STATE WATER RESOURCES CONTROL BOARD
BOARD MEETING SESSION – OFFICE OF CHIEF COUNSEL
MARCH 16, 2010

ITEM 7

SUBJECT

CONSIDERATION OF A PROPOSED DRAFT ORDER REGARDING THE PETITION OF CALIFORNIA SPORTFISHING PROTECTION ALLIANCE CONCERNING WASTE DISCHARGE REQUIREMENTS ORDER NO. R5-2008-0183 [NPDES NO. CA0077895] FOR THE UNIVERSITY OF CALIFORNIA, DAVIS MAIN WASTEWATER TREATMENT PLANT. (SWRCB/OCC FILE A-1988.)

DISCUSSION

The Central Valley Water Board adopted an NPDES permit regulating discharges from U.C. Davis' wastewater treatment plant. CSPA filed a petition challenging a number of provisions. The draft order is limited to the effluent limitations regulating electrical conductivity (EC). The permit concluded that there was no reasonable potential for EC from the plant to effect municipal uses of receiving waters and did not include a final effluent limitation for the protection of agricultural uses. The draft order concludes that the Central Valley Water Board erred in its assessment of reasonable potential for municipal uses, and that it erred in delaying the inclusion of a final, water quality-based effluent limitation for EC for protection of agricultural uses. There was not evidence in the record sufficient to require an effluent limitation for EC for protection of aquatic life.

POLICY ISSUE

Should the Board adopt the draft order requiring reassessment reasonable potential of EC discharges to adversely affect agricultural and municipal uses and to include appropriate water quality-based effluent limitations, if appropriate, within three years?

FISCAL IMPACT

None.

REGIONAL BOARD IMPACT

Yes – Central Valley Regional Board.

STAFF RECOMMENDATION or ADVISE OF STAFF ACTION

Adopt the draft order.

State Water Board action on this item will assist the Water Boards in reaching Goals 4 and 6 of the Strategic Plan Update: 2008-2012 to implement strategies that address water quality protection and restoration, and to enhance consistency across the water boards.

D R A F T

February 23, 2010

STATE OF CALIFORNIA

STATE WATER RESOURCES CONTROL BOARD

ORDER WQ 2010-

In the Matter of Own Motion Review of

WASTE DISCHARGE REQUIREMENTS FOR THE UNIVERSITY OF CALIFORNIA, DAVIS (ORDER NO. R5-2008-0183 [NPDES NO. CA0077895])

Issued by the
California Regional Water Quality Control Board,
Central Valley Region

SWRCB/OCC FILE A-1988

BY THE BOARD:

In this order, the State Water Resources Control Board (State Water Board or Board) reviews on its own motion a National Pollutant Discharge Elimination System (NPDES) permit issued by the Central Valley Regional Water Quality Control Board (Central Valley Water Board) to the University of California, Davis (University). The permit authorizes effluent discharges from the University's Main Wastewater Treatment Plant to the South Fork of Putah Creek and the Arboretum Waterway. Our review is limited to permit provisions regulating electrical conductivity or EC, which is a measure of salinity.[1] For the reasons explained in this Order, the Board remands the permit to the Central Valley Water Board for reconsideration and revision consistent with this order.

I. BACKGROUND

The University owns and operates a tertiary wastewater treatment plant that provides sewerage service to the University of California, Davis campus. The plant is located in the southern part of the main campus and serves a population of about 45,000. The treatment system includes a comminutor, mechanical bar screen, oxidation ditch, secondary clarifiers, filters and ultraviolet light disinfection. Wastewater is discharged to the South Fork of Putah Creek and to the Arboretum Waterway, also known as the North Fork of Putah Creek. Both the

---

[1] Issues raised by the California Sportfishing Protection Alliance that are not discussed in this order are hereby dismissed as not substantial or appropriate for State Water Board review. (See *People v. Barry* (1987) 194 Cal.App.3d 158, 175-177; *Johnson v. State Water Resources Control Board* (2004) 123 Cal.App.4th 1107; Cal Code Regs., tit. 23, §2052, subd. (a)(1).)

