

**Regional Water Quality Control Board  
Central Valley Region  
August 2009 Board Meeting**

**Staff Response to Public Comments for  
City of Angels Wastewater Treatment Plant  
Tentative Order Amending Waste Discharge Requirements  
Order No. R5-2007-0031 (NPDES Permit No. CA0085201)  
July 2009**

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At a public hearing scheduled for 12/13/14 August 2009, the Regional Water Quality Control Board, Central Valley Region (Central Valley Water Board) will consider adoption of an Order amending Waste Discharge Requirements Order No. R5-2007-0031 (NPDES Permit No. CA0085201) for the City of Angels Wastewater Treatment Plant. A tentative Order was issued on 8 April 2009. Timely comments were received by City of Angels (Discharger) and the California Sportfishing Protection Alliance (CSPA). The draft Order was modified based on comments received and a second tentative Order was issued on 15 June 2009. This document contains Central Valley Water Board staff responses to written comments received from interested persons. Written comments from interested persons were required to be received by the Central Valley Water Board by 15 July 2009 in order to be included in the record. Comments were received by the due date from the Discharger, California Department of Fish and Game (DFG), and CSPA. Written comments were also received by the due date in support of the proposed amendment from the Stockton East Water District. Written comments are summarized below, followed by Central Valley Water Board staff responses.

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**DISCHARGER COMMENTS**

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The Discharger provided comments on the 8 April 2009 tentative Order regarding two factual errors. The errors have been corrected in the proposed Order. The Discharger has provided several comments on the 15 June 2009 tentative Order that are outside the scope of the hearing. The proposed amendment is to allow mixing zones and dilution credits. Therefore, only comments related to the allowance of mixing zones and dilution credits have been responded to below.

**DISCHARGER COMMENT #1:** The term “chronic whole effluent toxicity” should be changed globally throughout the amended Order to read “chronic effluent toxicity.” This is because the required chronic effluent toxicity testing does not use “whole” effluent per Appendix E, V.B.7.

**Response:** The term “whole effluent toxicity” refers to the toxicity of the effluent as a whole as opposed to toxicity that may be the result of individual toxicants. It does not imply that the chronic toxicity testing is performed using 100% effluent. The chemical specific effluent limitations are used to prevent toxicity from individual constituents, while the chronic whole effluent toxicity requirements are used to prevent toxicity due to the synergistic effects of the individual toxicants in the effluent. No change is necessary in the proposed amendment.

**DISCHARGER COMMENT #2:** The date above the Executive Officer's signature on page 3 of the proposed Order needs to change to the August adoption date.

**Response:** The date has been changed in the agenda version of the proposed Order.

**DISCHARGER COMMENT #3:** The "X June" adoption date needs to be changed to "X August" in finding II.A of Order No. R5-2007-0031-01.

**Response:** This change has been changed in the agenda version of the proposed Order.

**DISCHARGER COMMENT #4:** Some supplemental language anti-backsliding finding (II.O) may be appropriate to cover the amendment. This would also apply to Fact Sheet III.C.3.

**Response:** Central Valley Water Board staff agrees and have made the following change to Finding II.O in the proposed amendment with identical changes to the Fact Sheet, Section III.C.3.

- O. **Anti-Backsliding Requirements.** Sections 402(o)(2) and 303(d)(4) of the CWA and federal regulations at title 40, Code of Federal Regulations section 122.44(l) prohibit backsliding in NPDES permits. These anti-backsliding provisions require effluent limitations in a reissued permit to be as stringent as those in the previous permit, with some exceptions where limitations may be relaxed. Some effluent limitations in this revised Order (Order No. R5-2007-0031-01) are less stringent than those in the originally adopted Order (Order No. R5-2007-0031). As discussed in the Fact Sheet, Section IV.D.4, this relaxation of effluent limitations is consistent with the anti-backsliding requirements of the CWA and federal regulations. However, this Order being a new NPDES for a new discharge, the anti-backsliding requirements do not apply to this permit.

**DISCHARGER COMMENT #5:** All mass limits should be rounded to 2-place accuracy so as to not overstate the technical accuracy of the input data (i.e., most analytical results have no more than 2-place accuracy). This issue of 2-place accuracy effluent limitations is discussed in the California Toxic Rule (CTR).

**Response:** Central Valley Water Board staff agrees. The only mass effluent limitations proposed in the amendment are for ammonia. Table 6, Effluent Limitations, shall be modified as follows with the same changes to Table F-14 of the Fact Sheet:

**Table 6. Effluent Limitations**

Parameter	Units	Effluent Limitations				
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
Ammonia (Total)	mg/l	23	--	56	--	--
	lbs/day <sup>1</sup>	3604	--	89087	--	--

<sup>1</sup> Based on a design flow of 1.9 million gallons per day

**DISCHARGER COMMENT #6:** “Chronic whole effluent toxicity” should be revised to “chronic effluent toxicity” per Appendix E, V.B.7. Use of the term “WET” should also be replaced globally with “ET” to avoid confusion.

**Response:** See response to Discharge Comment #1.

**DISCHARGER COMMENT #7:** For clarity “When discharging to Angels Creek,” should be added to the beginning of the first sentence of Section IV.A.1 in Appendix E of the amended Order. This is the same language used by the Central Valley Water Board in Appendix E, Section V. regarding toxicity testing.

**Response:** The proposed permit amendment is for the allowance of a mixing zone and dilution credits only. Therefore, this comment is outside the scope of this hearing. Regardless, these changes are unnecessary. Section IV.A.1 in Appendix E refers to effluent monitoring, which can only occur if discharging effluent to Angels Creek. Furthermore, Section V. in Appendix E already states that monitoring is only required when discharging to Angels Creek.

**DISCHARGER COMMENT #8:** The word “Whole” should be removed from the title of Appendix E, Section V because whole effluent chronic toxicity testing is not required. Use of the terms “whole” and “WET” should be revised throughout this section.

**Response:** See response to Discharge Comment #1.

**DISCHARGER COMMENT #9:** Section IV.C.2.a of the Fact Sheet needs to be revised to reflect that dilution credits are being granted.

