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Davis California

January 21, 2011

Ms. Jeanine Townsend
Clerk to the Board
State Water Resources Control Board
1001 I Street, Sacramento, CA 95814

Subject: Comment Letter - Policy for Toxicity Assessment and Control

Ms. Townsend,

The City of Davis appreciates the additional time allowed to provide comments on the Draft Policy for Toxicity Assessment and Control. We respectfully submit the attached comments for the State Water Resources Control Board's consideration.

Sincerely,

Stan Smith For

Keith A. Smith
Utilities Engineer

ROBERTSON - BRYAN, INC.
Solutions for Progress

January 18, 2011

Mr. Keith Smith
City of Davis, Department of Public Works
23 Russell Blvd.
Davis, CA 95616

Subject: Draft Comments for the State Water Board Draft Policy for Toxicity Assessment and Control on Behalf of City of Davis

Dear Mr. Smith:

Enclosed are draft comments on State Water Board Draft Policy for Toxicity Assessment and Control prepared by Robertson-Bryan, Inc. on behalf of City of Davis. Please contact myself or Andrew Sayers-Fay, Ph.D. with any questions.

Regards,

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City of Davis Draft Toxicity Policy Comments

ROBERTSON - BRYAN, INC.
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City of Davis Comment Letter – Policy for Toxicity Assessment and Control

Overview

The State Water Resources Control Board (State Water Board) Draft Policy for Toxicity Assessment and Control (Draft Policy) attempts to standardize practices across the state in order to efficiently direct resources to identify and reduce potential adverse effects on aquatic life from point source and non-point source dischargers. However, the City of Davis (City) has concerns over the effectiveness of the implementation procedures, as drafted, to focus on potential for adverse aquatic life effects.

In addition, the Draft Policy relies upon a statistical test procedure (Test of Significant Toxicity or TST) that has not been reviewed or approved under 40 CFR 136 to evaluate toxicity in the NPDES program. The City has substantial technical concerns about the accuracy of the TST in achieving the goals of the Toxicity Objectives set forth in Part II of the state's Draft Policy. The TST is focused on more precisely determining the magnitude of effect, but not the cause of toxicity. Furthermore, while the TST purports to set the threshold for toxicity at a 25% or greater effect compared to control, the discharger community has significant concern over the TST false positive error rate. Thus, the TST is used to trigger accelerated monitoring and Toxicity Reduction Evaluations (TREs), but its utility in predicting environmental harm to aquatic life has not been studied. Nor does the TST provide any new, improved tools for detecting the cause of toxicity.

Throughout the Staff Report, there is an evident desire to simplify the evaluation and enforcement of toxicity provisions. This Draft Policy may in fact minimize the time, effort, and expertise needed from State and Regional Water Boards. There is not, however, a clear focus on accurately identifying potential adverse impacts to aquatic life and cost-effectively directing state and discharger resources to protect aquatic life beneficial uses. The Draft Policy makes violation determinations easy without regard for improving solutions (i.e., the effectiveness of toxicity identification and reduction). Thus, there is a demonstrable concern that the flaws of the Draft Policy export costs to the City and fail to prioritize efforts based on harm to aquatic life. As an example, under the Draft Policy, publically owned treatment works (POTWs; aka municipal or regional wastewater treatment plants) are assigned reasonable potential. This increases

monitoring, and increases exposure to violations and fines without regard for treatment plant performance.

The City supports the efforts of the discharger community to develop alternatives to the Draft Policy and TST procedures through the efforts and comments from CASA, TriTAC, and CVCWA (Association Letter). In the event that the State Water Board does not agree with all of those alternatives, the City submits the following comments on recommended changes to the Draft Policy to address, as much as possible, the deficiencies of such an approach.

Toxicity Objectives and Statistical Method

1. Toxicity Objectives (Part II)
   The Draft Policy disregards the approved 40 CFR 136 toxicity test method endpoint determinations for a new, unapproved and unverified statistical test.

The statewide standardization and implementation of toxicity assessment and control is a desirable goal of the state. Rather than relying upon an unapproved, alternative statistical method for the evaluation of toxicity, the state would be better served by: 1) recognizing the effective use of no observable effects concentration (NOEC) hypothesis testing with percent minimum significant difference (PMSD) boundaries as detailed and required in 40 CFR 136 approved toxicity test methods (i.e., section 10.2.8); and 2) implementing policies that direct state and discharger resources to protect aquatic life beneficial uses through effective use of U.S. EPA's Toxicity Reduction Evaluation (TRE) guidance.

The Staff Report identifies the following concerns with NOEC hypothesis testing:

1. *"The NOEC and NOAEC endpoints rely upon a prior determination of effluent concentrations which can impede attempts to find a response range."*
2. *"Furthermore, confidence intervals cannot be calculated for hypothesis tests, and nonmonotonic data sets can be difficult to interpret."*
3. *"The most problematic aspect of traditional hypothesis testing, however, has been the lack of established statistical power. Insufficient statistical power significantly influences test sensitivity thereby resulting in a higher rate of β errors (inability to declare a truly toxic sample as toxic). This shortcoming can, however,*

be mitigated somewhat by setting acceptable upper and lower bounds of PMSDs (U.S. EPA 2000)."

U.S. EPA guidance recommends that the dilution series bracket the instream waste concentration (IWC). Thus, the only *a priori* determination is based on an environmentally relevant concentration. While IWC bracketed dilution series may not be ideal for determining the response range, there is the potential to obtain useful information about the response range with a NOEC hypothesis test. The TST procedure relies on a single concentration pass/fail test with no ability to generate response range information.

While confidence intervals cannot be calculated, PMSD boundaries can be used to limit the range of acceptable tests and thus minimize the confidence intervals. The PMSD is a measure of test sensitivity to determine whether the observed effect is significant (i.e., when is the observed response considered toxic). Specifically, the PMSD boundaries set a lower limit for negligible effects and an upper limit for a retest when high variability/poor precision occurs. The criticism that nonmonotonic data sets can be difficult to interpret, is not a weakness per se, but an example of dose-response relationships that are not well understood or well modeled. Ignoring data that does not confirm to expected behaviors either ignores: 1) evidence of problems in the test methods; and/or 2) ignores real dose-response relationships that may/may not require a revised understanding of whether there is potential harm to aquatic life.