South Fork of Putah Creek and the Arboreteum Waterway are tributaries of the Sacramento River.

The beneficial uses of the South Fork of Putah Creek (hereinafter Putah Creek) and the Arboretum Waterway include municipal and domestic supply (MUN) and agricultural supply (AGR).[2] In January 2003, the Central Valley Water Board adopted Order No. R5-2003-0003, the predecessor to the University's current permit. To protect Putah Creek's agricultural uses, Central Valley Water Board staff had proposed to include in the 2003 permit an annual average effluent limit for EC of 700 micromhos per centimeter (µmhos/cm). In lieu of doing so, however, the Central Valley Water Board accepted the University's offer to develop a technical report to address the site-specific impacts of EC on the agricultural uses of Putah Creek waters.[3]

On March 3, 2003, the Central Valley Water Board issued a formal request to the University, under Water Code section 13267, to submit the technical report by July 30, 2004. In ~~April 2003~~March 2004, the Central Valley Water Board amended the 2003 permit to add a monthly average EC effluent limitation of 900 µmhos/cm. The Central Valley Water Board found that this limit was necessary to protect Putah Creek's designated MUN use.[4] At that time, EC levels in the University's discharge averaged 1,000 µmhos/cm. Consequently, the Central Valley Water Board concurrently amended an existing cease and desist order to require full compliance with the EC limitation by December 30, 2007.[5]

On July 30, 2004, the University submitted the required technical report, entitled "An Approach to Develop Site-Specific Criteria for Electrical Conductivity to Protect Agricultural Beneficial Uses that Accounts for Rainfall," to the Central Valley Water Board.[6] The approach relies on a water and salt balance model to determine the maximum EC of an irrigation supply water that, if used as the sole source ~~or~~ of irrigation water over the long term, protects crop production. The model takes into account annual rainfall and other site-specific conditions. The University analyzed EC impacts using dry bean, which was determined to be the most salt-sensitive crop that could potentially be grown in the area downstream of the treatment plant outfall. The model showed that in 50 of the last 53 years bean yield would not have been

---

[2] Water Quality Control Plan (Basin Plan) for the Sacramento River and San Joaquin River Basins (4th ed. 1998), Table II-1.

[3] Order No. R5-2003-0003, finding 20, Central Valley Water Board Administrative Record (AR), vol. 1, item 2.

[4] Order No. R5-2003-0003 Amendment No. 1, AR, vol. 1, item 31.

[5] Order No. R5-2003-0004 Amendment No. 1, AR, vol. 1, item 31.

[6] AR, vol. 1, item 42.

measurably affected if irrigation water with an EC of 1,100 µmhos/cm had been used. The three years when the model predicted bean yield reductions of 2, 4 and 6 percent all occurred during a drought period in the 1970s. Based on the conservative nature of all model inputs and other factors, the University concluded that an EC value of 1,100 µmhos/cm would ~~fully~~ protect agriculture in the Davis area.

In February 2005, the Central Valley Water Board responded to the EC study, noting that the modeling approach had merit and requesting additional information.[7] The University provided the requested information in May 2005 and asked for a meeting to provide an overview of the model, answer questions, and work out a schedule to complete the EC study based on direction from Central Valley Water Board staff.[8] The Central Valley Water Board did not respond to the University's submission.

In June 2007, the University submitted a report of waste discharge to renew its permit and to expand the permitted capacity of the treatment plant from 2.7 to 3.6 million gallons per day (mgd) average dry weather flow.[9] The report described measures taken by the University to decrease salt loading to Putah Creek. These measures included replacing large water softeners at the Central Heating and Cooling Plant with reverse osmosis units to pre-treat industrial source water as part of a larger steam expansion project. In addition, the University described its efforts to bring in new sources of surface water to replace existing, saltier groundwater supplies. The report also indicated that "the University continues to believe that EC values of up to 1,100 µmhos/cm are protective of [Putah Creek's] downstream agricultural uses."[10] The University requested a performance-based EC limit, together with requirements to continue its source-control strategies.