**Response:** Central Valley Water Board staff agrees and have modified Section IV.C.2.a of the Fact Sheet in the agenda version as follows:

- a. Receiving Water. The receiving stream is Angels Creek, which is tributary to the Stanislaus River. ~~Based on the available information, the worst case dilution is assumed to be zero to provide protection for the receiving water beneficial uses. The impact of assuming zero assimilative capacity within the receiving water is that discharge~~

~~limitations are end-of-pipe limits with no allowance for dilution within the receiving water.~~ Beneficial uses of Angels Creek, through application of 'Tributary Rule', are: municipal and domestic supply; agricultural supply, including stock watering; hydropower generation; water contact recreation, including canoeing and rafting; non-contact water recreation, including aesthetic enjoyment; commercial and sport fishing; aquaculture; warm freshwater habitat; cold freshwater habitat; and wildlife habitat.

**DISCHARGER COMMENT #10:** Table F-2, Summary of Technology-based Effluent Limitations is not consistent with Table 6, Effluent Limitations. This inconsistency should be corrected.

**Response:** Central Valley Water Board staff agrees and have modified Table F-2 as follows:

**Table F-2. Summary of Technology-based Effluent Limitations**

Parameter	Units	Effluent Limitations				
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
5-Day BOD	mg/l	10	<u>15</u>	20		
	lbs/day <sup>1</sup>	158	<u>238</u>	317		
Total Suspended Solids	mg/l	10	<u>15</u>	20		
	lbs/day <sup>1</sup>	158	<u>238</u>	317		

<sup>1</sup> Based on design flow of 1.9 mgd.

**DISCHARGER COMMENT #11:** Table F-3 does not appear to be correct. The CTR chronic copper criterion is listed as 2.8 µg/L, when this appears to be the acute criterion. The dilution credit of 9 applies to the acute criterion, not the chronic. Footnote 3 makes reference to the chronic criterion.

**Response:** Central Valley Water Board staff agree and have modified Table F-3 as follows:

**Table F-3: Copper Hardness Evaluation**

Hardness		18.3 mg/L (as CaCO <sub>3</sub> )	
CTR Copper <del>Acute</del> Chronic Criterion		2.8 µg/L	
Dilution Credit		9	
Maximum Background Copper		1.1 µg/L	
Acute Effluent Concentration Allowance (ECA) for Copper <sup>1</sup>		18.4 µg/L	
<b>Mixed Downstream Ambient Concentration</b>			
Effluent Fraction	Hardness <sup>2</sup>	Criteria <sup>3</sup>	Copper <sup>4</sup>
	(mg/L) (as CaCO <sub>3</sub> )	(µg/L)	(µg/L)
1%	16.23	2.5	1.3
3%	16.69	2.6	1.6
5%	17.15	2.7	2.0
7%	17.61	2.7	2.3
10%	18.30	2.8	2.8

<sup>1</sup> Effluent Concentration Allowance calculated per Section 1.4 of the SIP.

<sup>2</sup> Mixed downstream ambient hardness is the mixture of the receiving water and effluent hardness using the lowest observed hardness values (i.e., 16 mg/L and 39 mg/L for the receiving water and effluent, respectively)

<sup>3</sup> Mixed downstream ambient criteria is the CTR ~~acute~~chronic criteria calculated using the mixed hardness.

<sup>4</sup> Mixed downstream ambient copper concentration is the mixture of the receiving water and effluent copper concentrations using the maximum background copper concentration (i.e., 1.1 µg/L) and the effluent copper concentration at the ECA.

**DISCHARGER COMMENT #12a:** The sixth paragraph (bottom of page F-18 as printed 15 June 2009) is of concern for several reasons. The single point discharge that resulted in 92.4% mixing 36 feet downstream was located where the bulk of the creek flow was forced between two boulders. This was the original design. Since that did not result in 95% mixing (our understanding of the desires of the Central Valley Water Board at that time for granting dilution credits and mixing zones), we tested the cross-stream diffuser. The current diffuser design involves a concrete weir to accurately measure creek flow, and to distribute that creek flow uniformly across the width of the weir. The diffuser is on the downstream edge of the weir to distribute the effluent uniformly into the entire creek flow. The diffuser openings are on one-foot centers to allow multiple zones of passage for aquatic life in the immediate vicinity of the diffuser.

To accommodate the proposed Order language that “the outfall diffuser must be limited to no more than one-half of the stream width”, the diffuser has been redesigned to double the density of diffuser openings so that half of the openings can be plugged without compromising diffuser hydraulics under the full range of design flows.

The potential problem as we see it is that mixing all of the effluent into only half of the creek flow at the weir has not been modeled. We do not know if this approach will result in better or poorer mixing than the single point discharge located between the two boulders referred to in the Order. In other words, we do not know if there will be a plume of blended effluent/creek water containing more than 10% effluent, 18 feet downstream from the diffuser discharging 100% of the effluent into only 50% of the creek flow. Results from field testing the actual diffuser and weir may require that the Order be reopened to revise the mixing zones, particularly the acute mixing zone which appears to be the critical issue from a hydraulics perspective as well as from a water quality perspective (i.e., the acute LTA governs for ammonia [Table F-7], copper [Table F-8], and zinc [Table F-10]).

We know from acute bioassay results for this and similar tertiary WWTPs that acute toxicity is not an actual problem because the Order requires a median 90% survival of fish after 4 days of continuous exposure to 100% effluent. Therefore, the issue is how to develop this acute mixing zone from a regulatory perspective:

- Where to monitor for compliance with CTR acute criteria.
- How to monitor for compliance with CTR acute criteria at the selected location.

**Response:** Central Valley Water Board staff agrees that the mixing based on the point source discharge or the prototype diffuser used for the mixing zone study may be different than the mixing that will occur with the actual in-stream diffuser proposed to be constructed by the Discharger. Consequently, the proposed amendment requires a mixing zone study be performed after installation of the diffuser to re-evaluate the mixing zone. This may result in the modification of the mixing zone dimensions and/or the allowed dilution credits to ensure an adequate zone of passage is provided. Central Valley Water Board staff do not agree that because the diffuser ports are 1-foot on center there is a zone of passage between the ports. The diffuser must not extend more than half of the creek width to ensure an adequate zone of passage, as required in the proposed amendment.