The lack of established statistical power can be mitigated by setting acceptable upper and lower PMSD bounds. Appendix C of the TST Implementation document provides the only, limited evidence of the effectiveness of the TST procedure by comparing outcomes with the NOEC procedure for real world sampling (i.e., with ambient toxicity monitoring data). It should be noted that evidence is only provided for two of the common test species (i.e., *Ceriodaphia dubia* and *Pimephales promelas*; water flea and fathead minnow, respectively). No evidence is provided for the utility of the TST procedure with *Selenastrum capricornutum* (i.e., green algae).

It is not evident from Appendix C of the TST implementation document that the NOEC hypothesis approach was performed using upper and lower PMSD boundaries. For example, the lower PMSD boundary for *Ceriodaphnia dubia* is 13%. However, Appendix C cites a *Ceriodaphnia* test failure with the NOEC approach and a mean effect of 7% which is far below the lower PMSD boundary. This means that negligible effects are considered toxic by not fully implementing the NOEC analysis procedures.

To not use the lower PMSD boundary is analogous to modifying the TST by not setting 10% as the negligible effect level and not striving to minimize the false positive error rate. Neither approach is a fair comparison of either method.

Likewise, Figure C-1 identifies *Ceriodaphnia* NOEC tests that "passed" with mean responses as high as 75% when the upper PMSD boundary is 47%. This is inaccurate. The NOEC test method requires a retest when the upper PMSD boundary is exceeded. Furthermore, Figure C-1 represents only 6.6% of the total toxicity tests performed, and it does not present the range of CVs for all tests that passed the NOEC test or the range of CVs for all the tests that passed the TST test. Thus it provides a skewed comparison of what the NOEC test with PMSD boundaries (i.e., the procedure in approved 40 CFR 136 toxicity test methods) would consider a pass versus the TST test. Even less information is provided in the TST implementation procedure to enable an accurate assessment of *Pimephales promelas* results.

Therefore, the City requests that the TST statistical procedures in the Draft Policy be replaced with the NOEC hypothesis approach detailed in the approved 40 CFR 136 toxicity test methods by replacing Part III, Section A-6 with the following:

> *"Results obtained from single-concentration chronic and acute toxicity tests shall be analyzed using the NOEC hypothesis endpoint test, with applicable upper and lower PMSD boundaries, as defined in the relevant, approved 40 CFR 136 toxicity test method including section 10.2.8.*
>
> *When the statistical analysis finds no toxicity but the PMSD exceeds the upper boundary, the test result is "indeterminate" at the IWC and the toxicity test must be repeated with an increase in the number of replicates calculated to discern toxic events[1]*
>
> *[1]See "Understanding and Accounting for Method Variability in Whole Effluent Toxicity Applications Under the National Pollutant Discharge Elimination System" (EPA 833-R-00-003) particularly Chapter 5 and Appendix B."*

2. Toxicity Objectives (Part II)
   Substantial changes are needed to the implementation of TST procedures in the Draft Policy to achieve the goal of protecting aquatic life.

The Draft Policy states that its primary objective to be the protection of beneficial uses, and in doing so assumes that beneficial uses are being adversely impacted from the

results of any single bioassay result returning a test result of "fail". Although numerous studies have found great utility in the use of WET to identify and correct effluent and ambient toxicity conditions, WET in many respects is also limited in its ability to accurately predict in-stream biological conditions, and ultimately accurately measure the ecological integrity of receiving waters for which the policy states is its primary objective.

Diamond and Daley (2000) compared WET results for 250 individual discharges to results of in-stream biological condition as measured by benthic macroinvertebrate assessments and found that overall agreement between discharge specific WET results and actual in-stream biological condition were relatively poor. The strongest attribute explaining the relationship between WET and in-stream condition was effluent dilution, with additional attributes including frequency of WET, taxa of test organism, and variability in incidence of a significant WET test endpoint.

Use of WET can result in varying levels of beneficial use protection. As discussed in Chapman (2000), the notion that WET can be used to independently predict and identify ecological impairment is too simplistic. The draft policy's treatment of a single bioassay test failure as an indication of beneficial use impairment ignores the complexity of natural systems and the demonstrated variability in the utility of WET as a predictive tool. Since the TST procedure reverses the WET null hypothesis to presume toxicity, there would likely be an even more tenuous connection between failed bioassay tests and real world harm to aquatic life. Thus, greater flexibility is required in the Draft Policy to investigate and evaluate the incidence of WET before a conclusion of beneficial use impairment can be drawn. Early conclusion on the matter of an adverse effect based on a single test without consideration of the many factors that ultimately contribute to in-stream ecological condition can lead to erroneous policy decisions and misdirected effort.

In the event the state pursues adoption of Part II toxicity objectives, there needs to be significant and substantial changes to the implementation of the TST procedures in order to achieve the goal of protecting aquatic life beneficial uses. As drafted, the policy is very effective at conservatively labeling small deviations in bioassay testing as evidence of substantial and immediate harm to aquatic life in ambient waters. The Draft Policy is further burdened by excessive punitive measures that fine dischargers regardless of efforts to identify and reduce toxicity to ambient waters and regardless of their effectiveness in doing so. The Draft Policy, does not identify any correlation between the use of TST procedures and reduced harm to aquatic life let alone

demonstrate any evidence of the effectiveness of TST procedures in accurately identify harm to aquatic life when present.

Thus, a discharger that diligently and timely seeks to identify and reduce adverse effects on aquatic life is fined to the same extent and frequency of a discharger who does not. This outcome was cautioned against in the CEQA scoping document. *"The use of numeric toxicity limits can become problematic when a noncompliant discharger is aggressively pursuing the necessary steps to identify and reduce the source(s) of the observed toxicity, but is continually accruing violations (page 4.)"*

Chapman, PM. 2000. Whole effluent toxicity testing—usefulness, level of protection, and risk assessment. Environ Toxicol Chem. 19:3–13.

