STATE OF CALIFORNIA

STATE WATER RESOURCES CONTROL BOARD

ORDER WQ 2008-0008 CORRECTED

In the Matter of the Petition of

CALIFORNIA SPORTFISHING PROTECTION ALLIANCE

for Review of Waste Discharge Requirements Order No. R5-2007-0132
[NPDES No. CA0079049] for the City of Davis Wastewater Treatment Plant, Yolo County
Issued by the
California Regional Water Quality Control Board,
Central Valley Region

SWRCB/OCC FILE A-1894

BY THE BOARD:

In this order, the State Water Resources Control Board (State Water Board) remands a National Pollutant Discharge Elimination System (NPDES) permit (Permit) to the Central Valley Regional Water Quality Control Board (Central Valley Water Board) for revisions. California Sportfishing Protection Alliance (Petitioner) has raised a series of objections to the permit issued by the Central Valley Water Board for the wastewater treatment plant owned and operated by the City of Davis (City). The contentions addressed in this order deal with Permit provisions related to chronic toxicity, hardness-dependent metals, and electrical conductivity.[1]

Based on the record before the Central Valley Water Board and our technical review, we conclude that the Permit should be remanded to the Central Valley Water Board for reconsideration and revisions consistent with this order.

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[1] To the extent Petitioner raised issues not discussed in this order, such issues are hereby dismissed as not substantial or appropriate for review by the State Water Board. (See *People v. Barry* (1987) 194 Cal.App.3d 158, 175-177 [239 Cal.Rptr. 349], *Johnson v. State Water Resources Control Board* (2004) 123 Cal.App.4th 1107 [20 Cal.Rptr.3d 441], Cal. Code Regs., tit. 23, § 2052, subd. (a)(1).) This order does not address any groundwater issues raised by the Petitioner. The State Water Board, on its own motion, will consider those issues in a separate order.

I. BACKGROUND

The City owns and operates a wastewater treatment plant with a dry weather design flow of about 7.5 million gallons a day. The plant uses a treatment system that consists of a mechanical bar screen, an aerated grit tank, three primary sedimentation tanks, a primary anaerobic digester, a secondary anaerobic digester, three sludge lagoons, two aeration ponds that are typically used only in winter, three facultative oxidation ponds, a Lemna pond, an overland flow system, a chlorine contact tank, and restoration wetlands that are used when the plant is discharging to Conaway Ranch Toe Drain. Wastewater is discharged to either the Willow Slough Bypass or the Conaway Ranch Toe Drain, both of which are waters of the United States. The discharges flow to the Yolo Bypass, which is within the Sacramento River watershed.

Beneficial uses of the surface waters (Willow Slough Bypass, Conaway Ranch Toe Drain, and Yolo Bypass) are agricultural supply, water contact and non-contact recreation, fish migration, freshwater habitat, and wildlife habitat.

Sludge from the plant is anaerobically digested in a primary and secondary digester and then is transferred to one of three unlined, onsite lagoons for drying. Supernatant from the sludge drying ponds is directed to the headworks. The digested and dried sludge (or Class B biosolids) is applied on about 20 percent of the overland flow fields, an area that is scheduled for periodic terrace renovation. The overland flow fields are comprised of 160 acres of both native and non-native grass and broadleaf species, over which the wastewater is distributed and allowed to sheet flow at a two percent slope.

The City previously operated the plant under waste discharge requirements issued in 2001. In September 2005, the City filed a timely report of waste discharge seeking renewal of the Permit. The Central Valley Water Board renewed waste discharge requirements

that serve as the Permit at its meeting on October 25, 2007.[2] Petitioner filed a timely petition for review on November 26, 2007.

II. CONTENTIONS AND FINDINGS

A. Toxicity

Petitioner contends that the City's discharge is toxic to aquatic life, but that the Permit includes no prohibition for toxic discharge, fails to include requirements that will eliminate toxic discharges, and does not assess the potential impacts of toxic discharges to endangered species. Petitioner also contends that the toxicity provisions in the Permit violate 40 Code of Federal Regulations (U.S. EPA regulations) sections 122.4(a), (d), and (g), the Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (SIP), and Water Code section 13377.

1. PROHIBITION OF TOXIC DISCHARGE

Contention: Petitioner contends that the Permit does not prohibit toxic discharges and authorizes acute toxicity, in that it allows 30 percent mortality, in alleged violation of U.S. EPA regulations section 122.44(d)(1)(i).

Discussion: Except with respect to chronic toxicity, as is discussed in the next section, we conclude that the Permit contains sufficient toxicity limitations. The Permit includes several mechanisms to prohibit toxicity in the discharge. Section IV.A.1 of the Permit (*Effluent Limitations and Discharge Specifications*) contains effluent limitations for all toxic pollutants that have the reasonable potential to cause or contribute to an exceedance of water quality standards,[3] both numeric and narrative. These pollutant-specific limitations are intended to ensure that no known toxic pollutants are discharged. In addition to chemical-specific effluent

[2] Order No. R5-2007-0132, NPDES No. CA0079049.

