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*Chlorine Policy
deadline: 6/15/06 5pm
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COACHELLA VALLEY WATER DISTRICT

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June 13, 2006

File: 0552.11

Song Her, Clerk to the Board
State Water Resources Control Board
1001 I Street, 24th Floor
Sacramento, CA 95814

Dear Ms. Her:

Subject: Comments – Chlorine Policy



The Coachella Valley Water District (CVWD) provides domestic water, wastewater, recycled water, irrigation/drainage and regional stormwater protection services to a population of 265,000 throughout the Coachella Valley in Southern California. We appreciate the opportunity to provide written comments regarding the Total Residual Chlorine and Chlorine-Produced Oxidants Policy of California (Policy) and the accompanying Substitute Environmental Document (SED).

CVWD supports comments provided by ACWA dated June 5 and Tri-Tac et al dated June 5.

CVWD has reviewed the Policy and SED and our major concerns are:

1. It is not feasible for public water systems to comply with the conditions of this policy for intermittent discharges of potable water.
2. The whole effluent toxicity studies used to support water quality objectives in this policy are based on toxicity determined during continuous exposure and are not appropriate for determining the instantaneous maximum objective for total chlorine residual.
3. Available monitoring equipment is unable to achieve the required detection limits for total residual chlorine when used for wastewater applications.
4. There is no approved analytical method for calibrating monitoring equipment to achieve the sensitivity required in this policy.

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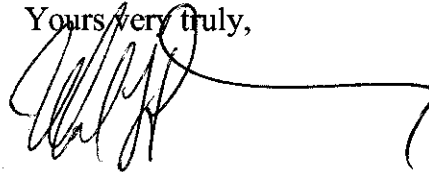
June 13, 2006

5. The monitoring procedures required in this policy will result in unjustified violation determinations based on monitoring data that is not representative of in-stream conditions.
6. It is inappropriate to use a statewide policy to manage total residual chlorine when individual Regional Water Quality Control Boards are better suited to develop water quality objectives and monitoring requirements based on local conditions.

Detailed comments on the subject policy are enclosed. Your consideration of these comments is appreciated.

If you have any questions, please contact Olivia Todd, Engineering Technician, extension 2200, or Steve Bigley, Water Quality Manger, extension 2286.

Yours very truly,

A handwritten signature in black ink, appearing to read 'Mark L. Johnson', with a long horizontal flourish extending to the right.

Mark L. Johnson
Director of Engineering

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Draft April 2006-Total Residual Chlorine and Chlorine-Produced Oxidants
Policy of California

1. Introduction- As stated in this Policy, "This Policy establishes: 1. TRC and CPO objectives that apply to all inland surface waters and enclosed bays and estuaries throughout the State to protect aquatic life beneficial uses; 2. Consistent procedures to regulate TRC & CPO discharges that apply to National Pollutant Discharge Elimination System (NPDES) permits that contain one or more numeric water quality-based effluent limitations; and 3. A basis for equitable compliance determinations to adequately enforce violations of TRC or CPO effluent limitations in non-storm water NPDES permits." As worded, this policy would apply to discharges of potable water from public water systems. Most potable water discharges are transitory, intermittent and often unscheduled. It is infeasible for these drinking water systems to dechlorinate and monitor to the level requested of the TRC Policy for these types of discharges. The State water resource control board staff has implied that it was not their intent for this policy to affect the way potable water discharges are currently managed. The policy needs to be revised to clearly indicate this policy does not apply to discharges of potable water which are managed through existing MS4 and NPDES permits.