Diamond J., Daley C. 2000. What is the relationship between whole effluent toxicity and instream biological condition. Environ Toxicol Chem. 19:158–168.

3. Control Water (Part II: Toxicity Objectives) The Draft Policy must state the requirements for a suitable control water consistent with U.S. EPA guidance.

The entire Draft Policy is predicated on the suitability and reliability of the control used for toxicity testing and thus all subsequent monitoring, toxicity reduction, and regulatory enforcement actions. Nowhere in the Draft Policy is there any definition of a suitable water for control. Fortunately, U.S. EPA has addressed the selection of control waters (referred to a dilution water) in Section 7 of the approved 40 CFR 136 toxicity test methods; Chapter 6 of *Method Guidance and Recommendations for Whole Effluent (WET) Testing (40 CFR Part 136)*(EPA 821-B-00-004); and Section 3.7 of *EPA Region 9 and 10 Toxicity Training Tool* (Denton *et al*, 2007). The importance of the dilution water is identified as follows (Denton *et al*, 2007):

> *"The use of dilution water is an important part of toxicity testing. Dilution water may be either standard laboratory water and/or receiving water. The type of dilution water used in effluent toxicity tests will depend largely on the objectives of the test.*
>
> - *If the objective of the test is to estimate the absolute acute or chronic toxicity of the effluent, which is the primary objective of NPDES permit-related toxicity testing, standard laboratory dilution water as defined in each test method is used.*

- *If the objective of the test is to estimate the toxicity of the effluent in uncontaminated receiving water, the test may be conducted using dilution water consisting of a single grab sample of receiving water (if non-toxic), collected either upstream and outside the influence of the outfall, or with other uncontaminated natural water (ground or surface) or standard dilution water having approximately the same characteristics (hardness and/or salinity) as the receiving water.*
- *If the objective of the test is to determine the additive or mitigating effects of the discharge on already contaminated receiving water, the test is performed using dilution water consisting of receiving water collected immediately upstream or outside the influence of the outfall (page 46)."*

Thus, it is necessary for the applicable Water Boards to define the purpose of the toxicity testing in the individual permits and to specify the control water. Furthermore, the State Board through the Draft Policy should direct the Water Boards to determine control waters consistent with the U.S. EPA guidance. Therefore the City recommends the following addition to Part II of the Draft Policy:

> ***"Control***
> *The control, or dilution water as it is referred to by U.S. EPA, is fundamental to the validity of the toxicity testing and for the evaluation of whether the toxicity objectives above are met. The applicable Water Boards shall determine the appropriate control to use when adopting individual permits. The control (i.e., dilution water) shall be chosen in accordance with U.S. EPA guidance in EPA Region 9 and 10 Toxicity Training Tool (Denton et al 2007); Section 7 of the approved 40 CFR 136 toxicity test methods; and Method Guidance and Recommendations for Whole Effluent (WET) Testing (40 CFR Part 136)(EPA 821-B-00-004)."*

4. Toxicity Objectives (Part II)
   Use of Instream Waste Concentration needs to reference SIP policies and procedures for mixing zones and dilution credit.

The Draft Policy makes use of the IWC for toxicity testing. When mixing zones or dilution credits are not granted by the applicable Water Boards, the IWC defaults to 100% effluent. It is important that mixing zones and dilution credit be granted, when appropriate, in order to ensure that toxicity testing is conducted at environmentally relevant mixtures of effluent and receiving water. If not, then a toxicity test failure could result in substantial expenditure of time and resource with no benefit to aquatic life.

Thus, the City suggests that the Part II of the Draft Policy identify this issue with the following addition:

> *"Both the chronic and acute toxicity objectives defined above rely upon the IWC. To obtain toxicity test results indicative of the potential harm, or lack thereof, to state and federal waters, it is necessary for the IWC to reflect what occurs in the receiving water. Section 1.4.2 of the SIP defines the policies and procedures to request and evaluate the suitability of mixing zones and dilution credit."*

5. TST Statistical Method (Part III, Section A-6)
   The TST procedure can result in a failed test even if the IWC mean response is greater than the toxicity objectives.

There is inherently variability in toxicity testing. The TST's stated approach is that increased replicates will improve the accuracy to discern differences from 75% of control. In practice, the TST allows for differences less than 25% to not only be considered significant, but to be considered evidence of toxicity. Since test species are typically not acclimatized to either a receiving water control or the IWC, there can be biological effects that are not driven by toxicity. The possibility that a non-toxic effect drives the statistically significant result decreases with the increasing magnitude of the effect. Conversely, as the effect decrease below 25%, the probability that the statistically significant effect is driven by toxicity decreases.

A significant problem in the TST statistical method used by the Draft Policy is that a toxicity test can fail the TST procedure when the IWC mean response is greater than the toxicity objectives (i.e., the IWC mean response is greater than 75% of control for chronic toxicity and 80% of control for acute toxicity) due to variability of the IWC sample and/or control. This is because the TST presumes toxicity until the precision of the statistical test is great enough to reject this null hypothesis. Since a failure of the TST procedure results in violations and enforcement actions, it is critical that a test failure reflects a substantial probability of adverse impacts to aquatic life and not an indeterminate result due to too much variability.

The Staff Report asserts that the TST procedure *"provides motivation to decrease within-test variability which will significantly reduce the risk of unreported toxic events."* There are two major flaws with this assertion:

1) the risk of unreported toxic events with the NOEC hypothesis and PMSD boundaries is low. The Staff Report and the U.S. EPA TST Technical Document

do not demonstrate any real, additional protection to aquatic life, especially in light of implementation costs of the Draft Policy; and

2) the TST procedures, as implemented in the Draft Policy, penalize dischargers with exceedances of effluent limitations and Class II violations to reduce high within-test variability. In contrast, the current EPA approved test method approach is to require a retest and determine whether or not toxicity is present. Furthermore, there are no compliance schedule opportunities for dischargers to evaluate toxicity through the Draft Policy's procedures (only to set up a new monitoring program) or to assess the number of increased replicates necessary to reliably reduce within-in test variability so that within-in test variability does not drive test failure.