[3] For convenience, we will sometimes use the shorthand "reasonable potential" to refer to the concept of a pollutant's "reasonable potential to cause or contribute to an exceedance of water quality standards."

limitations, the Permit includes Whole Effluent Toxicity (WET) requirements, intended to detect the effects of any other unknown pollutants, as well as any combined effects from various pollutants that may cause toxicity to receiving water organisms. Finally, Section V. 16 of the Permit (*Receiving Water Limitations*) states that the discharge shall not cause "toxic substances to be present, individually or in combination, in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life."

The range of permitted survivability appropriately reflects uncertainty in existing test methods. All such test results are, at best, analytical estimates that are prone to some degree of inaccuracy, due to factors beyond practicable control. This is particularly true for WET tests because of their high inherent variability of test organisms and test environmental conditions, as well as other factors. In fact, the coefficients of variation for toxicity test results (acute and chronic alike) range from 14.8 percent to 67.6 percent.[4] A permit limitation requiring 70 percent survival of test organisms in the test environment does not mean that it allows 30 percent mortality for aquatic organisms in the receiving water. Instead, the requirement reflects an established laboratory procedure. The WET test is a tool to assess toxicity in the effluent under certain conditions, for a specific set of species that are used in such laboratory tests.[5] In addition to the 70 percent survival requirement, there is also a 90 percent survival requirement as a median for three test results. The median requirement basically ensures that, in three tests, two of the results will show a survival rate of 90 percent or better. Among the permits issued in this state that have numerical acute toxicity limitations, all allow some degree of mortality of organisms during the tests. To account for the test variability, the U.S.

[4] Understanding and Accounting for Method Variability in Whole Effluent Toxicity Applications Under the National Pollutant Discharge Elimination System Program, U.S. EPA (EPA 833-R-00-003) June 30, 2000.

[5] An allowance for less than 100 percent survival in the effluent limitation is appropriate because even control sample toxicity test results, which are unaffected by discharge water quality, can randomly exhibit less than 100 percent survival thresholds. A WET limitation that does not allow for some degree of mortality in the test results would, at times, falsely indicate a positive demonstration of toxicity in the discharge that can likewise be seen at times in control sample results. The Permit's acute WET effluent limitation appropriately avoids the indication of such a "false positive."

Environmental Protection Agency's (U.S. EPA's) "Guidance for NPDES Permit Issuance, February 1994" states the following:

> Achievement of narrative criterion, as applied herein, means that ambient waters shall not demonstrate for acute toxicity: 1) less than 90 percent survival, 50% of the time, based on the monthly median, or 2) less than 70% survival, 10% of the time, based on any monthly median.

Thus, the U.S. EPA guidance provides for a level of mortality in test results that is similar to the acute WET numeric limitations in this Permit. The Central Valley Water Board's use of a percentage for acute mortality is consistent with U.S. EPA guidance and with a prohibition on toxic discharges.

2. NUMERIC LIMITS FOR CHRONIC TOXICITY

Contention: Petitioner observes that the Permit does not include a numeric limitation for chronic toxicity; instead, it only requires the City to conduct a toxicity reduction evaluation (TRE) if there is an observed chronic toxicity. Petitioner alleges that this violates U.S. EPA regulations section 122.44(d)(1)(i) and the SIP.

Discussion: We have already addressed this issue in a prior order[6] and, once again, we conclude that a numeric effluent limitation for chronic toxicity is not appropriate at this time. Our review of the Permit, however, concludes that it does not include an appropriate narrative effluent limitation for chronic toxicity and that one must be added.

The Basin Plan contains a narrative toxicity objective that states, "all waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life."[7] In addition, the SIP states, "a chronic toxicity effluent limitation is required for all discharges that will cause, have reasonable potential

[6] State Water Board Order No. WQO 2003-0012 (Los Coyotes and Long Beach).

[7] Water Quality Control Plan for the Sacramento and San Joaquin River Basins (Basin Plan) at III-8.00.

to cause, or contribute to chronic toxicity in receiving waters."[8] Furthermore, the Central Valley Water Board's Fact Sheet, prepared in conjunction with the adoption of the Permit, states:

> Based on quarterly whole effluent chronic toxicity testing performed by the City from May 2002 through May 2005, the discharge has reasonable potential to cause or contribute to an in-stream excursion above of the Basin Plan's narrative toxicity objective. No dilution has been granted for the chronic condition.

