological effects downstream of discharges, whether or not toxicity is expressed."
- The City states that mixing zones will allow for growth. This statement is simply unsupported. Will growth not occur if high sewer rates are charged to adequately treat the wastestream? Highly treated wastewater will actually improve the environment; this improvement will improve the quality of life thereby attracting a higher earning

population. Degradation of California's waterways is not a good way to attract higher paying jobs as the analysis would have one believe. What this does to downstream attraction of growth is also not discussed. The antidegradation discussion states that the wastewater treatment plant "…is operating within specifications". The specifications standard must have been very low in order to request limitations for ammonia of 56 mg/l, copper at 18 ug/l and zinc at 256 ug/l. The point that: "Degradation is not a result of inadequate wastewater facilities or operations" has not been shown, to the contrary, any domestic wastewater treatment plant that is designed to nitrify and asks for a discharge level of 56 mg/l for ammonia is at best deficient.

- The project alternatives section of the analysis does not discuss the treatment of metals, only source control. The analysis discusses the addition of an anoxic zone to the treatment train as though it has never been done before; such should be considered best practicable treatment and control (BPTC) of the discharge.
- BPTC is not discussed in the analysis and is a critical component of any antidegradation policy analysis.

Any antidegradation analysis must comport with implementation requirements in State Board Water Quality Order 86-17, State Antidegradation Guidance, APU 90-004 and Region IX Guidance. The conclusory, unsupported, undocumented statements in the Permit are no substitute for a defensible antidegradation analysis.

5. The proposed Permit establishes Effluent Limitations for metals based on the hardness of the effluent as opposed to the ambient upstream receiving water hardness as required by Federal Regulations, the California Toxics Rule (CTR, 40 CFR 131.38(c)(4)).

On March 24, 2000 the US Fish and Wildlife Service (Service) and the National Marine Fisheries Service (NMFS) issued a biological opinion on the effects of the final promulgation of the CTR on listed species and critical habitats in California in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 USC 1531 et seq.; Act). The biological opinion was issued to the U.S. Environmental Protection Agency, Region 9, with regard to the "Final Rule for the Promulgation of Water Quality Standards: Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California" (CTR)". The document represented the Services' final biological opinion on the effects of the final promulgation of the CTR on listed species and critical habitats in California in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 USC 1531 et seq.; Act).

On Page 13 (C) and repeated on pages 216 and 232 of the biological opinion it is required that:

> "By June of 2003, EPA, in cooperation with the Services, will develop a revised criteria calculation model based on best available science for deriving aquatic life criteria on the basis of hardness (calcium and magnesium), pH, alkalinity, and dissolved organic carbon (DOC) for metals."

The biological opinion contains the following discussion, beginning on page 205, regarding the use of hardness in developing limitations for toxic metals:

> "The CTR should more clearly identify what is actually to be measured in a site water to determine a site-specific hardness value. Is the measure of hardness referred to in the CTR equations a measure of the water hardness due to calcium and magnesium ions only? If hardness computations were specified to be derived from data obtained in site water calcium and magnesium determinations alone, confusion could be avoided and more accurate results obtained (APHA 1985). Site hardness values would thus not include contributions from other multivalent cations (e.g., iron, aluminum, manganese), would not rise above calcium + magnesium hardness values, or result in greater-than-intended site criteria when used in formulas. In this Biological opinion, what the Services refer to as hardness is the water hardness due to calcium + magnesium ions only.
>
> The CTR should clearly state that to obtain a site hardness value, samples should be collected upstream of the effluent source(s). Clearly stating this requirement in the CTR would avoid the computation of greater-than-intended site criteria in cases where samples were collected downstream of effluents that raise ambient hardness, but not other important water qualities that affect metal toxicity (e.g., pH, alkalinity, dissolved organic carbon, calcium, sodium, chloride, etc.). Clearly, it is inappropriate to use downstream site water quality variables for input into criteria formulas because they may be greatly altered by the effluent under regulation. Alterations in receiving water chemistry by a discharger (e.g., abrupt elevation of hardness, changes in pH, exhaustion of alkalinity, abrupt increases in organic matter etc.) should not result, through application of hardness in criteria formulas, in increased allowable discharges of toxic metals. If the use of downstream site water quality variables were allowed, discharges that alter the existing, naturally-occurring water composition would be encouraged rather than discouraged. Discharges should not change water chemistry even if the alterations do not result in toxicity, because the aquatic communities present in a water body may prefer the unaltered environment over the discharge-affected environment. Biological criteria may be necessary to detect adverse ecological effects downstream of discharges, whether or not toxicity is expressed.
>
> The CTR proposes criteria formulas that use site water hardness as the only input variable. In contrast, over twenty years ago Howarth and Sprague (1978) cautioned against a broad use of water hardness as a "shorthand" for water qualities that affect copper toxicity. In that study, they observed a clear effect of pH in addition to hardness. Since that time, several studies of the toxicity of metals in test waters of various compositions have been performed and the results do not confer a singular role to hardness in ameliorating metals toxicity. In recognition of this fact, most current studies carefully vary test water characteristics like pH, calcium, alkalinity, dissolved organic carbon, chloride, sodium, suspended solid s, and others while observing the responses of test organisms. It is likely that understanding metal toxicity in waters of various chemical makeups is not possible without the use of a geochemical model that is more elaborate than a regression formula. It may also be that simple toxicity tests (using mortality,