In fact, there are substantial concerns as to the predictability of adverse aquatic life impacts from toxicity tests with small mean responses (see comment #6). Thus, when the mean response is greater than the toxicity objectives but variability is too high, a retest is needed in a manner analogous to an exceedance of the upper PMSD limit during hypothesis testing (see Section 10.2.8.2.2 of the 40 CFR 136 approved toxicity test methods). The City requests the following minimum changes to resolve this problem when implementing the TST procedure to determine violations of objectives and enforcement actions:

> *"**Step 5:** If the calculated t-value is less than the critical t-value and the IWC mean response is ≤75% of control for chronic toxicity or ≤80% of control for acute toxicity, the IWC is declared toxic and the test result is a "fail" at the IWC. If the calculated t-value is less than the critical t-value and the IWC mean response is >75% of control for chronic toxicity or >80% of control for acute toxicity, the test result is "indeterminate" at the IWC and the toxicity test must be repeated with an increase in the number of replicates calculated to discern toxic events[1]. Test initiation for a repeated test must begin within 14 days of receipt of the "indeterminate" test result. If the calculated t-value is greater than the critical t-value or the mean response is ≥90% of control, the IWC is not declared toxic and the test result is a "pass" at the IWC.*
>
> *[1]See "Understanding and Accounting for Method Variability in Whole Effluent Toxicity Applications Under the National Pollutant Discharge Elimination System" (EPA 833-R-00-003) particularly Chapter 5 and Appendix B."*

6. TST Statistical Method (Part III, Section A-6)
   The TST procedure can result in a failed test even if the IWC mean response is greater than 90% of control.

In U.S.EPA's Test of Significant Toxicity Technical Document (EPA 833-R-10-004) one of the regulatory management decisions is to *"declare an effluent non-toxic no more than 5 percent of the time ($\beta < 0.05$) when the effluent effect at the critical effluent concentration is 10 percent (page xii)* [emphasis added]." This appears to be a misstatement and "non-toxic" was meant to be "toxic." However, a five percent risk of a failed test is unacceptable considering the accelerated monitoring, violations, and enforcement actions that are triggered. Particularly so given that the TST technical document also states, *"EPA defines negligible as 10 percent toxicity or less."* Thus, the City requests the following changes:

> ***"Step 5:*** *... If the calculated t-value is greater than the critical t-value or the mean response is ≥90% of control, the IWC is not declared toxic and the test result is a "pass" at the IWC."*

Reasonable Potential

7. Reasonable Potential (Part III, Section A-1, B-1, and C-1)
   The Draft Policy employs a different and more stringent requirement for reasonable potential than the toxicity objectives.

The Draft Policy relies upon a lower threshold to determine reasonable potential than the toxicity objectives by subjecting toxicity tests with a test result of "pass" to a further evaluation. Use of a lower threshold for reasonable potential that is not a state narrative or numeric criteria is in contrast to both SIP procedures (Section 1.3), U.S. EPA procedures in Chapter 3 of the Technical Support Document For Water Quality-based Toxics Control (TSD), and the requirements of the Clean Water Act.

> *"40 CFR 122.44(d)(1)(ii) When determining whether a discharge causes, has the reasonable potential to cause, or contributes to an instream excursion* ***above a narrative or numeric criteria within a State water quality standard****, the permitting authority shall use procedures which account for existing controls on point and nonpoint sources of pollution, the variability of the pollutant or pollutant parameter in the effluent, the sensitivity of the species to toxicity testing (when evaluating whole effluent toxicity), and where appropriate, the dilution of the effluent in the receiving water* **[emphasis added]**."

Since the statistical test is used to assess potential harm to aquatic life, passing the test cannot be viewed as demonstrating harm to aquatic life. Thus the City suggests the following changes:

~~*"Toxicity test data that produces a test result of "pass" shall be further evaluated by the NPDES wastewater or point source WDR discharger to determine both reasonable potential and the most sensitive test species for use in routine monitoring by calculating the percent effect at the IWC, for each test result, using the following equation:*~~

~~$$\% \text{ Effect at IWC} = \frac{\text{Mean Control Response} - \text{Mean Response at IWC}}{\text{Mean Control Response}} \cdot 100$$~~

Based upon the foregoing, a waste discharge has reasonable potential to cause or contribute to an excursion above the toxicity objectives established in Part II if the effluent at the IWC produces a test result of "fail." ~~*or if the percent effect at the IWC is greater than 0.10."*~~

8. Reasonable Potential (Part III, Section A-1, B-1, and C-1)
   Draft Policy unjustifiably asserts that reasonable potential for 1 mgd and greater POTWs must be assumed since it is inherently difficult to do otherwise.

The Draft Policy assumes reasonable potential for all major POTW facilities (i.e., >1 mgd) without consideration of historical bioassay results or that some of these facilities are among the newest and most advanced wastewater treatment facilities in the state. The Staff Report asserts that this *"would provide a higher level of ecological protection from the voluminous discharges of these facilities than that of an isolated test."* Such a reasonable potential policy contradicts SIP reasonable potential procedures for priority pollutants. The Staff Report asserts that SIP procedures would require *"quantifying toxicity into a measurable quantity"* and that the inherent difficultly *"would require an extensive amount of time, effort, and expertise on behalf of the Water Boards."*

The City asserts that the toxicity objectives in Part II of the Draft Policy have already defined the numeric test to determine compliance with statewide toxicity objectives. Thus, it would take minimal effort to define a SIP-like reasonable potential determination, specifically for toxicity, that requires a comparison of available bioassay results against the Part II toxicity objectives. For example:

> For both acute and chronic toxicity objectives, the Discharger shall compare available bioassay results for the IWC, conducted in accordance with the Draft Policy, to the toxicity objectives in Part II. A test failure for any species demonstrates reasonable potential for that toxicity objective (e.g., failure of a *Ceriodaphnia dubia* chronic bioassay test would mean reasonable potential has been demonstrated for chronic toxicity, specifically for *Ceriodaphnia*).