In spite of this conclusion, the Permit does not contain a chronic toxicity effluent limitation consistent with our precedent. The Central Valley Water Board relies on the State Water Board's WQO 2003-012 as justification for imposing neither numeric nor narrative chronic toxicity limits in the permit. However, our prior order does not relieve a regional water board of the obligation to include certain provisions in a permit. In that order we found:

> US EPA has also stated that if a narrative effluent limitation is used, the permits must also contain (1) numeric benchmarks for triggering accelerated monitoring, (2) rigorous toxicity reduction evaluation (TRE)/toxicity investigation evaluation (TIE) conditions, and (3) a reopener to establish numeric effluent limitations for either chronic toxicity or the chemical(s) causing toxicity.[9]

In Order WQO 2003-012, we stated our intent to update the SIP to address chronic toxicity numeric effluent limitations. State Water Board staff is currently working with U.S. EPA to develop reliable toxicity tests and to use sound science in developing a policy. While the process is taking longer than we had anticipated when we adopted that order, the result of the Board's participation in a nationwide, peer-reviewed process should result in a better product in the end. In Order WQO 2003-012, we stated that, pending adoption of a policy, it was not appropriate to include final numeric effluent limitations for chronic toxicity in NPDES permits for publicly owned treatment works, but that permits must contain the following:

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[8] SIP, § 4.

[9] Order No. WQO 2003-0012 at p. 10.

1. A narrative limit such as: “There shall be no chronic toxicity in the effluent discharge;”

2. Numeric benchmarks for triggering accelerated monitoring;

3. Rigorous toxicity reduction evaluation/toxicity investigation evaluation conditions; and

4. A reopener to establish numeric effluent limitations for either chronic toxicity or the chemical(s) causing toxicity.

The Permit complies with the last three requirements. Numeric benchmarks are included in the Provisions in section VI.C.2.a.iii, a discussion of TRE conditions is included in section VI.C.2.a.ii, and there is a reopener to establish numeric effluent limitations for priority pollutants causing toxicity, based on results of WET testing (included in section VI.C.1.a). The Permit fails to comply with the first requirement. On remand, the Central Valley Water Board must amend the Permit to add an appropriate narrative effluent limitation.

3. IMPACT ON ENDANGERED SPECIES

Contention: Petitioner’s contention that the Permit must include findings regarding toxicity as it relates to endangered species and must discuss endangered species migration has no merit.

Discussion: The essence of this contention is Petitioner’s claim that the City will, in discharging pursuant to the Permit, harm or kill endangered species, and that the Permit therefore authorizes a “take” of endangered species, requiring the inclusion of findings with respect to federal and state endangered species laws. There is no provision in state or federal law requiring a regional water board to make a finding regarding endangered or threatened species, when issuing an NPDES permit. Whether a “take” permit must be obtained from the California Department of Fish and Game is not a matter on which a regional water board need comment. Further, the Permit does not authorize a “take.” If the project will likely result in an illegal “take” of listed species, the City must obtain a permit or a consistency determination

under appropriate provisions of state and federal law.[10] The Permit does not relieve the City of any obligations to comply with laws and regulations concerning endangered species.

The Fact Sheet prepared by the Central Valley Water Board staff stated:

> This Order does not authorize any act that results in the taking of a threatened or endangered species or any act that is now prohibited, or becomes prohibited in the future, under either the California Endangered Species Act (Fish and Game Code sections 2050 to 2097) or the Federal Endangered Species Act (16 U.S.C. sections 1531 to 1544).[11]

The Central Valley Water Board provided appropriate notice of the draft permit to the California Department of Fish and Game, the National Marine Fisheries Service, and the U.S. Fish and Wildlife Service. None of these agencies provided comments or expressed concern about the Permit and no amendment to the Permit is required.

Conclusion for all Toxicity Contentions: The Central Valley Water Board has properly prohibited toxic discharges in the Permit by prescribing pollutant-specific effluent limitations, receiving water limitations, and requirements for assessing and reducing toxicity. However, because there is a reasonable potential for chronic toxicity, the permit must be amended to include narrative effluent limitations for chronic toxicity.

B. Hardness

1. HARDNESS DETERMINATION IN REASONABLE POTENTIAL AND EFFLUENT LIMITATIONS

Contention: Petitioner contends that the Permit incorrectly established effluent limitations for the hardness-dependent metals, based on a hardness value in the effluent of 190 mg/l $CaCO_3$ (calcium carbonate), when it should have used the hardness value in upstream receiving water.

Discussion: The Central Valley Water Board used upstream receiving water hardness values, but the hardness values selected by the Central Valley Water Board are not

[10] See, e.g., Fish & G. Code, §§ 2080.1 and 2081.