**DISCHARGER COMMENT #12b:** The tentative Order proposes an acute monitoring location 18 feet downstream of the diffuser. This is a very turbulent reach of Angels Creek. We have no evidence that diffusing all of the effluent into half the creek will result in no more than 10% effluent in every parcel of water passing this location. However, creek hydraulics in this reach are sufficiently dynamic that a one-hour composite sample should be representative of the one hour, acute exposure (rather than instantaneous exposure) of aquatic life at the edge of the acute mixing zone. Based on these concerns and reasoning, we suggest that the Order reflect:

1. The acute mixing zone is limited to 18 feet downstream of the diffuser.
2. The Order may be reopened to amend this acute mixing zone length or the diffuser width based on field trials with the actual diffuser, its operation providing a very large zone of passage.
3. Compliance with the CTR acute aquatic life objectives is to be determined by 24-hour composite samples collected 18 feet downstream from the diffuser, at a stream location centered on the diffuser, and at mid-depth.

Based on these same concerns for the chronic mixing zone, we suggest that the Order reflect:

1. The chronic mixing zone is limited to 36 feet downstream of the diffuser.
2. The Order may be reopened to amend this chronic mixing zone length or the diffuser width based on field trials with the actual diffuser.
3. Compliance with the CTR chronic aquatic life criteria is to be determined by 24-hour composite samples collected 36 feet downstream of the diffuser at mid-stream, and at mid-depth.

**Response:** The proposed permit amendment does not require monitoring at the edge of the acute and chronic mixing zones. Compliance with acute and chronic criteria is demonstrated through monitoring of the effluent at the end-of-pipe based on the allowed dilution credits. The permit does require, however, a demonstration of the edges of these mixing zones through an additional mixing zone study after installation of the diffuser.

**DISCHARGER COMMENT #13:** The chronic zinc translator listed in Section IV.C.3.s for zinc (0.986) is different from the chronic zinc translator used in Table F-10 (0.978). These should be made consistent with each other.

**Response:** Central Valley Water Board staff agrees. The chronic zinc translator was incorrect in Table F-10. It has been changed to 0.986 to be consistent with Section IVC.3.s, which is the default translator specified in the CTR. This change has no effect on the water quality-based effluent limitations for zinc.

**DISCHARGER COMMENT #14:** The ECA discussion for aquatic life criteria in the Fact Sheet, Section IV.C.4.b must be expanded to show how dilution credits can be applied.

**Response:** Central Valley Water Board staff agrees and have modified Section IV.C.4.b of the Fact Sheet as follows:

- b. Effluent Limitation Calculations.** For each water quality criterion/objective, the ECA is calculated using the following steady-state mass balance equation from Section 1.4 of the SIP: ~~In calculating~~

~~maximum effluent limitations, the effluent concentration allowances were set equal to the criteria/standards/objectives.~~

$$\begin{array}{l} ECA_{acute} = CMC \qquad \qquad \qquad ECA_{chronic} = CCC \\ \underline{ECA = C + D(C - B)} \qquad \qquad \qquad \text{where } C > B, \text{ and} \\ \underline{ECA = C} \qquad \qquad \qquad \qquad \qquad \qquad \text{where } C \leq B \end{array}$$

where:

ECA = effluent concentration allowance

D = dilution credit

C = the priority pollutant criterion/objective

B = the ambient background concentration.

**DISCHARGER COMMENT #15:** In Table F-9 it shows translators greater than 1.0, which suggests that there can be more dissolved lead in a sample than there is total recoverable lead in that same sample. Is this correct, or is the lead translator different from a conventional translator: [Total Recoverable Metal] x Conventional Translator = [Theoretical Dissolved Metal]?

**Response:** Central Valley Water Board staff agrees that this may be confusing. The value is correct, but it actually is the default conversion factor from the CTR. Therefore, Table F-9 has been modified to describe the value as the CTR conversion factor rather than a translator. Tables F-8 and F-10 for copper and zinc, respectively, have also been changed.

**DISCHARGER COMMENT #16:** The dilution credit in Table F-11 needs to be changed from 19 to 18, if Table F-11 is not deleted altogether as being unnecessary with UV disinfection.

**Response:** Central Valley Water Board staff agrees and have corrected this typo in Table F-11 in the agenda version of the amendment.

**DISCHARGER COMMENT #17:** The copper average monthly effluent limitation (AMEL) in Table F-13, Summary of Water Quality-Based Effluent Limitations and Table F-14, Summary of Final Effluent Limitations should be 9.2 µg/L.

**Response:** Central Valley Water Board staff agrees and has corrected the typos in Tables F-13 and F-14 in the agenda version of the amendment.

**DISCHARGER COMMENT #18:** Section VII.B.2.a of the Fact Sheet needs to be revised to reflect the Chronic Toxicity Monitoring Trigger in the Order, and that whole effluent chronic toxicity monitoring is not required for regular or accelerated chronic toxicity testing (see Appendix E, Section V.B.7).

**Response:** Central Valley Water Board staff agrees that Section VII.B.2.a of the Fact Sheet needs to be revised to reflect the Chronic Toxicity Monitoring Trigger in the Order. The third paragraph of Section VII.B.2.a of the Fact Sheet has been modified as follows:

**Monitoring Trigger.** A numeric toxicity monitoring trigger of  $> 16$  TUc (where TUc = 100/NOEC) is applied in the provision, because this Order ~~does not allow~~ any dilution for the chronic condition. Therefore, a TRE is triggered when the effluent exhibits a pattern of toxicity at ~~400~~3.125% effluent.

With regard to the second part of the Discharger's comment, the term "whole effluent" does not imply chronic toxicity testing using 100% effluent. See response to Discharger Comment #1.

**DISCHARGER COMMENT #19:** Should Section VIII.C. of the Fact Sheet be augmented with the August 2009 public hearing date for the amendments?

**Response:** This section refers to the date the existing permit was adopted. The August 2009 adoption date refers to the adoption date the proposed Order that is amending the existing permit. Therefore there is no need to make any changes to this section for this amendment.