This example uses the IWC which accounts for available dilution at critical conditions and acknowledges that there is inherent variability in bioassay results based on a single test concentration. In the event that the State Water Board adopts narrative toxicity objectives, the reasonable potential analysis would rely upon the test procedures defined in the implementation section (e.g., reliance upon hypothesis testing procedures defined in the 40 CFR 136 approved toxicity test methods).

To address staff concerns over the results being based on "an isolated test," the City highlights the following from the Draft Policy:

> *"A minimum of four single-concentration toxicity tests, utilizing the IWC and control, shall be performed for each species used (page 4)."*

Furthermore, it would be far more accurate to increase the minimum number of toxicity tests for major POTW facilities than to contradictorily assert reasonable potential for all major POTWs, and thus require monthly toxicity test monitoring, without ever having reviewed available toxicity test monitoring data. If staff have concerns over the reliability of historical toxicity test data, the Draft Policy could require all major POTWs to collect new toxicity test data, in lieu of existing permit requirements but in accordance with the Draft Policy, within one year of the Draft Policy's effective date.

Staff's assertions on the potential harm from major POTW is a static perspective that the Draft Policy would codify into a static policy without any provision for a discharger to evaluate the assertion or prove otherwise, even using the results of toxicity tests conducted in accordance with the Draft Policy. Unchanged, the Draft Policy will result in the unnecessary expenditure of public funds and is analogous to asserting that certain kinds of waterbodies should be immediately 303(d) listed without regard to monitoring data and without any provision for de-listing.

In the event that reasonable potential is assumed for any discharger, the City supports the Association's Letter that would set a presumed threshold for reasonable potential at 5 mgd or greater. This is consistent with the discharge level used by USEPA as a

threshold for the requirement of industrial pretreatment programs and a like threshold for requiring participation in the Phase I(MS4), point source and non-point source pollution prevention and control.

9. Monitoring Frequency (Part III, Section A-5)
   Discharges at a rate of greater than or equal to 1 mgd are required to conduct monthly chronic toxicity tests.

As previously discussed, the Draft Policy assumes reasonable potential for all major POTW facilities (i.e., >1 mgd) without consideration of historical bioassay results or that some of these facilities are among the newest and most advanced wastewater treatment facilities in the state (for further information see comment #8 on reasonable potential). A 5mgd threshold would be consistent with the USEPA's threshold for the requirement of industrial pretreatment programs. Since the monitoring frequencies are based upon presumed reasonable potential, the City requests the following changes:

> *"NPDES wastewater and point source WDR dischargers that are continuous dischargers and discharge at a rate equal to or greater than one million gallons per day and have demonstrated reasonable potential through a minimum of four toxicity tests per species shall conduct one chronic toxicity test every calendar month for the duration of the permit. NPDES wastewater and point source WDR dischargers that are non-continuous dischargers that discharge at a rate equal to or greater than one million gallons per day and have demonstrated reasonable potential through a minimum of four toxicity tests per species shall conduct one chronic toxicity test every calendar month for the duration of the permit, but only during each period of discharge.*

Staff Report Evaluation of Costs

10. Monitoring Changes Will Result in a Substantial Increase in Cost Without An Increase in Environmental Protection.

The Staff Report for the Draft Policy assumes that there will be cost savings from the elimination of acute toxicity testing and the reliance on a single concentration test with a single species. For the City, the total cost savings is estimated at $23,800 annually. However, several Regional Basin Plans contain language requiring acute toxicity testing. For example, the Sacramento and San Joaquin Rivers Basin Plan states: *"As a minimum, compliance with this* [toxicity objective] *objective as stated in the previous sentence shall be evaluated with a 96-hour bioassay"* (p. III-8.01). Thus the City does

not anticipate saving $8,316 annually in acute monitoring costs as indicated in Staff Report Appendix A.5.

The current NPDES permit requires single concentration chronic toxicity testing during routine monitoring and multi-concentration testing during accelerated monitoring. The Staff Report inaccurately states that the City currently is required to perform routine multi-concentration testing. Since there is no change in the number of dilutions required under the current permit or the Draft Policy, there will be no cost savings related to single versus multi-concentration dilutions.

The Staff Report inaccurately assumes that both City outfalls are operated simultaneously. In the Staff Report, this incorrectly results in a doubling of any potential costs differences. The outfalls are not operated simultaneously, but it is common for both to be operated during the same monitoring period and thus trigger monitoring requirements for both. Since the City typically switches between the outfalls twice a year, this has resulted in six "quarterly" WET monitoring events. Under a monthly monitoring requirement, the City would anticipate up to fourteen monitoring events between the two outfalls.

To estimate the costs of individual toxicity tests relevant for the existing use of NOEC hypothesis testing with PMSD boundaries, the Staff Report makes a reasonable attempt. However, the Draft Policy's use of the TST requires more precise bioassay results in order to refute the default null hypothesis (i.e, would now assume the effluent is toxic) and accurately determine whether the effluent is toxic. Thus, to the extent practicable for each species and given the inherent variability in the biological responses of individual organisms, the City is very likely to require a doubling of test replicates to reduce the coefficient of variation (CV) and increase test precision. For *Pimephales promelas* and *Ceriodaphnia dubia*, doubling the number of replicates increases the cost approximately 50%. For *Selenastrum capricornutum*, doubling the number of replicates increases the cost by 25%.

The Draft Policy requires three-species screening for the "most sensitive species" through a minimum of four tests at least once every five year permit cycle. The Staff Report does not factor in this cost. Given the substantial differences in treatment between the two outfalls (i.e., use of restoration wetlands for treatment), the City will be obligated to conduct three-species screening at both outfalls independently. Since *Selenastrum capricornutum* is likely to be determined as the "most sensitive species,"

the City would then need to test with each of the other two species eight times during the 5-year permit cycle.

The minimum net effect of the Draft Policy over five years is an increase in chronic WET monitoring direct costs of approximately $2,000 ($56,880.50 versus $54,810.00) and no change in acute monitoring costs. This is in stark contrast to the Draft Policy's incorrect calculations of a net savings of $23,800 annually. The complexity of aquatic toxicity assessment results in substantial indirect costs to the City for professional services.