[11] Order No. R5-2007-0132, Att. F, III.C.5.

the appropriate hardness values for determining reasonable potential or establishing effluent limitations. For pollutants listed in the California Toxics Rule (CTR),[12] the SIP establishes the State Water Board's policy on determining reasonable potential and developing effluent limitations. The SIP does not address how to determine hardness for application to equations for the protection of aquatic life when using hardness-dependent metals criteria. It simply states that the criteria shall be properly adjusted for hardness using the hardness of the receiving water.[13] The CTR requires that, for waters with a hardness of 400 mg/l or less, as calcium carbonate, the actual ambient hardness of the surface water must be used. It further requires that the hardness values used must be consistent with the design discharge conditions for design flows and mixing zones.[14,15] Design flows for aquatic life include the lowest one-day flow with an average recurrence frequency of once in ten years (1Q10) and the lowest average seven consecutive day flow with an average recurrence frequency of once in ten years (7Q10).

CTR criteria become less stringent as hardness increases. When surface waters are at the 1Q10 or 7Q10 design flows, they are essentially at a drought flow and are likely to have relatively high hardness. When surface water flows are high or at flood stage, they are likely to have much lower hardness, due to a high influence by surface runoff from precipitation or snowmelt and a low influence by groundwater.

Hardness cannot readily be determined for the CTR design flows because it is statistically based and may not reflect actual field measurements of hardness. In addition, the actual hardness of receiving water varies in ways that are not strictly dependent on flow. We have previously observed that the steady-state method for the development of effluent

[12] 40 C.F.R. § 131.38.

[13] SIP, § 1.2.

[14] See, 40 C.F.R. § 131.38(c)(4)(i).

[15] The CTR does not define whether the term "ambient," as applied in the regulations, necessarily requires the consideration of upstream as opposed to downstream hardness conditions.

limitations within the SIP is based upon a selection of critical or worst-case parameters.[16] The requirements of the CTR and SIP are somewhat conflicting for selection of hardness. On the one hand, the CTR regulations require selection of a hardness factor consistent with design low flows that result in high hardness values. On the other hand, the steady-state method for development of effluent limitations requires the selection of critical or worst case parameters, an approach that could include a relatively low hardness sample taken from a high-flow receiving water during wet season flow conditions. Thus, the regional water boards have considerable discretion in the selection of hardness. Regardless of which method is used for determining hardness, the selection must be protective of water quality criteria, given the flow conditions under which a particular hardness exists. Thus, using different hardness values for wet and dry conditions may be appropriate.

In reviewing the hardness values used by the Central Valley Water Board, we agree, in part, with the Petitioner's contention that the board should have used the hardness values in upstream receiving water to account for wet flow conditions. Further, we conclude that the Central Valley Water Board did not select a representative hardness value for the Conaway Ranch Toe Drain.

In the Fact Sheet, the Central Valley Water Board stated that it used upstream receiving water hardness values—and not effluent hardness values—in calculating metal hardness-dependent effluent limitations. The Fact Sheet indicates that the hardness values of 190 mg/l and 250 mg/l were representative of low-flow upstream ambient water hardness values for Willow Slough Bypass and Conaway Ranch Toe Drain, respectively. The Central Valley Water Board chose to use these hardness values for the corresponding receiving waters because they found these to be the lowest hardness values observed at times of low-flow (or no flow) in the receiving water, without any influence from storm events. The Central Valley Water

[16] See, State Water Board Order No. WQO 2004-0013 (Yuba City).

Board considered them to be the reasonable, worst case condition since both discharges are to ephemeral streams and end-of-pipe limits apply where no dilution is anticipated.

There remains the issue of whether 190 mg/l and 250 mg/l were the appropriate hardness values to use in determining reasonable potential and calculating effluent limitations. Available data show actual hardness values lower than 190 mg/l at Willow Slough Bypass and lower than 250 mg/l at Conaway Ranch Toe Drain. Though all of these values were influenced by storm events, those daily samples were are still representative of actual conditions of the receiving water and require protection from toxicity impacts. Acute toxicity criteria are expressed as short-term exposure concentrations to prevent or minimize impacts from spikes that can occur over short periods of time. Therefore, the low-flow hardness values of 190 mg/l at Willows Slough Bypass and 250 mg/l at Conaway Ranch Toe drain are not protective for acute toxicity impacts during times of storm events.

Based on the current record, it would be more appropriate to use the lowest reliable upstream receiving water hardness values of 78 mg/l for Willows Slough Bypass and 85 mg/l for Conaway Ranch Toe Drain for protection from acute toxicity impacts, regardless of when the samples were taken or whether they were influenced by storm events. Because high flow conditions may deviate from the design flow conditions for selection of hardness as specified in the CTR, it may not be necessary, in some circumstances, to select the lowest hardness values from high flow or storm event conditions. Regardless of the hardness used, the resulting limits must always be protective of water quality criteria under all flow conditions. The Central Valley Water Board must reconsider the hardness values in the Permit. On remand, the Central Valley Water Board may admit supplemental evidence to the record, including additional hardness and flow data and a translator or water effects ratio study. If more substantive, reliable, and representative downstream receiving water mixed hardness data were available, such data could also be considered for determination of criteria.

Because we recognize that the receiving water conditions do vary seasonally, we expect that the Central Valley Water Board may want to establish more than one effluent limitation, based on seasonal or other conditions, so long as they are fully protective of water quality.