On December 5, 2008, the Central Valley Water Board reissued a permit to the University in Order No. R5-2008-0183. The permit increased the treatment plant's design flow to 3.6 mgd. The permit did not retain the prior EC limitation of 900 µmhos/cm because the Central Valley Water Board found that a limit was unnecessary to protect Putah Creek's MUN use. Instead, the permit included a performance-based effluent limitation for EC of

---

[7] Letter from Kenneth D. Landau, Assistant Executive Officer, Central Valley Water Board, to Mr. David Phillips, Associate Director, Utilities Department, University (Feb. 16, 2005), AR, vol. 2, item 57.

[8] Letter from David L. Phillips, Associate Director, Utilities, University, to Mr. Kenneth D. Landau, Assistant Executive Director, Central Valley Water Board, AR, vol. 2, item 60.

[9] AR, vol. 3, item 77.

[10] *Id.* at page 3 of cover letter for report of waste discharge.

1,400 µmhos/cm as a monthly average.[11] According to the permit findings, the performance-based EC limit is to remain in effect for the five-year permit term.[12] The permit findings indicate that when the permit is renewed, sometime on or after December 2013, a final EC limit will be included "when site-specific water quality and agricultural-related information is available."[13] The permit also required the University to update and finalize the 2004 EC study.[14]

The California Sportfishing Protection Alliance (CALSPA) filed a timely petition for review of Order No. R5-2008-0183 in January 2009. The Board was unable to take final action on the petition within the regulatory deadline; therefore, the Board is reviewing the University's permit on its own motion.[15] Our review is limited to CALSPA's contention that the Central Valley Water Board failed to properly analyze reasonable potential for EC.

II. ISSUES AND FINDINGS

Issue: CALSPA contends that the permit fails to include a final, water quality-based effluent limitation for EC despite the fact that the University's discharge has the clear reasonable potential to exceed water quality objectives for EC. CALSPA asserts that the discharge violates EC objectives to protect the AGR and MUN uses and threatens to violate objectives to protect aquatic life uses.

Discussion: In the following discussion, the Board concludes that the Central Valley Water Board incorrectly analyzed reasonable potential as applied to Putah Creek's MUN use. The Board further concludes that it is inappropriate to defer establishing appropriate EC limitations to protect AGR until after the permit is renewed in December 2013 or later. Finally, the Central Valley Water Board did not err in concluding that there was no reasonable potential to violate objectives to protect aquatic life uses.

Under the Clean Water Act[16], an NPDES permit must include technology-based effluent limitations and any more stringent limitations necessary to achieve water quality standards.[17] The latter are referred to as water quality-based effluent limitations. Water quality-

---

[11] See Order No. R5-2008-0183, Effluent Limitation IV.A.2.a. The limit was based on the highest running monthly average taken from 1,598 data points.

[12] *Id.*, Finding II.R.

[13] *Ibid.*

[14] *Id.,* Special Provision VI.C.2.c.

[15] See Wat. Code § 13320, subd. (a); Cal. Code Regs., tit. 23, § 2050.5.

[16] 33 U.S.C. § 1251 et seq.

[17] See *id.* §§ 1311, 1342.

based effluent limitations are necessary for any pollutant that may be discharged at levels that cause, or have the reasonable potential to cause, or contribute to exceedance of a water quality standard.[18] The analysis to determine what pollutants require water quality-based effluent limitations is called the "reasonable potential analysis."