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## DEPARTMENT OF FISH AND GAME (DFG) COMMENTS

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**DFG COMMENT #1a:** Concentrations of ammonia up to 56 mg/l as a daily maximum and 23 mg/l as a monthly average would be allowed. 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, would any nitrification and denitrification be occurring?

**Response:** If the Facility was discharging at the proposed water quality-based effluent limitations (WQBELs) there would be little to no nitrification occurring. The water quality concern regarding ammonia is not whether nitrification or denitrification is occurring, but rather the level of the effluent limitations for ammonia and whether they are protective of aquatic life. The proposed effluent limitations for ammonia are WQBELs based solely on USEPA's water quality criteria and the available assimilative capacity and dilution in Angels Creek. The treatment capability of the Facility is not a factor in calculating WQBELs.

The WQBELs ensure that the receiving water will be in compliance with EPA's recommended water quality criteria for the protection of aquatic life at the end of the mixing zone. Within the mixing zone there may be ammonia concentrations exceeding the criteria, which is the basic definition of a mixing zone, a zone in which water quality criteria are not attained.

The Facility contains a sequencing batch reactor (SBR) activated sludge treatment process that has the capability to nitrify and denitrify the wastewater. Therefore, it is highly likely that the Facility can meet more stringent effluent limitations for ammonia. However, at this time there is limited ammonia data to properly determine performance-based effluent limitations. Furthermore, discharges to Angels Creek are likely to occur during wet weather events when the Facility experiences high inflows due to infiltration and inflow into the sewer collection system. During these wet periods the detention time in the SBR may not be sufficient to provide complete nitrification/de-nitrification, making it difficult to adequately estimate facility performance for ammonia removal. So, although Central Valley Water Board staff is fairly certain that more stringent ammonia effluent limits can be met by the Facility, we can not calculate performance-based limits at this time that because there is insufficient data on which to base the limits. Consequently, the proposed amendment includes the WQBELs, which are fully protective of aquatic life outside the mixing zone. The permit also requires the Discharger prepare and implement pollutant evaluation and minimization plans for ammonia to ensure that Facility maximizes its removal of ammonia. The proposed amendment also informs the Discharger that upon collection of sufficient data to adequately determine Facility performance, the permit may be reopened to establish more stringent performance-based effluent limitations.

**DFG COMMENT #1b:** Up to 18 ug/l of copper as a daily maximum and 9.2 ug/l as a monthly average would be allowed. 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 a hardness of 18.3 was used by the Regional Board. Acute toxicity of Cu is documented as low as 8.2 ug/L for amphipod, 2.8 for rainbow trout, and 4.83 in fathead minnow. Mean chronic Cu toxicity concentrations are documented as low as 3.0 for rotifer, 5.68 for cladoceran, and 6.67 for caddis fly (EPA Criteria).

**Response:** The proposed amendment allows a mixing zone and dilution credit. Thus, compliance with water quality criteria is determined at the edge of the mixing zone, not at the end-of-pipe. End-of-pipe concentrations exceed the applicable criteria where a mixing zone is allowed. The proposed end-of-pipe effluent limitations for copper are based on the CTR criteria for the protection of aquatic life. The WQBELs ensure that the water quality criteria are met at the edge of the mixing zone. The definition of a mixing zone is "...a limited volume of receiving water that is allocated for mixing with a wastewater discharge where water quality criteria can be exceeded without causing adverse effects to

the overall waterbody.” (*Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays and Estuaries of California* (SIP), Appendix 1-4) As discussed in detail in Section IV.C.2.c of the Fact Sheet, the mixing zone was established based on a mixing zone study performed by the Discharger and meets all of the requirements of the SIP.

Regarding the appropriate hardness for calculating the CTR criteria for copper, the proposed amendment considers the lowest observed upstream receiving water hardness in the calculation of the criteria and development of the WQBELs. This is discussed in Section IV.C.2.b of the Fact Sheet.

**DFG COMMENT #1c:** Lead up to 4.9 ug/l as a daily maximum and copper up to 18 ug/l as a daily maximum would be allowed in creek water. The additive toxicity of copper and zinc were not considered as required by the Basin Plan, page IV 18.00.

**Response:** Central Valley Water Board staff disagrees. The proposed Order addresses the additive toxicity of the toxic pollutants through whole effluent toxicity (WET) requirements. WET testing addresses the additive and synergistic toxicity effects of chemical-specific pollutants in the discharge. The existing Order includes an acute toxicity effluent limitation that requires at minimum 90% median survival in three or more 96-hour bioassays performed using 100% effluent. The proposed amendment does not include changes to the acute whole effluent toxicity (WET) limitation. In addition, the existing Order requires chronic WET requirements. The Discharger is required to conduct chronic WET testing, as specified in the Monitoring and Reporting Program (Attachment E, Section V.). Furthermore, the proposed Order requires the Discharger to investigate the causes of, and identify corrective actions to reduce or eliminate effluent toxicity. If the discharge exceeds the toxicity numeric monitoring trigger established in the Order, the Discharger is required to initiate a Toxicity Reduction Evaluation (TRE), in accordance with an approved TRE Work Plan, and take actions to mitigate the impact of the discharge and prevent reoccurrence of toxicity. A TRE is a site-specific study conducted in a stepwise process to identify the source(s) of toxicity and the effective control measures for effluent toxicity. TREs are designed to identify the causative agents and sources of whole effluent toxicity, evaluate the effectiveness of the toxicity control options, and confirm the reduction in effluent toxicity.

**DFG COMMENT #2a:** There does not appear to be a sound understanding or knowledge of the impacts and quality of the discharge as 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.”

More thorough evaluation of effluent pollutant concentrations should be done up front before allowance of excessive concentrations of ammonia and metals that would be harmful to aquatic life. Ammonia and copper levels currently proposed would be deleterious.

**Response:** See response to DFG Comment #1a. The proposed effluent limitations are protective of aquatic life. Insufficient effluent data exists to determine if more stringent limitations, above and beyond the proposed WQBELs.

**DFG COMMENT #2b:** Bioassessment should be conducted above and below the discharge to make sure the discharger is held to improving the discharge or eliminating it if there is a documented problem. All NPDES permits should have bioassessment in them, especially in better quality waters. DFG strongly recommends that bioassessment be required as part of this proposed permit including up front and ongoing facility monitoring requirements.