2. Part II, Calculation- This provision states, "Because chlorine residual can be acutely toxic to fish and other aquatic life within minutes of exposure, weekly and monthly limits are not protective and are, therefore, impracticable." This would be a supporting statement for the lethality of instantaneous exposure of total residual chlorine (TRC). However, the toxicity studies performed and used for determining the appropriate level of chlorine residual allowed to reach receiving waters was based on a continuous TRC exposure environment. In the introduction of the Draft Substitute Environmental Document, it states, "A review of available literature reveals considerable amounts of information supporting TRC effects on aquatic organisms. Many toxicity values are less than or equal to 1 milligram per liter (mg/L) (U.S. EPA, 1994). Specifically, concentrations less than 0.1mg/L were found to be toxic to Fathead minnows, *Daphnia magna*, *Daphnia pulex*, *Nitocra spinipes*, rainbow trout, brook trout, small mouth bass, and green sunfish (Bureau of Water Management, 1971; Brungs, 1973; AQUIRE, 1994; and Wan et.al. 2000)." ... "Further studies revealed that sensitive species such as brook and brown trout were no longer found in waters with residual concentrations of 0.02mg/L. *Daphnia magna* died at concentrations of 0.014mg/L and *Nitorcra spinipes* reproduction was reduced at 0.012mg/L (Brungs, 1973)." Conducting tests to determine the reproductive capabilities of an organism and the preferred habitat of an organism would take time to complete. It would also require TRC to be a constant condition. As one can see, this data represents results of continuous exposures rather than instantaneous exposure. A discharge containing an elevated level of TRC is more likely to result in a short term condition. Therefore, unless the organism located

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in the discharge site's water is immobile for a period of time and/or the receiving water is not flowing and/or the receiving water is not consuming the residual chlorine, the health of the organism and the habitat of the organism in the receiving water will not be affected as portrayed in the afore mentioned study. Facilities should not be penalized for short term exposure if the method used to prove toxicity caused by total chlorine residual was based solely on continuous exposure.

In addition, the data presented in these studies does not indicate if TRC was the only toxic parameter tested that would lead to the decline or relocation of certain species. In other words, it is unclear whether or not chlorine residual alone was the cause of the health problems and the change in habitat of the organisms or if another more potentially toxic chemical was present and in combination with the TRC was actually the source of the health problems and relocations. CVWD recognizes the toxic potential of TRC. However, the studies used to support this policy are not appropriate. It would be beneficial to the dischargers if more information had been provided. For example, if a Whole Effluent Toxicity (WET) analysis was completed, it would be helpful to provide a summary of how the TRC is the primary cause of toxicity.

3. Monitoring Requirements- This provision states that, "Continuous monitoring is defined as monitoring that produces one or more data points every minute." The continuous total chlorine residual analyzers are capable of monitoring at this rate; however, it may not be a reflection of a completely new and representative sample. In other words, the analyzer could start taking an additional read on the tail of the previous sample's aliquot. The proximity of the analyzers' location to the location of the sample source and the capabilities of the pumping/vacuum system transporting the sample to the analyzer will determine the rate of analysis. It could take several minutes for a new representative sample to reach a monitoring device. We recommend the frequency of continuous monitoring be changed from one or more data points every minute to one or more data points every five minutes.
4. Quantification/Reporting Requirements- According to this provision, "On-line chlorine residual devices must have the ability to record measurements at no less than one per minute and record concentrations in parts per billion (ug/L or ppb). On-line devices must have a manufacturer's stated detection limit, scale range, or sensitivity below the permitted effluent limit." Most of these devices are capable of taking a measurement instantaneously, but the software systems of these analyzers are not capable of recording the reads as quickly or in concentrations of parts per billion. The measuring range on most chlorine residual devices is in the parts per million (ppm).

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For example, the Hach GLI AccuChlor2 Residual Chlorine Analyzer, 115VAC, has a measuring range of 0-60.0ppm when using its auto-ranging with a 0.001ppm resolution in the 0-9.999ppm range and a 0.01ppm resolution in the 10.0-60.0ppm range. Chemical Injection Technologies' Superior Chlorine Residual Analyzer Model SA-100 has measuring ranges of 0-0.200ppm or 0-200.00ppm with a resolution of 0.01ppm. Foxcroft's FX-1000p Amperometric Chlorine Analyzer has a measuring range of 0-5.00ppm with a resolution of 0.001ppm. Most devices state that at the measurements taken at the lower levels are not as efficient or accurate. Therefore, although these measurements may be converted to parts per billion it would not be accurate especially with a wastewater application. Wastewater systems produce matrix interferences that would not be available in a manufacturer's quality control laboratory. These types of interferences can impair the instruments ability to detect TRC when compared to laboratory tests performed with deionized water. In this type of system, it is not possible to rely on what the manufacturer says the equipment is capable of doing. The manufacturer's tests are performed in a lab environment. These devices will be out in the field exposed to the elements, in some cases, and used for wastewater with a variety of matrixes. The provision needs to consider real world conditions when determining minimum detection levels required for compliance purposes.