If flows do not consistently correlate with seasonal variations, the Central Valley Water Board may base the alternate effluent limitations on minimum flows present in the receiving water. For example, February may be wet or dry, depending on the year. The Discharger must be required to reliably determine and report flows, and the "season" must generally correlate with the wet months and may not vary on a daily basis[17] or change frequently from "wet" to "dry."

The Central Valley Water Board may also consider whether sufficient information exists to determine whether or not the lowest hardness values of record can occur during low flow periods when little dilution is available. If low hardness occurs only during times of high dilution, it may be appropriate to develop separate effluent limitations for low and high flow conditions that take into account hardness, dilution, and other conditions as they actually occur in the environment, rather than combining worst case conditions that do not actually occur in the receiving water.[18]

Conclusion: The Central Valley Water Board was justified in using upstream receiving water hardness values rather than effluent hardness values. However, for protection from acute toxicity impacts in the receiving waters, which can occur in short durations even during storm events, in this case, based on the existing record, the Central Valley Water Board should have used the lowest valid upstream receiving water hardness values of 78 mg/l for Willow Slough Bypass and 85 mg/l for Conaway Ranch Toe Drain. Effluent limitations must

[17] *See e.g., Technical Support Document for Water-Quality-Based Toxics Control, Responsiveness Summary,* p. 21 #8; WQO 2004-0013, p. 9, n.19.

[18] See, Letter to Gary Stenhouse from James F. Pendergast, Acting Director, Permits Division, EPA Office of Water (9/20/96) ("Pendergast letter"), response to Question #3.

protect beneficial uses considering reasonable, worst-case conditions. We recognize that this approach does not necessarily agree with conclusions in other guidance stating that low flow conditions are the "worst-case" conditions. However, nothing in this Order is intended to suggest that low flows are inappropriate for determining the reasonable, worst-case conditions in other contexts.

2. HARDNESS DETERMINATION IN REASONABLE POTENTIAL FOR LEAD, NICKEL, AND ZINC

Contention: Petitioner contends that the discharge has the reasonable potential to exceed the hardness-dependent CTR aquatic life water quality criteria for lead, nickel, and zinc at the Willow Slough Bypass, using the lowest upstream receiving water hardness of 56 mg/l calcium carbonate and, therefore, that the Permit should have included effluent limitations for those metals. Because the Permit failed to include an effluent limitation for those metals, Petitioner contends that it is inconsistent with U.S. EPA regulations section 122.44, and Water Code section 13377.

Discussion: We agree with the Central Valley Water Board that effluent limitations for lead, nickel, and zinc are not appropriate. Using a hardness value of 190 mg/l, the Central Valley Water Board determined that there was no reasonable potential for lead, nickel, or zinc to cause or contribute to an exceedance of water quality standards at Willow Slough Bypass and, therefore, no need to adopt an effluent limitation at that discharge point for the three pollutants.

Petitioner contends that the Central Valley Water Board should have used the lowest upstream receiving water hardness—56 mg/l—even if this hardness was measured after a rainstorm event. If the Central Valley Water Board had used the 56 mg/l value, the discharge would appear to have the reasonable potential to exceed the CTR aquatic toxicity water quality criteria for lead, nickel, and zinc as shown in the following table:

Constituent	CTR chronic objective @ hardness of 56 mg/l	Maximum Effluent concentration (MEC)	Reasonable Potential
Lead	1.5	1.9	Yes
Nickel	32	40	Yes
Zinc	73	80	Yes

However, the hardness value of 56 mg/l was not a representative result for hardness of the receiving water as this sample was placed in a centrifuge prior to being analyzed. The centrifuge process was done to remove turbidity from the samples, but this action not only results in removing a fraction of the soil particles that interfere in the analysis, it also removes the ions associated with hardness that attach to those particles. Therefore, the hardness result of 56 mg/l is not representative of the receiving water and should not be used to determine reasonable potential. The next available hardness result of the upstream receiving water shows a value of 78 mg/l, and as was discussed above, this value was the proper value of hardness to use for Willow Slough Bypass. Using this hardness value, the following table shows that there still would be no reasonable potential:

Constituent	CTR chronic objective @ hardness of 78 mg/l	Maximum Effluent concentration (MEC)	Reasonable Potential
Lead	2.3	1.9	No
Nickel	42	40	No
Zinc	97	80	No

Whether the Central Valley Water Board used the 78 mg/l or the 190 mg/l value, the effluent would not have the reasonable potential to exceed the CTR water quality criteria for lead, nickel, and zinc and an effluent limitation for these metals is not necessary.