**Response:** The effluent and receiving water monitoring and reporting requirements in an NPDES permit provide the Central Valley Water Board with information to assure that the Discharger is complying with its permit requirements. Further monitoring and reporting is required to provide the information necessary for the Central Valley Water Board to renew the permit with updated requirements that are protective of the receiving waters. A bioassessment of the receiving water provides valuable information that characterizes the health of the receiving water environment and impacts from potentially varying sources within the watershed. However, it does not provide discharge-specific information relating to the regulation of the specific point source discharge. Therefore, in general, bioassessments are not required in an NPDES permit for an individual discharge.

**DFG COMMENT #3a:** Can the Regional Board reliably calculate a mixing zone without the knowledge of the capabilities of the wastewater treatment system?

**Response:** Yes. The treatment capabilities of the wastewater treatment plant or the existing quality of a discharge is not a factor in the sizing of the mixing zone. The size of the mixing zone is based on the physical mixing of the effluent with the receiving water, which has been defined at the critical conditions for this proposed amendment through a mixing zone study performed by the Discharger. The WQBELs are based on the amount of available dilution, the water quality criteria, and corresponding amount of assimilative capacity. The proposed WQBELs result in the water quality criteria being met at the edge of the mixing zone. The quality of the discharge is not a factor in developing WQBELs.

**DFG COMMENT #3b:** The mixing zone allowed is too large for the creek and would not allow safe fish passage. The stream width within the mixing zone varies from 18 feet to 8 feet; an 8-foot width creek cannot accommodate a mixing zone while allowing a zone of passage. It is not clear that the zone of passage is evaluated (or designed) adequately for the proposed amendment. If the requirement is for a zone of passage around pollutants then the mixing zone must not run bank to bank in the creek. To determine the mixing zone length and width transects, DFG recommends that water quality data be collected and analyzed. The amount of flow at any given time of year would determine where the mixing would occur and how long it would take. Different flows could alter where the zone of passage is or could be at a certain place in time.

**Response:** Central Valley Water Board staff disagrees. The proposed mixing zone allows for a zone of passage in three ways:

- 1) The proposed amendment requires that the diffuser extend no more than one-half of the creek width. This allows a zone of passage on one half of the creek.
- 2) The dilution credit for acute toxicity is only half of the available dilution determined to be available at 36 feet downstream of the discharge where the plume is fully mixed across the stream width. Thus, the acute mixing zone is estimated to only extend 18 feet downstream, which means the receiving water will be in compliance with acute criteria before the plume reaches all of the way across the stream. This ensures a portion of the creek to be always in compliance with acute criteria, thus providing a zone of passage.
- 3) The permit requires compliance with an acute toxicity effluent limitation with compliance determined based on performing 96-hour acute bioassays using 100% effluent. Although a dilution credit for acute toxicity is provided for calculating chemical-specific WQBELs, the permit does not allow for a dilution credit for the acute whole effluent toxicity effluent limitation.

DFG comments that an 8-foot width creek cannot accommodate a mixing zone while allowing a zone of passage. The creek is 18 feet wide at the diffuser and for much of the mixing zone length. The point at which the creek narrows to 8 feet is right at the end of the chronic aquatic toxicity mixing zone so the creek will meet water quality standards across the entire width of the creek at that point. The creek is substantially wider at the end of the acute aquatic toxicity mixing zone. Therefore, a zone of passage is provided. The proposed amendment requires an additional mixing zone study after installation of the diffuser, since the initial mixing zone was conducted using a prototype diffuser. The mixing zone study will be required to verify the edge of the mixing zones and demonstrate a zone of passage is available. The mixing zone and dilution credits may be modified based on the results of the mixing zone study to ensure an adequate zone of passage is available.

With regard to the sizing of the mixing zone, DFG's comment recommends that water quality data be collected and analyzed. Central Valley Water Board staff agree. The Discharger conducted a mixing zone study through a dye study conducted at critical design conditions. The mixing zone study is discussed in the Fact Sheet.

**DFG COMMENT #3c:** Fish tend to hang at the bottom of riffles waiting for food to be washed down. A fish is not going to realize pollutants are coming through the system and move. They will be exposed for the entire duration that the pollutant is passing over them. Fish also tend to hang out in refugia such as undercut banks, root wads, etc. where mixing is likely to take longer due to lack of flows.

**Response:** Central Valley Water Board staff agrees. Within the mixing zone the creek may not be in compliance with water quality criteria, which is the basic definition of a mixing zone. See response to DFG Comment #1b. The proposed mixing zone meets the requirements of the State Water Resources Control Board Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California Policy (also referred to as the State Implementation Plan or the SIP) and Basin Plan. The mixing zone is as small as practicable, will not compromise the integrity of the entire water body, restrict the passage of aquatic life, dominate the waterbody or overlap existing mixing zones from different outfalls. Because effluent discharge is limited to a maximum of five percent of the resulting receiving water flow, and discharge will occur at a location immediately upstream of a turbulent cascading section of Angels Creek (which facilitates mixing), 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.

**DFG COMMENT #4:** Was evaluation conducted per 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?

**Response:** As discussed in Section IV.C.2.c of the Fact Sheet, the mixing zone meets all of the requirements of the SIP.

**DFG COMMENT #5:** Were the effluent limitations in the proposed Permit supported by scientific investigation as required by the SIP and the Basin Plan?

**Response:** As discussed in Section IV.C.2.c of the Fact Sheet, the mixing zone was established based on a mixing zone study performed by the Discharger in accordance with the SIP and Basin Plan.

**DFG COMMENT #6:** Will a diffuser be installed, and if so, will it cover the entire width of the creek?

**Response:** The proposed amendment requires that the outfall extend no more than halfway across the creek to ensure a zone of passage is allowed. The following is stated in the last paragraph on page F-18 of the Fact Sheet, "To ensure a zone of passage is provided, the outfall diffuser must be limited to no more than one-half the stream width."