Facility supervisory control and data acquisition (SCADA) systems are software and not routinely capable of taking a read every minute. Systems will need significant software development and possibly dedicated links from plants to locations where data is stored so that reads can be recorded every minute. This is an unreasonable task that will take time and a significant budget increase for facilities to accomplish. This additional frequency is not justified. Monitoring performed at five minute frequencies remain protective of the environment and are more cost effective.

5. Quantification/Reporting Requirements- This provision states, "Facilities must verify the solution concentration by Method 4500-Cl E as found in Standard Methods for the Examination of Water and Wastewater, 20th edition, whose stated detection limit is 0.010 part per million. All off-line measurements of chlorine residual shall be performed using this analytical method." Standard Methods does not mention using an on-line continuous monitoring device in any of the analytical methods used for determining chlorine residual. In fact, the method reporting limit for chlorine residual is 0.2mg/L. Anything below that level is not reported with any degree of certainty without "special modifications to the amperometric titration procedure."(Standard Methods for the examination of water and

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wastewater, 4-60). Standard methods also states that in regards to the precision and bias of the analytical methods used to determine the chlorine residual, "Published studies give the results of nine methods used to analyze synthetic water samples without interferences..."(4-56). The analyzers will be sampling wastewater. Wastewater will have several interferences. In other words, the detection limit for this application may not be reached because they are below the reporting limits of Standard Methods. The analytical methods need to be revised to confirm the minimum detection limit meets the proposed limits before the subject policy is adopted.

6. Quantification/Reporting Requirements- This provision states that, "There shall be 24 determinations per day." However, it does not state what is required to be reported. This requirement will need to include exactly what will need to be reported. If facilities are reporting one hour averages there will be on the average at least 730 records of data per month that could be reported to the board, unless both the primary analyzer and the back-up analyzer will both need to be reported then at least 1460 records of data will be reported to the board per month. This amount of record keeping and reporting would be unreasonable. The provision should state, "There shall be 24 determinations per day, the average of which will be reported, in addition to any violations."

7. Quantification/Reporting Requirements- The provision states, "If the analytical result of a single grab sample is higher than the instantaneous maximum effluent limitation for TRC or CPO, a violation will be flagged, and the discharger will be considered out of compliance for that single sample." If a monitoring is to occur every fifteen minutes for intermittent chlorination, there could be a potential for 360 violations per day at a cost of \$3,000 per violation. No single measurement should result in a violation. All testing needs to allow for confirmation by using additional tests. CVWD would like this requirement to also consider the Best Management Practices (BMP) used by facilities to mitigate adverse effects from a TRC or CPO exceedance. Appropriate mitigation should override such problems with the system.

The provision should take into consideration the BMP capabilities of the facilities not just the capabilities of the primary and back-up analyzers. The facilities should be allowed a reaction time period to correct or verify any mechanical errors or chlorine residual problems before a violation is applied. For example, Coachella Valley Water District's chlorination/dechlorination system is capable of shutting down the discharge to the receiving water when the dechlorination agent lowers to a certain level which still ensures there will not be a detectable TRC. This system is controlled by the Stantrol 960. The Strantrol 960 controls

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chlorine feed rate, and the sulfur dioxide feed control. The sulfur dioxide analyzer is used to meet discharge requirements and also will be a factor in outfall shutdown. The output of the analyzer will go to the Programmable Logic Controller (PLC) for process control and SCADA monitoring. The chlorine analyzer is used as an additional data gathering device for plant operation. The sample goes to the chlorine analyzer and the analyzer output then goes to the PLC for SCADA monitoring. The chlorine analyzer will be a factor when determining an outfall shutdown. The four gas feed controllers, two chlorine and two sulfur dioxide; receive signals from the Strantrol 960 through the PLC. They will send the feed rate signal in pounds to the PLC for SCADA monitoring and CVWD headquarters for outfall shutdown determination. The PLC will take all the above information plus other discrete inputs which are relevant and determine if there is a possibility of a discharge violation. A discharge violation is not possible when an outfall shutdown is initiated. Therefore, chlorinated effluent will not reach or be discharged into the receiving water, even though the detection limits for chlorine residual may be exceeded within the chlorine contact channel. CVWD requests that violations not be based solely on a single exceedance of the detection limit.