In addition, the Draft Policy requires a 50% increase in the number of accelerated monitoring tests (from four to six). As stated above, use of the TST and the reversal in the null hypothesis necessitates a doubling of replicates to reasonably ensure that the test results accurately reflect effluent quality. Depending on the species, this will result in an approximate doubling of accelerated monitoring cost (i.e., by a factor of from 1.875 to 2.25).

Furthermore, the City believes that deficiencies of the Draft Policy will result in further increased monitoring costs. For example, the toxicological information gained from multi-concentration chronic toxicity testing is substantial (see Comment #13) enough that such information is required during accelerated monitoring. Given the single sample trigger of routine monitoring, the City will likely find it a necessity to use multi-concentration testing to verify the accuracy of routine TST results when faced with the possibility of a minimum of six additional multi-concentration tests. Finally, the blanket allowance by the Draft Policy for a single "most sensitive" species does not comport with sound science and EPA guidance (see Comment #12) which, at a minimum, requires a case-by-case assessment to authorize use of a single species. Thus, the City can find no assurance that Regional Water Boards will not require three-species for routine monitoring.

Instead of focusing resources on mitigating receiving water toxicity, the Draft Policy results in increased routine monitoring costs, not savings, and a doubling of accelerated monitoring costs. In contrast, the real world environmental benefit of the Draft Policy and the TST procedure are not demonstrated.

Toxicity Reduction

The City has worked closely Regional Board staff in regards to compliance with our TRE plan to address issues of low-level unstable toxicity and apparent seasonal toxicity.

There have been significant challenges to identify both the cause of potential toxicity and potential control measures. Challenges arise from the biological nature of wastewater treatment and even more so when using wetlands as an ecologically responsible choice for additional treatment. Other challenges are inherent to municipal wastewater which has low-levels of a variety of constituents. Low-levels are beneficial for the sake of the environment, but difficult to track.

The City's initial experience was a frustrating expenditure of time and resources conducting repetitive TIEs when the apparent toxicity was low-level (<50% effect), unstable (degraded during testing), and intermittent. With Regional Board concurrence the City has focused efforts on a portion of the year showing the largest and most consistent apparent toxicity. The expenditures incurred by the City's actually have increased with such a targeted approach, but the information being gathered is more useful in screening for toxic constituents.

For the City, the Draft Policy would result in a mandatory adherence to the repetitive cycle of TIEs. To the extent discretion would be granted to the Regional Board to direct TRE compliance, once triggered, the City would still be faced with mandatory fines for low-level, unstable, intermittent toxicity. The City believes that the greatest deficiencies of the WET monitoring program relate to when it is appropriate to enter and exit a TRE and what can be accomplished in a TRE. The Draft Policy does not address whether harm is occurring to aquatic life, nor does it provide additional tools or knowledge to address potential toxicity through a TRE.

11. Compliance Schedules (Part III, Sections A-8. B-4, and C-4)
Compliance Schedules in the Draft Policy are <u>not</u> allowed when efforts are taken to achieve compliance with the toxicity objectives.

Procedures for compliance schedules in the Draft Policy differ substantially from SIP procedures for priority pollutants and from the toxicity policy's CEQA Scoping Document. Compliance schedules are identified in the Draft Policy as follows: *"The applicable Water Board has the discretion to grant a compliance schedule to NPDES wastewater and point source WDR dischargers <u>in order to achieve the objectives established in Part II</u>* [emphasis added]." However, the implementation procedures discuss compliance schedules only for the purpose of establishing a toxicity monitoring program (see Part III, Section B-4 and Part III, Section C-4). Furthermore, *"dischargers operating under existing NPDES wastewater permits or point source WDRs containing toxicity monitoring requirements are not eligible to receive a compliance schedule (Part*

III, Section A-8)." There is no discussion or acknowledgement of the steps a discharger would need to take to identify the cause of and control measures for IWC toxicity.

In contrast, compliance schedules identified in the CEQA scoping document (December 2005) are designed to serve as an effective tool to reduce effluent toxicity and thus achieve compliance with toxicity objectives. *"The transition to a numeric limit can be a significant regulatory change and may require a TRE before compliance can be achieved. The use of temporary schedules of compliance, where authorized, could provide regulatory flexibility for dischargers adjusting to new numeric limits. The compliance schedule would include interim limits, a monitoring schedule, and a schedule of deadlines for steps within the TRE process. ... A schedule of compliance for new numeric toxicity limits could be provided for a period as short as practicable, but not exceeding five years. The drawbacks of this option include the potential of assigning violations to POTW dischargers that are genuinely attempting to reduce toxicity through an aggressive TRE process (page 4)."*

The challenges faced by POTW dischargers, in particular, are identified in the CEQA scoping document:

> *"POTWs face the unique challenge of treating a highly variable and partially unrestricted influent. For this reason the State Water Board may consider the use of a separate toxicity limit provision to regulate discharges of this class. For example, when an industrial discharger observes toxicity there is a finite list of possible causes of that toxicity. This creates a fairly straightforward means of investigating and controlling the sources of toxicity. However, toxicity in a POTW's influent could result from a number of sources, including the use of new household products. Investigating and controlling toxicity observed in POTW effluent can be a lengthy and technically difficult process. Source control may include implementing new pretreatment or public awareness programs. The State Water Board may consider the use of narrative toxicity limits exclusively for POTWs in order to avoid penalizing these facilities while they are aggressively pursuing a TRE to control toxicity (page 6)."*

Compliance schedules should be granted to achieve compliance with the toxicity objectives. The toxicity objectives and implementation procedures of the Draft Policy constitute the adoption of new and more stringent objectives and as such are such a substantial change from existing practice that a discharger's compliance with the objectives is unknowable *a priori*. City requests that dischargers be granted a one year

period to collect toxicity test data per the adopted Policy to identify any lack of compliance (i.e., reasonable potential). Furthermore, implementation of U.S. EPA guidance for TRE and TIE procedures requires time to identify potential toxicants and implement control measures to come into compliance. The two year time frame, granted to some dischargers, is arbitrarily defined from permit adoption/reissuance/reopening rather than on time needed to comply with the toxicity objectives in Part II.