Conclusion: Under ephemeral stream conditions, to protect for acute toxicity impacts that can occur in short-term periods, the lowest upstream hardness of 78 mg/l (regardless of whether it was influenced by storm events) is the appropriate value to determine

the reasonable potential for the effluent to exceed acute criteria for lead, nickel, and zinc. Using the water hardness value of 78 mg/l, instead of 190 mg/l, the effluent still does not have reasonable potential to exceed the CTR water quality criteria for lead, nickel, and zinc. Therefore, the Central Valley Water Board acted properly in not including an effluent limitation for those metals.

3. Hardness Determination in Effluent Limitations for Copper

Contention: Petitioner contends that the discharge has the reasonable potential to exceed the hardness-dependent CTR aquatic life water quality criterion for copper using the lowest downstream receiving water hardness of 74 mg/l for Willow Slough Bypass. The CTR criterion at this hardness, adjusted with the developed site-specific translator, is 10.2 µg/l. The maximum effluent concentration (MEC) observed for copper was 16 µg/l. Based on these results, the Petitioner maintains that the effluent has the reasonable potential to exceed the CTR criterion for copper and that the Permit should include an effluent limitation.

Discussion: We agree with Petitioner's contention as it pertains to the Conaway Ranch Toe Drain. The Permit must include acute and chronic effluent limitations for copper at the Conaway Ranch Toe Drain. As was discussed above, for protection from acute toxicity impacts, the lowest valid upstream receiving water hardness value should be used rather than the low-flow hardness value, unaffected by storm events. In this case, the lowest upstream receiving water hardness for Willow Slough Bypass is 78 mg/l and for Conaway Ranch Toe Drain is 85 mg/l. For copper, a dissolved-to-total translator was also developed and, for the Willow Slough Bypass discharge, the acute copper translator was calculated as 0.32; the chronic copper translator was 0.37. Therefore, using a hardness value of 78 mg/l and applying the site specific translators of 0.32 and 0.37 respectively, the applicable acute criterion was calculated to be 33.1 µg/l, and the applicable chronic criterion was 19.5 µg/l. The MEC at Willow Slough Bypass was 13 µg/l, which is less than either the acute or chronic criterion. Thus, the effluent at that point of discharge does not have the reasonable potential to exceed the CTR

acute and chronic water quality criteria for copper. Effluent limitations for copper are not required for the discharge to Willow Slough Bypass.

For the discharge to Conaway Ranch Toe Drain, the Central Valley Water Board used the U.S. EPA's default translator of 0.96. Using this default translator, along with an upstream receiving water hardness of 85 mg/l, results in an applicable acute criterion of 12 µg/l and an applicable chronic criterion of 8.1 µg/l. The Central Valley Water Board only evaluated data from January 2002 through May 2005 in its reasonable potential analysis and, based on those data, found the MEC at Conaway Ranch Toe Drain to be 16 µg/l. However, the record shows that a sample, taken on May 31, 2006, had an MEC of 39 µg/l. Based on either of these MECs, the effluent at Conaway Ranch Toe Drain has a reasonable potential to exceed the CTR acute and chronic water quality criteria for copper.

A summary of the above reasonable potential analysis results is shown in the following tables:

Reasonable Potential Analysis for Acute Copper Criterion

Receiving Water	Dissolved Acute Criterion (µg/l)	Acute Translator	Total Translated Acute Criterion (µg/l)	MEC (µg/l)	Reasonable Potential
Willows Slough @Hardness of 78 mg/l	10.6	0.32 (site specific)	33.1	13	No
Conaway Ranch Toe Drain @Hardness of 85 mg/l	11.5	0.96 (default EPA's)	12	16 (using only 3 yrs of data) 39 (using more recent data)	Yes regardless of the data used

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Reasonable Potential Analysis for Chronic Copper Criterion

Receiving Water	Dissolved Chronic Criterion (µg/l)	Chronic Translator	Total Translated Chronic Criterion (µg/l)	MEC (µg/l)	Reasonable Potential
Willows Slough @Hardness of 78 mg/l	7.2	0.37	19.5	13	No
Conaway Ranch Toe Drain @Hardness of 85 mg/l	7.8	0.96	8.1	16 (using only 3 yrs of data) 39 (using 5/31/06 data)	Yes regardless of the data used

Conclusion: For the Willow Slough Bypass discharge point, using the City's developed translators and the lowest upstream receiving water hardness value, the discharge did not have reasonable potential to exceed the acute and chronic CTR copper criteria. Therefore, it is appropriate that the Permit not include effluent limitations for copper at that point of discharge. For the Conaway Ranch Toe Drain discharge point, using the U.S. EPA default translator of 0.96 and the lowest hardness value of 85 mg/l, there is reasonable potential for copper in the discharge to cause or contribute to an exceedance of the water quality criteria. Thus, the Central Valley Water Board should have included acute and chronic effluent limitations for copper for this point of discharge.