As mentioned before, if the toxicity tests performed and used to determine the appropriate level of chlorine residual that is allowed to reach receiving waters was determined from continuous exposure, then facilities should not be penalized for instantaneous exposure if it has not been proved to be the cause of toxicity.

The provision will also need to consider the positive spike occurrence that could be the result of a monitoring artifact/false positive. Again, no single measurement should result in a violation. All testing needs to allow for confirmation by using additional tests. There needs to be an affirmative defense for chlorine spikes. Facilities should not be unfairly punished due to faulty monitoring equipment.

8. Compliance Determination- This provision includes the following statement, "If grab samples taken at the end-of-pipe show chlorine residual above the stated effluent limit, the discharger must begin receiving water monitoring to adequately characterize and assess impacts to aquatic life within the receiving water." This provision fails to identify the type of receiving water monitoring that would be required. This provision should clearly state that receiving water monitoring is limited to the applicable TRC or CPO.

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9. Introduction: As stated in the findings, "Coldwater species...are more sensitive to TRC than those warm water species...Chlorine toxicity depends on water temperature, pH levels, nitrogenous compounds, and presences of organic matter." Depending on the receiving water there could be less toxicity with the same amount of TRC. Also stated in the findings, "In the 1996 study, it was shown that concentrations of TRC at night could be 3 times greater than those measured during midday and can be driven by a combination of sunlight and periphyton". The water quality objectives should take into consideration the parameters specific to each type of environment and receiving water. The Coachella Valley Stormwater Channel is located in the desert and categorized as freshwater yet having extremely different water quality than a mountain stream. The provisions regarding the water quality objectives should be site specific and regulated by the appropriate Regional Board rather than a statewide policy.
10. Introduction, MMP (Mandatory Minimum Penalties): This finding states that, "CWC 13385 (h) requires that the Regional Water Board for each serious violation assess a MMP of \$3,000. A serious violation is any waste discharge that exceeds the effluent limitation for a Group I pollutant by 40 percent or more or a Group II pollutant by 20 percent or more.... Chlorine is listed as a Group II pollutant." In addition, this finding states, "The Regional Water Boards are required by CWC 13385 (i) to assess MMPs of \$3,000 per non-serious violation, not counting the first three violations." This is not mentioned in the proposed policy. The Total Residual Chlorine and Chlorine-Produced Oxidants Policy of California does not refer to this section of the CWC. This policy states, "Any excursion over the 1-hour average, 4-day average, or instantaneous maximum of the intermittent discharge is a violation." It should state, "Any excursion of 20 percent or more is a serious violation and subject to the \$3,000 fine after the first three violations." This statement would clarify what constitutes a violation and the enforcement action to be taken as a result of the violation for both the TRC policy and the SED.
11. Chapter 1 – Water Quality Objectives: As stated in the findings, "To protect aquatic life, it is appropriate for the State Water Board to adopt uniform objectives for TRC and CPO that apply statewide to inland surface waters and enclosed bays and estuaries." The studies referenced in the introduction were conducted in 1971, 1973, 1994, and 2000. During this time span, several permits have been written and renewed. These permits include total chlorine residual limits which were deemed

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acceptable for protecting the water quality standards of the discharger's receiving waters. The total chlorine residual limits included in the permits protect the water quality of the receiving water specific to each discharger and should not be changed to a uniform statewide objective that may not be applicable. These studies also state, "Chlorine toxicity depends on water temperature, pH levels, nitrogenous compounds, and presences of organic matter.", according to the Total Residual Chlorine and Chlorine-Produced Oxidants Policy of California. These constituents vary with each receiving water. Depending on the receiving water, there could be less toxicity with the same amount of TRC. Perennial flows in the Coachella Valley Stormwater Channel are a result of wastewater and irrigation drainage and this channel is located in the desert, which would be a much different environment than a freshwater receiving water like Big Bear Lake. The water quality objectives should take into consideration the parameters specific to each type of environment and receiving water. Of the choices given, CVWD recommends no action to be taken and continue with the status quo allowing the Regional Boards to determine the appropriate chlorine residual limits for each NPDES permit.