**DFG COMMENT #7:** It is not clear that adequate studies have been conducted to address exposure of aquatic organisms to acute and chronic toxicity of effluent, nor protection from nutrient loading and biostimulation. Release of effluent into this system will increase nutrient levels. Flows can help determine the distribution of those nutrients but some are likely to be locked up in the system until warmer summer and fall temperatures allow them to be utilized. Increased nutrients can alter food web dynamics, create different conditions for new or invasive species to colonize, and alter plant growth which can severely alter water temperatures.

**Response:** With regard to the comment on whether adequate studies have been conducted to address exposure of aquatic organisms to acute and chronic toxicity, the Discharger conducted a mixing zone study that meets the requirements of the SIP and Basin Plan (see Section IV.C.2.c of the Fact Sheet). The study adequately addresses aquatic toxicity.

With regard to nutrient loading and biostimulation, for the proposed discharge this is not a concern for several reasons. The discharge will comprise no more than 5% of the creek flow and ammonia concentrations will be below aquatic toxicity criteria within a short distance. Ammonia concentrations that could result in biostimulation are significantly greater than the aquatic toxicity water quality criteria. Furthermore, the discharge is seasonal, will be intermittent, and only occur during wet winters (i.e., the discharge will not occur every year). This reduces the possibility of the build up of nutrients in the creek.

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## **CSPA COMMENTS**

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CSPA provided comments on the 8 April 2009 tentative Order and also submitted comments on the 15 June 2009 tentative Order. The response to comments below address the comments received by CSPA on both tentative orders.

**CSPA COMMENT #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 (CTR), 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."

**Response:** The proposed permit amendment does not allow compliance schedules for meeting water quality-based effluent limitations for CTR or non-CTR criteria. The commenter is confusing a dilution credit with a compliance schedule and assumes that the discharge has not been in compliance with the existing permit. The Discharger has not initiated discharge to Angels Creek; therefore, there is no compliance issue with the existing permit. The proposed amendment to the permit is based on new information provided by the Discharger that allows the implementation of dilution credits in the calculation of water quality-based effluent limitations. The Discharger is required to immediately comply with the effluent limitations in the permit when it initiates the discharge to Angels Creek.

**CSPA COMMENT #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 commenter has made several arguments regarding mixing zones; therefore, the response has been prepared, below, to address each argument separately.

**CSPA Comment #2a:** The proposed Order allows a mixing zone for toxic and human health based pollutants to a small ephemeral stream. 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 require that aquatic life acute criteria be based on 1Q10 flows, aquatic life chronic criteria be based on 7Q10 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.

**Response:** Flows in Angels Creek are controlled by the Angels Powerhouse. Based on stream flow data, there is flow year-round in Angels Creek. Regardless of whether the stream is ephemeral, the existing NPDES permit,

Order No. R5-2007-0031, includes Discharge Prohibition III.E that states, “*The discharge of tertiary treated wastewater at Discharge Point - 001 is prohibited except from November 15 through May 15, when Angels Creek flows provide a downstream flow ratio greater than or equal to 20:1 (Angels Creek flow : effluent) as a daily average.*” Therefore, at no time can the discharge to Angels Creek occur when there is no flow in the creek. The dilution credits proposed are in accordance with the SIP. With regard to when Table 3 is to be used to calculate dilution ratios, the SIP states on page 16, “*If, however, dilution ratios that are calculated using the Table 3 parameters are inappropriate for use due to site-specific issues, the mixing zone and dilution credit shall be determined using site-specific information and procedures detailed for incompletely-mixed discharges.*” Based on the site-specific conditions that the discharge may only occur seasonally (i.e. November 15 through May 15) and when Angels Creek flows provide a flow ratio of at least 20:1 (creek: effluent), it is not appropriate to use the SIP’s Table 3 dilution ratios. The Discharger conducted a mixing zone study that demonstrates that the discharge is completely mixed in the creek at 36 feet downstream of the discharge. Therefore, dilution credits based on the minimum allowed flow ratio is appropriate. Calculating dilution ratios based on minimum river flows that occur during a time period in which the permit does not allow discharges, is not appropriate due to the site-specific conditions during discharge.

**CSPA Comment #2b:** 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.

**Response:** The existing quality of a discharge is not a factor in the sizing of the mixing zone. The size of the mixing zone is based on the physical mixing of the effluent with the receiving water, which has been defined at the critical conditions for this proposed amendment through a mixing zone study performed by the Discharger. The water quality-based effluent limitations (WQBELs) are based on the amount of available dilution, the water quality criteria, and corresponding amount of assimilative capacity. The proposed WQBELs result in the water quality criteria being met at the edge of the mixing zone. The quality of the discharge is not a factor in developing WQBELs. However, in situations where a facility can meet effluent limitations that are more stringent than the WQBELs calculated with dilution, the Central Valley

Water Board often requires more stringent performance-based effluent limitations in NPDES permits for compliance with State Water Resources Control Board's Resolution 68-16 (Antidegradation Policy). This is to ensure that the Facility is operating to its fullest capabilities and that best practicable treatment or control (BPTC) is being implemented and maintained. The Discharger provides a high level of treatment including nitrification and denitrification, and Title 22 (or equivalent) tertiary filtration. The discharger proposes to install ultraviolet light disinfection and a multi-port diffuser prior to initiation of the discharge to Angels Creek. Furthermore, the Facility is designed to operate in accordance with the adopted NPDES permit, which requires the Discharger to maximize land disposal, prohibits discharge to surface water when there is sufficient storage capacity, and only allows the discharge to surface water seasonally and when there is at least a flow ratio of 20:1 (creek: effluent). This combination of treatment and controls is BPTC for this Facility.

Currently the Discharger has not initiated the discharge to Angels Creek. The only method of disposal is to land through spray irrigation and tertiary-treated wastewater reclamation on a golf course. Since the discharge to surface water has not begun, and the proposed ultraviolet light disinfection system has not been installed, there is minimal representative effluent data to determine the future performance of the Facility. There is insufficient information to accurately calculate performance-based effluent limitations. The purpose of the statement in the proposed amendment that is quoted by the commenter is to inform the Discharger that when sufficient effluent data has been collected, if it is found that the Discharger is able to meet more stringent effluent limitations, then the NPDES permit may be reopened and the appropriate effluent limitations may be lowered to match the performance of the Facility. This would not necessarily affect the size of the mixing zone. The proposed amendment also requires the Discharger to develop and implement pollutant minimization plans for each pollutant with corresponding WQBELs calculated using a dilution credit to ensure the maximum reduction of these pollutants.