4. HARDNESS DETERMINATION IN EFFLUENT LIMITATIONS FOR SILVER

Contention: Petitioner contends that the discharge has the reasonable potential to exceed the hardness-dependent CTR aquatic life, water quality criterion for silver, using the lowest downstream receiving water hardness of 74 mg/l for Willow Slough Bypass. The CTR criterion at this hardness is 2.4 µg/l, while the discharge's MEC observed for silver was 4.2 µg/l. Based on these results, Petitioner contends that the effluent has reasonable potential to exceed the CTR criterion for silver and that an effluent limitation is required.

Discussion: The Central Valley Water Board properly determined that there was no reasonable potential for silver at Willow Slough Bypass, but at the Conaway Ranch Toe Drain, available data indicate that there is a reasonable potential to contribute to an exceedance of the applicable criterion for silver. An effluent limitation for silver at the Conaway Ranch Toe Drain is, therefore, necessary.

As was indicated above, for protection from acute toxicity impacts, the lowest valid upstream receiving water hardness should be used instead of the low-flow hardness value that is unaffected by storm events. In this case the lowest upstream receiving water hardness for Willow Slough Bypass is 78 mg/l and for Conaway Ranch Toe Drain is 85 mg/l. Using a hardness of 78 mg/l and the default U.S. EPA translator of 0.85, the applicable acute criterion was calculated to be 2.6 µg/l. The MEC for silver in the discharge at Willow Slough Bypass was 0.74 µg/l. Thus, the effluent at Willow Slough Bypass does not have a reasonable potential to exceed the CTR acute water quality criterion for silver and an effluent limitation for silver is not necessary.

For the Conaway Ranch Toe Drain discharge, using the U.S. EPA default translator of 0.85 and an upstream receiving water hardness of 85 mg/l, an applicable acute criterion of 3.1 µg/l is derived. The Central Valley Water Board only evaluated data from January 2002 thru May 2005 in conducting its reasonable potential analysis and, based on those data, found the MEC at Discharge Point 002 to be 4.2 µg/l. Based on this MEC, the effluent at that discharge point has the reasonable potential to exceed the CTR acute water quality criterion for silver. Therefore, an effluent limitation would be necessary.

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A summary of this reasonable potential analysis results is shown in the following table:

Reasonable Potential Analysis for Acute Silver Criterion

Receiving Water	Dissolved Acute Criterion (µg/l)	Acute Translator	Total Translated Acute Criterion (µg/l)	MEC (µg/l)	Reasonable Potential
Willows Slough @Hardness of 78 mg/l	2.3	0.85 (default EPA's)	2.6	0.74 (using only 3 yrs of data)	No
Conaway Ranch Toe Drain @Hardness of 85 mg/l	2.6	0.85 (default EPA's)	3.1	4.2 (using only 3 yrs of data)	Yes

Conclusion: The discharge at Willow Slough Bypass does not have the reasonable potential to exceed the acute CTR silver water quality criterion and, therefore, the Central Valley Water Board need not have included an effluent limitation for silver in the Permit. However, the discharge at the Conaway Ranch Toe Drain does have the reasonable potential to cause or contribute to an excursion above the acute water quality criterion for silver; therefore, the Permit must include an effluent limitation for silver.

C. Electrical Conductivity

Contention: Petitioner contends that, since the Permit contains an Interim Effluent Limitation for electrical conductivity (EC) of 2050 µmhos/cm as an annual average, the instantaneous maximum level of EC is not limited and could be "astronomically" high.

Discussion: The interim effluent limitation is appropriate, but the Central Valley Water Board should carefully consider whether existing studies, submitted by other dischargers, may allow calculation of a final effluent limitation for EC without additional study. We have previously held that the Central Valley Water Board could not directly apply the United Nations agricultural water quality goal for EC of 700 µmhos/cm to the City of Woodland's discharge

without further study.[19] Specifically, the State Water Board concluded that a study was needed to evaluate site-specific conditions, such as leaching by rainfall or flooding, crop type, soil type, and irrigation methods, to determine whether those site-specific conditions would allow some relaxation of the 700 µmhos/cm EC value contained in the United Nations report.

Because the City has conducted no such site-specific study, the Central Valley Water Board concluded that it could not impose a final effluent limitation for EC at this time. Instead, an interim performance-based effluent limitation was established. The interim limitation was calculated applying recommended methods in U.S. EPA's technical support document and appears to be appropriate, pending the study. The record indicates, however, that the City of Woodland submitted just such a site-specific study to the Central Valley Water Board over two years ago, in May 2006. The site-specific factors applicable to the City of Woodland's discharge are very similar to those that would apply to the City of Davis discharge. Both involve the same downstream receiving waters (including the Yolo Bypass) and agricultural land. The facilities are only a few miles apart. The Central Valley Water Board should review the City of Woodland study and apply relevant results and findings to establish an appropriate final EC limit for the plant. An additional study for EC is probably unnecessary in order to determine an appropriate EC limit.