As identified above, the use of compliance schedules in the Draft Policy are wholly inadequate to the goal of achieving compliance with the toxicity objectives. Furthermore, they are in stark contrast to the adopted procedures for priority pollutants in the SIP (Section 2.1). The SIP compliance schedule procedures establish need based on an infeasibility analysis and, when granted, require that:

> *"A schedule of compliance shall include a series of required actions to be undertaken for the purpose of achieving a CTR criterion and/or effluent limitations based on a CTR criterion. These actions shall demonstrate reasonable progress toward the attainment of a CTR criterion and/or effluent limitations. The compliance schedule shall include a schedule for completion that reflects a realistic assessment of the shortest practicable time required to perform each task (page 20-21)."*

Adoption of similar language for compliance with the toxicity objectives would not only acknowledge the real challenges and time needed for compliance, but also increase the state's oversight of the process (e.g., by requiring documentation of source control and/or pollution minimizations efforts and a demonstration that the proposed schedule is as short as practicable).

12. EPA Does Not Recommend a Single Most Sensitive Species Approach.

The TSD does not support a single sensitive species approach, unless an effluent has been adequately characterized to justify such an approach. While this would limit the number of tests (and thus costs and violation exposure), it represents a deviation from sound scientific practice established by U.S. EPA.

> *"To provide sufficient information for making permitting decisions, EPA recommends a minimum number of three species, representing three different*

phyla (e.g., a fish, an invertebrate, and a plant) be used to test an effluent for toxicity. However, in some cases, the optimum number of species may be fewer or more depending upon such factors as how thoroughly the effluent has been characterized, the available receiving water dilution, the use classification and existing uses of the receiving water, as well as other special considerations. For example, if an effluent has been characterized as highly consistent, with little chance of variation due to batch processes, changes in raw materials or changes in treatment efficiency, then the use of the two most sensitive species, or even the one most sensitive species, may be appropriate as determined on a case-by-case basis (page 16)."

13. **Multi-concentration Toxicity Testing (Part III, Section A-7)**
Accelerated monitoring requires five-concentration toxicity tests that will provide necessary information to assess the potential threat to aquatic life. Enforcement and violation policies should reflect this.

When a monitoring test fails, the Draft Policy states:

"If a test results in a "fail," dischargers shall initiate an accelerated monitoring schedule approved by the applicable Water Board, no later than fourteen days from the date of the exceedance. At a minimum, an accelerated monitoring schedule shall consist of six, five-concentration chronic toxicity tests, conducted at approximately two-week intervals, over a twelve week period."

U.S. EPA guidance in the TSD cites the need for accelerated monitoring as follows:

"As a practical approach for determining if a TRE is an appropriate response, EPA recommends if toxicity is repeatedly or periodically present at levels above the effluent limits more than 20 percent of the time, a TRE should be required. With toxicity present at this rate, the TRE protocols will be useful."

There is important information to be gained from an examination of a multi-concentration dose response curve. Chapter 4 of *Method Guidance and Recommendations for Whole Effluent (WET) Testing (40 CFR Part 136)* (EPA 821-B-00-004) is dedicated to such reviews. This information can be vital to assessing potential impacts to aquatic life. For example compare the following:

Example A: Toxicity test that shows toxicity at the IWC with a mean response at 80% of control and a decreasing mean response with increasing effluent concentration until there is no biological activity at 100% effluent.

Example B: Toxicity test that shows toxicity at the IWC with a mean response at 80% of control and an inconsistently toxic, variable mean response of 75% – 85% of control with increasing effluent concentration up to 100% effluent.

Example A provides substantial evidence of a dose-response relationship for an unknown toxicant that is capable of causing complete toxicity when undiluted and significant toxicity at the IWC. Example A raises considerable concern that adverse impacts to aquatic life may be occurring at the IWC, particularly if the accelerated monitoring were to demonstrate a repeated, consistent toxicity profile.

In contrast, Example B provides no evidence of a dose-response curve. Rather Example B raises concerns about whether the measured toxicity at the IWC has any biological significance in the effluent let alone in ambient waters.

Given the available information to be gained through accelerated monitoring, including whether TRE protocols may be useful, the City asserts that enforcement and violations policies of the Draft Policy are most rationally determined after the results of the accelerated monitoring are known. Furthermore, the TSD defines a TRE as:

> *"a site-specific study conducted in a stepwise process designed to identify the causative agents of effluent toxicity, isolate the sources of toxicity, evaluate the effectiveness of toxicity control options, and then confirm the reduction in effluent toxicity."*

Thus, finable violations should only be imposed when a Discharger has failed in a timely manner to reduce effluent toxicity and the City requests the following changes:

> ~~*"A test result indicating a "fail" at the IWC during accelerated monitoring is a Class II violation pursuant to the Water Quality Enforcement Policy adopted on November 17, 2009 (Resolution No. 2009-0083)."*~~

Limitations and Compliance

14. Numeric Effluent Limitations (Part III, Section A-2)
Draft Policy incorrectly states that maximum daily effluent limitations are required.

The Draft Policy cites 40 CFR 122.45(d)(1) in requiring maximum daily effluent limitations. However, 40 CFR 122.45(d) (1) explicitly states that the maximum daily effluent limitation requirement is *"for all dischargers other than publicly owned treatment works."* Furthermore 40 CFR 122.45(d)(2) requires, *"Average weekly and average monthly discharge limitations for POTWs."*

In addition, the Draft Policy asserts that *"a single daily discharge of toxic effluent can exceed the water quality objectives established in Part II and impact aquatic life."* Comment #2 has already discussed the tenuous evidence that a single WET result can be linked to environmental harm. Furthermore, the EPA develops aquatic life criteria with the understanding that a single excursion does not result in immediate, irreparable harm. In Section 2.3.5 of the TSD entitled "Frequency for Single Chemicals and Whole Effluent Toxicity," EPA states the following:

> *"EPA derives its criteria intending that a single marginal excursion would result in little or no ecological effect and require little or no time for recovery. If the frequency of marginal criteria excursions is not high, it can be shown that the frequency of severe stresses, requiring measureable recovery periods, would be extremely small. EPA thus expects the 3-year return interval to provide a very high degree of protection (TSD p. 36)."*