Water quality standards consist of beneficial uses, water quality criteria (or objectives in California) to protect the uses, and an antidegradation policy.[19] Water quality objectives may be either numeric or narrative. Water quality objectives for EC are found in the Central Valley Water Board's Basin Plan.[20] For waters designated for MUN, the Basin Plan incorporates numeric secondary maximum contaminant levels (MCLs) for EC promulgated by the Department of Public Health.[21] The secondary MCLs include a recommended level, upper level, and a short term value of 900, 1,600, and 2,200 µmhos/cm, respectively. The Basin Plan does not contain numeric EC objectives to protect AGR or aquatic life uses, but rather contains a narrative objective for chemical constituents. The objective provides that "[w]aters shall not contain chemical constituents in concentrations that adversely affect beneficial uses."[22]

In California, the State Water Board's Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (2005) (SIP) dictates the procedures that must be followed to analyze reasonable potential for priority toxic pollutants. For other pollutants, such as EC, the Regional Water Quality Control Boards (Regional Water Boards) are not restricted to one particular method. Instead, the Regional Water Boards can use the procedures described in United States Environmental Protection Agency's (U.S. EPA) Technical Support Document (TSD)[23], the SIP procedures as guidance[24], or any other appropriate methodology. At a minimum, however, the Regional Water Boards must clarify the methodology that is used and use the methodology consistently.[25]

The Central Valley Water Board opted to follow the reasonable potential procedures in the SIP for both priority toxic pollutants and non-priority pollutants.[26] Under the

---

[18] 40 C.F.R. § 122.44(d).

[19] See 33 U.S.C. § 1313(c)(2)(A); 40 C.F.R. § 131.6.

[20] See fn. 2, *ante.*

[21] *Id.* at III-3.00.

[22] *Ibid.*

[23] Technical Support Document for Water Quality-based Toxics Control (Mar. 1991), EPA 505 2-90-001.

[24] See, e.g., Order WQO 2001-16 (*Napa*).

[25] See Order WQO 2004-0013 at 6 (*Yuba City*).

[26] Order No. R5-2008-0183, attach. F at F-17.

SIP, reasonable potential exists and an effluent limitation is required if the maximum pollutant concentration in a discharge exceeds the most stringent applicable water quality objective.[27]

1. **MUN**

The average monthly effluent EC concentration in the University's discharge is 1,091 µmhos/cm, and the maximum concentration is 1,679 µmhos/cm. The maximum effluent concentration exceeds both the recommended and upper level secondary MCL values for EC of 900 µmhos/cm and 1600 µmhos/cm, respectively. Apparently on this basis, the permit found reasonable potential for EC.[28] The Central Valley Water Board, nevertheless, also made a finding that the discharge did not have reasonable potential because the average receiving water EC levels in Putah Creek did not exceed the recommended level of 900 µmhos/cm.[29]

There are several problems with this approach. First, the SIP does not allow consideration of dilution in the reasonable potential analysis. Under the SIP, if the maximum effluent concentration exceeds the lowest applicable objective, "an effluent limitation is required and the analysis for the subject pollutant is complete."[30] Dilution may be considered under the SIP, if at all, only in the calculation of effluent limitations.

Second, the Central Valley Water Board used incorrect data to analyze EC levels in Putah Creek. The permit states that Putah Creek has a maximum running 30-day average EC concentration of 599 µmhos/cm during the irrigation season, a maximum running 30-day average of 684 µmhos/cm during the non-irrigation season, and a maximum daily level of 877 µmhos/cm.[31] These values, however, are based on data from a monitoring site located *upstream* of the University's discharge. Data from the downstream monitoring site indicate that the maximum running 30-day average for EC during the irrigation season is 671 µmhos/cm, the maximum running 30-day average during the non-irrigation season is 855 µmhos/cm, and the maximum daily is 981 µmhos/cm.[32] It is obvious that it is inappropriate to use receiving water data that has not been affected by the discharge to find that the discharge has no effect on the water.

Third, even assuming that it was appropriate to consider receiving water EC concentrations in assessing reasonable potential under the SIP, the receiving water data

---

[27] SIP, p. 6, §1.3, *Step 4.*

[28] Order No. R5-2008-0183, attach. F at F-17 and attach. G.

[29] *Id.,* attach F. at F-27 through F.-28.

[30] Fn. 27, *ante.*

[31] *Id.*, att. F. at F-28.