Petitioner's contention that the instantaneous concentration of EC is not limited and could be astronomically high has no merit. The interim limit was calculated using best professional judgment, applying basic statistical methods, and was based on current performance, using yearly average samples (daily data were converted to yearly averages). Based on this approach, the interim limit was calculated to be 2050 µmhos/cm. Had the interim limit been calculated using all the single daily samples, the interim limits would have been 2598 µmhos/cm for Willow Slough and 2942 µmhos/cm for Conaway Ranch Toe Drain.

[19] State Water Board Order No. WQO 2004-0010 (City of Woodland).

Conclusion: Based upon our prior order (WQO 2004-0010), the Central Valley Water Board appropriately determined that it should consider site-specific factors before establishing a final effluent limit of 700 µmhos/cm for EC for the City of Davis. Thus, it required a site-specific study. Because the City of Woodland has submitted such a study involving the same downstream receiving waters, agricultural lands, and geographical area, the Central Valley Water Board should review and consider the results and findings of that study to determine if it can establish an appropriate final EC limit. An additional new study for EC should not be necessary. The interim limitation established was appropriate, as it used a reasonable statistical approach, was based on best professional judgment, and resulted in a conservative, enforceable, performance-based limitation for EC from past and current yearly averages. On remand, the Central Valley Water Board must assess whether any further site-specific study is necessary in light of the City of Woodland's technical report. If the Central Valley Water Board concludes that further study is required, it must make findings in the record to justify its decision. Otherwise, it should adopt a final effluent limitation for EC.

III. ORDER

IT IS HEREBY ORDERED THAT, this matter be remanded to the Central Valley Water Board to make revisions to the Permit that are consistent with this order. Specifically, the Central Valley Water Board must do the following:

1. Amend the Permit to include a narrative limitation for chronic toxicity such as, "There shall be no chronic toxicity in the effluent discharge."
2. Revise the Fact Sheet to include a discussion of the appropriate hardness to use to protect from acute toxicity impacts (which can occur in short-term periods including storm events) in the receiving waters. The Fact Sheet should also state that the lowest valid upstream receiving water hardness values of 78 mg/l for Willow Slough Bypass and 85 mg/l for Conaway Ranch Toe Drain should be used to determine reasonable potential for the effluent to exceed the hardness-dependent metal CTR

criteria, unless additional evidence and analysis, consistent with this Order, demonstrates that different hardness values are appropriate to use and are fully protective of water quality.

3. Revise the Fact Sheet to indicate that lead, zinc, and nickel do not have the reasonable potential to exceed the applicable hardness-dependent CTR criteria, even using the lowest valid available upstream receiving water hardness value of 78 mg/l for protection of acute toxicity impacts for the Willow Slough Bypass.
4. Revise the Fact Sheet to state that the effluent at Conaway Ranch Toe Drain does have reasonable potential to exceed the acute and chronic CTR criteria for copper and effluent limitations are needed for this discharge point, unless additional evidence and analysis, consistent with this Order, demonstrates that reasonable potential does not exist.
5. If the Central Valley Water Board determines, pursuant to paragraph #4, that reasonable potential exists for copper, amend the Permit to add acute and chronic effluent limitations for copper, based on the lowest upstream receiving water hardness for the discharge at Conaway Ranch Toe Drain. A compliance time schedule may be added, if necessary.
6. Revise the Fact Sheet to state that, based on the lowest upstream receiving water hardness at Willow Slough Bypass, the effluent does not have reasonable potential to exceed the CTR acute water quality criterion for silver, but the effluent at Conaway Ranch Toe Drain does have reasonable potential and an effluent limitation is needed for this discharge point, unless additional evidence and analysis, consistent with this Order, demonstrates that reasonable potential does not exist.
7. If the Central Valley Water Board determines, pursuant to paragraph #6, that reasonable potential exists for silver, amend the Permit to add an effluent limitation

for silver for the discharge at the Conaway Ranch Toe Drain and include a compliance time schedule if necessary.

8. Review the City of Woodland's EC site-specific study to determine whether it provides an appropriate basis for calculating a final EC effluent limitation for the discharge regulated by the Permit, and if so, amend the Permit as necessary to make the appropriate changes for EC, including the addition of an effluent limitation as appropriate, based on that review. If the City of Woodland study is not used, findings justifying that decision must be made. This portion of the Order may take additional time to complete and may be completed after the revisions required by in sections 1 – 7 are completed.

CERTIFICATION

The undersigned, Clerk to the Board, does hereby certify that the foregoing is a full, true, and correct copy of an order duly and regularly adopted at a meeting of the State Water Resources Control Board held on September 2, 2008.

AYE:	Chair Tam M. Doduc Vice Chair Gary Wolff, P.E., Ph.D Arthur G. Baggett, Jr. Charles R. Hoppin Frances Spivy-Weber
NAY:	None
ABSENT:	None
ABSTAIN:	None

Jeanine Townsend
Clerk to the Board