**CSPA Comment #2c:** 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 waste stream 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 waste stream. 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.

**Response:** As discussed above, the Discharger provides an existing high level of treatment including advanced biological removal through nitrification and denitrification, and Title 22 (or equivalent) tertiary filtration, and further proposed treatment by installing ultraviolet light disinfection and a multi port diffuser prior to initiation of the discharge to Angels Creek. The predominant method of disposal for this Facility is to land, including wastewater reclamation for golf course irrigation. Existing Order No. R5-2007-0031 requires the Discharge maximize disposal to land and only allows the surface water discharge when there is insufficient storage capacity and conditions which prevent land application of wastewater. Furthermore, the permit only allows a seasonal surface water discharge and requires a minimum flow ratio of 20:1 (creek: effluent). Together, the existing permit maximizes land disposal, wastewater reclamation, and the use of BPTC for this Facility discharge.

**CSPA Comment #2d:** 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.

**Response:** The Discharger conducted an in-stream mixing zone study which evaluated the physical mixing of the effluent with the receiving water. The mixing zone study was conducted at the minimum flow ratio allowed in the existing permit and with a prototype diffuser. The mixing zone study, conducted in accordance with the SIP, demonstrates that the discharge is completely mixed within 36 feet downstream of the diffuser. The mixing zone study, and proposed dilution credit and mixing zone, therefore meets the requirements of the SIP and the Basin Plan.

**CSPA Comment #2e:** 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." 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.

**Response:** Central Valley Water Board staff agrees that the discharge modeled in the mixing zone study, may not meet the definition of "completely-mixed" per the SIP. However, as stated at the end of the second paragraph in Section 1.4.2.1 (bottom of page 15 of the SIP) "for year-round mixing zones, the mixing zone and dilution credit shall be determined using parameters specified in Table 3". In the fourth paragraph, titled "Complete Mixing", the SIP reads "If, however, dilution ratios that are calculated using the Table 3 parameters are inappropriate for use due to site-specific issues, the mixing zone and dilution credit shall be determined using site-specific information and procedures detailed for incompletely-mixed discharges". However, due to the site-specific, non-year round flow conditions, Central Valley Water Board staff implemented the more stringent requirement of basing the proposed dilution factor on an independent mixing zone study, as provided in the fifth paragraph of the same section labeled "Incompletely-mixed Discharges".

This discharge is to a small, shallow stream with significant turbulence, and is discharged from a cross-stream diffuser. For all practical purposes, the

discharge is fully mixed at the edge of the proposed mixing zone. The mixing zone study was based on United States Geological Survey guidance for tracer studies, and demonstrates that the discharge was 97.6%<sup>1</sup> mixed at 36 feet downstream of the diffuser. In conclusion, due to site-specific conditions for this discharge (i.e. seasonal discharge and a 20:1 discharge prohibition) the dilution ratios (for completely-mixed discharges) in Table 3 of the SIP are not appropriate. For site-specific discharges, the SIP requires the dilution credits be determined using the procedures detailed for incompletely-mixed discharges, which requires a mixing zone study. The Discharger completed the required mixing zone study. The dilution credits were established in the proposed permit amendment based on the mixing zone study. In essence, whether the discharge is characterized as completely or incompletely mixed is irrelevant, because the mixing zone study and calculation of dilution credits met all requirements for incompletely mixed discharges. Central Valley Water Board staff included minor clarifying changes to Finding 4 of the agenda-version of the proposed Order and in the Fact Sheet (page F-18) of the amended permit. The changes are highlighted in yellow in the strike version of the proposed amendment.

**CSPA Comment #2f:** The SIP requires that a mixing zone not “dominate the receiving water body...”. The Regional Board’s permit requires the installation of a cross-stream diffuser in this 18 feet wide creek. By definition a cross-stream diffuser crosses the stream width and therefore dominates the entire waterbody.

**Response:** The proposed permit requires that the diffuser structure extend no more than one-half of the stream width to ensure that the discharge does not dominate the waterbody and ensures a zone of passage. Angel’s Creek is a fast flowing stream, with rapid mixing and 20:1 dilution taking place in the creek at the location of the diffuser. The Discharger’s mixing zone study indicates the discharge is fully mixed within a distance of 36 feet downstream of the diffuser. Compliance with the proposed effluent limitations and discharge prohibitions result in the effluent discharge making up no more than 5 percent of the downstream flow. This site-specific mixing situation, with a minimum of 20:1 dilution, does not allow facility effluent to dominate the waterbody.

**CSPA Comment #2g:** 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,

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<sup>1</sup> Percentage of mixing calculated using Appendix A of “Techniques of Water-Resources Investigations of the United States Geological Survey – Measurement of Discharge Using Tracers” (Book 3, Chapter A16).

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. 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 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. Therefore the proposed mixing zone restricts the passage of aquatic life.

**Response:** Although dilution credits for acute criteria are allowed in the proposed amendment for the calculation of water quality-based effluent limitations, the existing Order contains an effluent limitation for acute whole effluent toxicity that requires compliance based on 96-hour bioassays of undiluted waste. Therefore, compliance with the acute toxicity limitations in the existing permit ensures that there will be no acute lethality to aquatic life passing through the mixing zone. Furthermore, the diffuser may not extend more than half way across the stream and the acute mixing zone does not encompass the entire stream width. This allows a zone of passage for aquatic life. The proposed mixing zone does not restrict the passage of aquatic life, because the discharge is not acutely toxic and the diffuser will not provide a physical barrier that restricts the passage of aquatic life.

**CSPA Comment #2h:** 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.

**Response:** The point at which the creek narrows to 8 feet is right at the end of the chronic aquatic toxicity mixing zone. The creek is substantially wider at the end of the acute aquatic toxicity mixing zone. Therefore, a zone of passage is provided. The proposed amendment requires an additional mixing zone study after installation of the diffuser, since the initial mixing zone was conducted using a prototype diffuser. The mixing zone study will be required to verify the edge of the mixing zones and demonstrate a zone of passage is available. The mixing zone and dilution credits may be modified based on the results of the mixing zone study to ensure an adequate zone of passage is available.