[32] See Report of Waste Discharge, att. 8, AR, vol. 4, item 98.

discussed above pertains only to Putah Creek and not to the Arboretum Waterway. Although the University's 2003 permit authorized the discharge of effluent to the waterway, it apparently did not require any receiving water monitoring for the Arboretum Waterway.[33] Hence, there is no apparent rationale for concluding that there was no reasonable potential with respect to EC discharges to the Arboretum Waterway.

In sum, the Central Valley Water Board erred in assessing reasonable potential for EC as applied to the MUN use for Putah Creek and the Arboretum Waterway. Under the SIP, reasonable potential for EC existed and a final water quality-based effluent limitation was required in the University's permit. The Central Valley Water Board could factor in dilution in calculating the limitation, if the board designated an appropriate mixing zone in accordance with Basin Plan provisions on mixing zones.[34] Alternatively, the Central Valley Water Board could have used other procedures to assess reasonable potential. In the latter case, the permit must clearly explain the methodology used to assess reasonable potential and document the conclusions.

2. **AGR**

The Central Valley Water Board determined that the narrative chemical constituent objective as applied to Putah Creek's AGR use would be the agricultural water goal of 700 µmhos/cm as a long-term average. However, based on this Board's 2004 *Woodland* order[35], the Central Valley Water Board did not include a final effluent limitation to protect the AGR use, but rather required additional site-specific study.

In the *Woodland* order, the Board addressed the City of Woodland's effluent discharge to the Yolo Bypass. The Board held that, in order to implement the narrative chemical constituent objective for EC as applied to the AGR use, a site-specific study of factors affecting agricultural irrigation in the watershed should first be completed. The site-specific study was necessary to implement the narrative objective and, in particular, to ascertain whether relaxation of the 700 µmhos/cm EC value was appropriate. The order required Woodland to complete the study and submit a final report by June 2006. Once the study was completed, the Central Valley Water Board was directed to reevaluate whether Woodland's

---

[33] The administrative record contains limited receiving water data for the Arboretum Waterway summarizing 12 rounds of sampling collected from November 2002 to March 2005. (Notice of Intent to Adopt a Negative Declaration on the UC Davis Arboretum Waterway Improvements Project (Apr. 24, 2006); AR, vol. 2, item 68, p. 59.) The data indicate that the mean and maximum winter EC levels in the waterway during this time period were 444 and 822 µmhos/cm, respectively.

[34] Basin Plan at IV-16.00.

[35] Order WQO 2004-0010.

discharge had reasonable potential to violate the narrative objective for EC, and, if so, to reopen the permit to include appropriate effluent limits for the constituent. Woodland submitted its site-specific study to the Central Valley Water Board in May 2006.

The Cities of Davis and Woodland and the University are in close proximity in Yolo and Solano Counties and all discharge to tributaries of the same receiving waters. These tributaries have similar issues with regard to EC. In 2008, in this Board's *Davis* order[36], the Board questioned the need for another site-specific study for EC to address the City of Davis's discharge, given that the City of Woodland had already submitted such a study involving the same downstream receiving waters, agricultural lands, and geographical area. In the *Davis* order, the Board directed the Central Valley Water Board to reevaluate whether additional site-specific study was warranted, and, if not, to adopt a final effluent limitation for EC in the City of Davis's permit.

The University completed its own site-specific study in 2004, approximately sixteen months after the Central Valley Water Board's initial request. The University proposed an EC value to implement the narrative chemical constituent objective at that time. Central Valley Water Board staff indicated general satisfaction with the approach in 2005 and failed to respond to the University's request to complete the study. In 2008, the Central Valley Water Board adopted the present permit, giving the University an additional three years and three months to update and finalize the 2004 report. Further, the permit findings indicate that an effluent limitation for EC to protect agricultural beneficial uses in Putah Creek may not be included in the permit until it is renewed, sometime on or after December 2013. In the interim, the Central Valley Water Board replaced the effluent limitation of 900 µmhos/cm from the prior permit with a performance-based effluent limitation of 1,400 µmhos/cm as a monthly average. There is no contention that this limitation will protect the AGR beneficial use.