12. Chapter 2- Mixing Zones: CVWD agrees that this policy should remain silent in regards to mixing zones leaving it up to the Regional Boards to decide whether or not mixing zones are applicable or necessary. CVWD agrees with the following statement in this provision, "The Regional Water Boards are most knowledgeable in the waters they regulate. Therefore, if mixing zones are authorized in a Basin Plan and do not cause acutely toxic conditions to aquatic life or adversely impact benthic organisms, it is appropriate for the Regional Water Board to exercise its discretion on this issue."
13. Chapter 3- Calculation of Effluent Limitations: CVWD recommends choosing no additional action for calculating the effluent limits. The state water board has divided the state into several regional sections with a representative regional board for each section. Each region is unique. Each regional board is familiar with the circumstances and environment within that region. Each regional board will be able to more accurately determine an effective effluent limit for each body of water given its characteristics. CVWD agrees with no additional action even though there will be effluent limit inconsistencies throughout the state.
14. Chapter 4 – Compliance Schedules: If the statewide TRC policy is adopted, it will be necessary for facilities to make significant changes and these changes will require adequate time for budgeting, design, construction, and equipment testing. Facilities in regions with no compliance schedule provisions will not be able to immediately comply with the subject policy. CVWD recommends adopting a compliance

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schedule of five years to protect facilities in regions that have no existing compliance schedule provisions.

15. Chapter 5 – Monitoring and Reporting Frequency: CVWD recommends that there be no action in regards to changing the monitoring and recording frequencies. As mentioned above in #7 and #9, the frequency should be determined by the type of receiving water, facility and the BMPs that facility is capable of accomplishing. The regional boards are familiar with the treatment plants within their region and will be able to better assess the total chlorine residual present in the discharge.
16. Chapter 6 – Compliance Determination: CVWD recommends allowing each Regional Board to decide how compliance is met. CVWD, however, agrees with the statement, "A positive residual dechlorination agent in the effluent indicates that chlorine is not present in the discharge, which can validate a zero residual reading on the chlorine analyzer. This type of monitoring can prove that some chlorine residual exceedances are false-positives." This provision also requires that, "When continuous monitoring systems are off-line for calibration and maintenance, a back-up system must be in place to show compliance...Grab samples must adequately characterize the discharge. This means that at least one sample in 15-minute intervals of the discharge prior to its release into the receiving water and until the continuous monitoring system is back on-line." As a result of the grab sample monitoring the provision requires the discharger, "to begin monitoring the receiving water as well as the discharge to adequately characterize and assess impacts to aquatic life within the receiving water." It is unclear what method should be used to monitor receiving water if there is an overage of the stated effluent limit and how to "adequately characterize and assess impacts to aquatic life within the receiving water." This provision should clearly state that receiving water monitoring is limited to the applicable TRC or CPO.

Also, CVWD does not agree with the statement that, "Any excursion over the 1-hour average or 4-day average should be a violation." There should be allowance of affirmative defense for this type of violation and BMPs should be taken into consideration. A confirmation process is common for drinking water testing. The confirmation of TRC or CPO exceedance should be similar to the process used for coliform monitoring for drinking water.

17. Chapter 7 – Storm Water Discharges: CVWD agrees that no action should be taken and that these provisions should not apply to the storm water NPDES programs. CVWD also agrees with the statement that, "The State Water Board would continue to base storm water regulation on BMPs, rather than the suggested Policy provisions."

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18. Chapter 8 – Nonpoint Source Pollution Discharges: CVWD recommends that no action be taken and that this policy should not apply to non-point source discharges.