**CSPA Comment #2i:** 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.

**Response:** The statements in the proposed Order amending the existing permit are appropriate findings. The California Environmental Quality Act (CEQA) document for the City of Angels Wastewater Treatment Plant upgrades, including the new surface water discharge, did not find that Angels Creek was a critical habitat or that it contained endangered species. Furthermore, Angels Creek is dominated by controlled discharges from the Angels Powerhouse. The stretch of Angels Creek from the Angels Powerhouse downstream to the New Melones Reservoir is 2.3 miles. The mixing zone is comparatively small (i.e. 36 feet) and as discussed in Response No. 2g above, acutely toxic conditions will not occur in the mixing zone. Allowing a 36 foot mixing zone would not adversely impact biologically sensitive or critical habitats in this 2.3 mile stretch of stream.

**CSPA Comment #2j:** 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. There is no reasonable analysis or discussion of undesirable or nuisance aquatic life to support the Regional Board’s conclusions.

**Response:** The statement in the proposed findings “The discharge will not cause nuisance, result in floating debris, oil, or scum, produce objectionable color, odor, taste, or turbidity, cause objectionable bottom deposits, or produce undesirable or nuisance aquatic life.” is not conclusory. It is a requirement in the existing permit expressed as receiving surface water limitations (Section V.A.) and Discharge Prohibitions (Section III.) in the existing NPDES permit that prohibit these conditions. For example, the existing NPDES permit includes a receiving surface water limitation requiring that the discharge shall not release biostimulatory substances that promote aquatic growths that cause nuisance or adversely affect beneficial uses.

**CSPA Comment #2k:** The Regional Board states that: “In determining the size of the mixing zone, the Central Valley 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.

**Response:** In addition to the SIP, guidance in Section 4.3.3 of the TSD was considered in determining the size of the mixing zone. With regard to the lethality to passing organisms, see response to CSPA Comment #2g, above.

**CSPA Comment #2l:** 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.

**Response:** Central Valley Water Board staff disagrees. The mixing zone study concludes that the undiluted effluent data has shown no lethality in a 4-day period, as evident by 96-hour acute bioassays using 100% effluent. This demonstrates that exposure periods less than 96-hours (e.g., 1-hour acute time period) would also not result in lethality.

**CSPA Comment #2m:** 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.

**Response:** See response to CSPA Comment #2f.

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

**Response:** The relaxation of the effluent limitations in the proposed amendment is based on new information, a site-specific mixing zone study that was not available at the time the existing effluent limitations were developed. Degradation that is confined to a mixing zone is consistent with state and federal anti-degradation policies. Mixing zones do not violate state or federal antidegradation policies. (APU 90-004, p. 2; *EPA Water Quality Standards Handbook 2d.*, §§ 4.4, 4.4.4, and Appendix G (Questions and Answers), p. 2.) Water quality standards are not required to be met within mixing zones. An antidegradation analysis is not required for areas within a mixing zone, as long as the requirements of the mixing zone policy are met. (*American Wildlands v. Browner* (10th Cir. 2001) 260 F.3d 1192, 1195-1196, 1198.) Only a “simple”

antidegradation analysis is required for a mixing zone under the State Water Board Guidance. A “simple” antidegradation analysis consists of a finding that the mixing zone will not be adverse to the purpose of the state and federal antidegradation policies. (Attwater memo, p. 2.) This finding is included in Finding N of the Permit and is supported by the findings in the Fact Sheet related to the mixing zone and effluent limitations. Therefore, the proposed amendment is consistent with the anti-backsliding requirements of the Clean Water Act, federal regulations, and State policy (State Water Board Resolution No. 68-16).

**CSPA COMMENT #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.

**Response:** Central Valley Water Board staff disagrees. The Discharger submitted and updated Antidegradation Analysis, dated March 2009. The Central Valley Water Board agrees with the findings of the Antidegradation Analysis, which demonstrates that the estimated degradation caused by the discharge is negligible at the end of the short mixing zone (i.e. approximately 36 feet) and non detectable in New Melones Reservoir and further downstream waters. This is due the limited time, limited amount, and high quality of the tertiary treated effluent discharge relative to the 2.4 million acre-foot storage volume of New Melones Reservoir and its annual inflow of water from the Stanislaus River. The increase in volume and mass of pollutants from the new discharge will not have significant impacts on aquatic life, municipal and domestic supply, and recreation uses, which are the beneficial uses most likely affected by the pollutants discharged. The proposed discharge to Angeles Creek will not cause a violation of water quality objectives. The proposed discharge will result in some minimal degradation of waters of the state and navigable waters of the United States, but in this case, such degradation is consistent with the maximum benefit to the people of the state. Limited degradation that does not cause exceedance of water quality objectives is warranted to allow for the economic benefit stemming from local growth. In this case, the City of Angels is growing and continued treatment of wastewater is necessary to protect water quality and accommodate growth. The Order allows wastewater utility service necessary to accommodate housing and economic expansion in the area, and is considered to be a benefit to the people of the State. The Discharger provides a high level of treatment including nitrification and denitrification, and Title 22 (or equivalent) tertiary filtration. The Discharger proposes to install ultraviolet light disinfection and a multi-port diffuser prior to initiation of the discharge to Angeles Creek. Furthermore, the Facility is designed to operate in accordance with the adopted NPDES permit, which requires the Discharger to maximize land disposal, prohibits discharge to surface water when there is sufficient storage capacity, and only allows the discharge to surface water seasonally and when

there is at least a flow ratio of 20:1 (creek: effluent). This combination of treatment and controls is BPTC for this Facility. The agenda version of the proposed amendment (Section IV.D.4. of the Fact Sheet) has been modified to add clarifying language regarding compliance with the Antidegradation Policy. The changes are highlighted in yellow in the strike version of the proposed amendment.

**CSPA COMMENT #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)).

**Response:** Central Valley Water Board staff disagrees. As detailed in the Fact Sheet (Section IV.c.2.b.), of the existing permit, the effluent limitations for metals with hardness-dependent CTR criteria are based on the actual ambient receiving water hardness.