The Board concludes that further delay in establishing appropriate EC limits to protect AGR in this case is unwarranted. In the *Woodland* order, the Board determined that two years was a sufficient time period for Woodland to complete a site-specific study, at the conclusion of which the Central Valley Water Board was required to reconsider reasonable potential for EC and to reopen the permit, if appropriate. Two site-specific studies have now been submitted to the Central Valley Water Board on appropriate EC levels to protect irrigated agriculture in the area. Even if further study were required in this case, the Board concludes that three years and three months to complete the study is excessive. The Board further

[36] Order WQ 2008-0008.

concludes that it is inappropriate to wait until after 2013 to include appropriate final effluent limitations for EC in the University's permit. There is, in fact, no basis to believe that the Central Valley Water Board did not have before it all the information necessary to adopt a final effluent limitation when it adopted the permit.

The results of the University's site-specific study appear to be promising. The Board notes that the study recommended an EC value to protect AGR of 1,100 µmhos/cm, which is also within the range between the recommended and upper level secondary MCL for EC. Hence, the final EC value that is ultimately selected to protect the AGR use, based on the site-specific studies, may also protect the MUN use. The long-term average EC levels in Putah Creek downstream of the University discharge are below both the recommended secondary MCL for EC as well as the University's recommended value for agricultural irrigation. The Central Valley Water Board could allow the University to conduct a dilution and mixing zone study for Putah Creek and authorize an appropriate dilution credit, if warranted.

3. **Aquatic Life**

CALSPA contends that EC levels in the University's discharge exceed levels that support a good mix of aquatic life and approach the upper tolerance limit for fish. There is insufficient evidence in the record, however, to determine the validity of this contention. CALSPA cites a Biological Significance document, dated November 1, 2006, to support its argument; but this document is not in the record. In any event, the Board notes that the permit does regulate both acute and chronic toxicity to protect aquatic life.

III. CONCLUSION

The Central Valley Water Board incorrectly analyzed reasonable potential for EC as applied to the MUN use for Putah Creek and the Arboretum Waterway. The University's permit also allows an excessive period of time to update and finalize the University's 2004 site-specific study on EC levels to protect the AGR use of Putah Creek waters. The permit will, therefore, be remanded to the Central Valley Water Board with direction to shorten the time allowed to update the study to a maximum of two years. Within one year of completion of the study, the Central Valley Water Board is directed to reevaluate reasonable potential for both the MUN and AGR uses for both Putah Creek and the Arboretum Waterway and, if reasonable potential is found, to reopen the permit and to include appropriate effluent limitations. The

Central Valley Water Board, however, need not reevaluate reasonable potential for EC for the Arboretum Waterway if discharge to the waterway is prohibited in 2011.[37]

IV. ORDER

IT IS HEREBY ORDERED THAT this matter is remanded to the Central Valley Water Board for action consistent with this Order. Specifically, the Central Valley Water Board shall:

1. Revise the University's permit to shorten the time period for the site-specific EC study update to a maximum of two years.

2. Within one year of completion of the site-specific study update, reevaluate reasonable potential for EC for both the MUN and AGR uses of Putah Creek and the Arboretum Waterway and, if reasonable potential is found, reopen the permit to include appropriate water quality-based effluent limitations.

~~3. Provide annual status report to the State Water Board's Executive Director on compliance with the terms of this order.~~

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 ~~February~~ March 16, 2010.

AYE:

NO:

ABSENT:

ABSTAIN:

DRAFT

_____
Jeanine Townsend
Clerk to the Board

[37] The University's permit prohibits discharge to the Arboretum Waterway by December 5, 2011. The University is also required to conduct a receiving water constituent study and an antidegradation analysis for this waterbody. Depending on the results of the antidegradation analysis, the Central Valley Water Board may reopen the permit to modify the discharge prohibitions. (Order No. R5-2008-0183, Discharge Prohibition, III.E.; Special Provision VI.C. 2.d.; Special Provision VI.C.1.i.)