growth, or reproductive endpoints) are not capable of discriminating the role of hardness or other water chemistry characteristics in modulating metals toxicity (Erickson *et al*. 1996). Gill surface interaction models have provided a useful framework for the study of acute metals toxicity in fish (Pagenkopf 1983; Playle *et al*. 1992; Playle *et al*. 1993a; Playle *et al*. 1993b; Janes and Playle 1995; Playle 1998), as have studies that observe physiological (e.g. ion fluxes) or biochemical (e.g. enzyme inhibition) responses (Lauren and McDonald 1986; Lauren and McDonald 1987a; Lauren and McDonald 1987b; Reid and McDonald 1988; Verbost *et al*. 1989; Bury *et al*. 1999a; Bury *et al*. 1999b). Even the earliest gill models accounted for the effects of pH on metal speciation and the effects of alkalinity on inorganic complexation, in addition to the competitive effects due to hardness ions (Pagenkopf 1983). Current gill models make use of sophisticated, computer-based, geochemical programs to more accurately account for modulating effects in waters of different chemical makeup (Playle 1998). These programs have aided in the interpretation of physiological or biochemical responses in fish and i n investigations that combine their measurement with gill metal burdens and traditional toxicity endpoints.

<u>The Services recognize and acknowledge that hardness of water and the hardness acclimation status of a fish will modify toxicity and toxic response. However the use of hardness alone as a universal surrogate for all water quality parameters that may modify toxicity, while perhaps convenient, will clearly leave gaps in protection when hardness does not correlate with other water quality parameters such as DOC, pH, Cl- or alkalinity and will not provide the combination of comprehensive protection and site specificity that a multivariate water quality model could provide. In our review of the best available scientific literature the Services have found no conclusive evidence that water hardness, by itself, in either laboratory or natural water, is a consistent, accurate predictor of the aquatic toxicity of all metals in all conditions.</u>

Hardness as a predictor of copper toxicity: Lauren and McDonald (1986) varied pH, alkalinity, and hardness independently at a constant sodium ion concentration, while measuring net sodium loss and mortality in rainbow trout exposed to copper. Sodium loss was an endpoint investigated because mechanisms of short-term copper toxicity in fish are related to disruption of gill ionoregulatory function. Their results indicated that alkalinity was an important factor reducing copper toxicity, most notably in natural waters of low calcium hardness and alkalinity. Meador (1991) found that both pH and dissolved organic carbon were important in controlling copper toxicity to *Daphnia magna*. Welsh *et al*. (1993) demonstrated the importance of dissolved organic carbon in affecting the toxicity of copper to fathead minnows and suggested that water quality criteria be reviewed to consider the toxicity of copper in waters of low alkalinity, moderately acidic pH, and low dissolved organic carbon concentrations. Applications of gill models to copper binding consider complexation by dissolved organic carbon, speciation and competitive effects of pH, and competition by calcium ions, not merely water hardness (Playle *et al*. 1992; Playle *et al*. 1993a; Playle *et al*. 1993b). Erickson *et al*. (1996) varied several test water qualities independently and found that pH, hardness, sodium, dissolved organic matter, and suspended solids have important roles in

> determining copper toxicity. They also suggested that it may difficult to sort out the effects of hardness based on simple toxicity experiments. It is clear that these studies question the use of site calcium + magnesium hardness only as input to a formula to derive a criterion for copper because pH, alkalinity, and dissolved organic carbon concentrations are key water quality variables that also modulate toxicity. In waters of moderately acidic pH, low alkalinity, and low dissolved organic carbon, the use of hardness regressions may be most inaccurate. Also, it is not clear that the dissolved organic carbon in most or all waters render metals unavailable. This is because dissolved organic carbon from different sources may vary in both binding capacity and stability (Playle 1998).

Federal Regulation 40 CFR 131.38(c)(4) states that: "For purposes of calculating freshwater aquatic life criteria for metals from the equations in paragraph (b)(2) of this section, for waters with a hardness of 400 mg/l or less as calcium carbonate, the actual ambient hardness of the surface water shall be used in those equations." (Emphasis added). The proposed Permit states that the effluent hardness and the downstream hardness were used to calculate Effluent Limitations for metals. The definition of *ambient* is "in the surrounding area", "encompassing on all sides".

The Federal Register, Volume 65, No. 97/Thursday, May 18th 2000 (31692), adopting the California Toxics Rule in confirming that the ambient hardness is the upstream hardness, absent the wastewater discharge, states that: "A hardness equation is most accurate when the relationship between hardness and the other important inorganic constituents, notably alkalinity and pH, are nearly identical in all of the dilution waters used in the toxicity tests and in the surface waters to which the equation is to be applied. If an effluent raises hardness but not alkalinity and/or pH, using the lower hardness of the downstream hardness might provide a lower level of protection than intended by the 1985 guidelines. If it appears that an effluent causes hardness to be inconsistent with alkalinity and/or pH the intended level of protection will usually be maintained or exceeded if either (1) data are available to demonstrate that alkalinity and/or pH do not affect the toxicity of the metal, or (2) the hardness used in the hardness equation is the hardness of upstream water that does not include the effluent. The level of protection intended by the 1985 guidelines can also be provided by using the WER procedure." The Regional Board has ignored the requirement of the regulation to use the instream ambient hardness.

Thank you for considering these comments. If you have questions or require clarification, please don't hesitate to contact us.

Sincerely,

Bill Jennings, Executive Director
California Sportfishing Protection Alliance