Thus given the above and the typical duration of acute (24 to 96 hours) and chronic bioassay tests (4-7 days), the City requests the following changes to the Draft Policy:

> *"Numeric effluent limitations for ~~chronic or~~ acute toxicity shall be expressed as maximum daily effluent limitations and chronic toxicity shall be expressed as average weekly effluent limitations, as allowed ~~referenced~~ in 40 C.F.R section 122.45(d)~~(1)~~. This is based on the differences in test duration between acute and chronic toxicity tests. Because the statistical test endpoint is pass/fail at the IWC ~~This is because a single daily discharge of toxic effluent can exceed the water quality objectives established in Part II and impact aquatic life, and thus~~ it would be impractical to impose ~~average weekly and~~ average monthly effluent limitations.*

15. Compliance Determination (Part III, Section A-7)

A failed test is an exceedance that results in two violations even if the IWC mean response is greater than the toxicity objectives.

The Draft Policy states that a *"test result indicating a 'fail' is an exceedance of effluent limitations and an excursion above the objectives established in Part II."* This, by definition, creates two permit violations for every test failure. Furthermore, a toxicity test can fail the TST procedure when the IWC mean response is greater than the toxicity objectives due to variability in the IWC sample and/or control (i.e., the IWC mean response is less than or equal to 75% of control for chronic toxicity and 80% of control for acute toxicity) (see comments #5 & #6). Thus, the City requests the following changes:

> *"A test result indicating a "fail," when the IWC mean response is ≤75% of control for chronic toxicity or ≤80% of control for acute toxicity, is an exceedance of effluent limitations ~~and an excursion above the objectives established in Part II~~. If a test results in a "fail," and the IWC mean response is ≤75% of control for chronic toxicity or ≤80% of control for acute toxicity, dischargers shall initiate an accelerated monitoring schedule approved by the applicable Water Board, no later than fourteen days from the notification date of the exceedance."*

16. Compliance Determination (Part III, Section A-7)

During accelerated monitoring, a failed test at the IWC is a Class II violation even if the IWC mean response is greater than the toxicity objectives.

The Draft Policy states that a *"test result indicating a 'fail' at the IWC during accelerated monitoring is a Class II violation pursuant to the Water Quality Enforcement Policy adopted on November 17, 2009 (Resolution No. 2009-0083)."* The *Water Quality Enforcement Policy* defines Class II violations as follows:

> *"Class II violations are those violations that pose a moderate, indirect, or cumulative threat to water quality and, therefore, have the potential to cause detrimental impacts on human health and the environment. ... Class II violations include, but are not limited to, the following:*
>
> *... b. Violations of acute or chronic toxicity requirements where the discharge may adversely affect fish or wildlife"*

See comment #2 on links between results and harm to aquatic life in the environment.

Furthermore, the Staff Report discusses establishing statewide excursion/exceedance provisions, but does not provide a justification for a Class II violation. The Staff Report

discussion only highlights that the consistency of uniform requirements would aid implementation and that ensuring TREs are triggered by violations would improve the health of aquatic ecosystems.

In addition, a toxicity test can fail the TST procedure when the IWC mean response is >75% of the control mean for chronic tests or >80% for acute tests due to variability in the IWC sample and/or control (see comment #8). Thus, the City requests the following changes:

> *~~"A test result indicating a "fail" at the IWC during accelerated monitoring is a Class II violation pursuant to the Water Quality Enforcement Policy adopted on November 17, 2009 (Resolution No. 2009-0083).~~ NPDES wastewater and point source WDR dischargers that have a test result indicating a "fail" at the IWC during accelerated monitoring (i.e., the IWC mean response is less than or equal to the toxicity objectives of 75% of control for chronic toxicity and 80% of control for acute toxicity) ~~Class II violation~~ shall conduct a Toxicity Reduction Evaluation (TRE)."*

Corrections

17. The Draft Policy Prioritizes Chronic Toxicity Testing (Part III).

The Draft Policy sets chronic toxicity as the priority over acute toxicity in monitoring, reasonable potential analysis, effluent limitations, etc. This is evidenced by statements such as:

> *"The applicable Water Board shall have the discretion to require reasonable potential analyses for acute toxicity (page 4)."*
>
> *"If required, acute toxicity monitoring shall be conducted at intervals determined by the applicable Water Board (page 6)."*
>
> *"The applicable Water Board has the discretion to include a numeric effluent limitation for acute toxicity (page 7)."*

The justification for this is not apparent in the Draft Policy and is likely confusing to the lay audience that would perceive an acute effect (e.g., mortality) as of greater concern than a chronic effect (e.g., reduced reproduction). The Draft Policy is consistent with U.S. EPA guidance derived from real world toxicity test results, but does not reflect the limitations imposed by some Regional Basin Plans that require acute toxicity testing. Thus, the City requests the following paragraph be inserted as the second paragraph of Part III on page 3:

"The Draft Policy places a priority on chronic toxicity monitoring over acute toxicity monitoring consistent with U.S. EPA recommendations in Section 3.3.3 of the Technical Support Document for Water Quality-based Toxics Control (EPA 505/2-90-001). However, compliance with Regional Basin Plans may not allow for the exclusion of acute toxicity testing."

18. Definitions (Part I)

The "effect level" does not accurately represent the outcomes of the TST procedure.

The Draft Policy defines the "effect level" as an absolute value for both chronic and acute toxicity. However, the TST statistical procedure determines effects at lower levels depending on test variability. If the Draft Policy is adopted with the TST procedures, it is necessary for the "Effect level" definition to accurately acknowledge that chronic effects less than 25% of control and acute effects less than 20% of control can be defined as toxic. Thus, the City requests the following clarifications:

*"**F. Effect level** is the decreased response, relative to control, ~~value~~ that always denotes toxicity in an instream waste concentration sample~~, relative to the control~~. Acute toxicity is always demonstrated at an effect level of 0.20 or greater. Chronic toxicity is always demonstrated at an effect level of 0.25 or greater. Toxicity may be denoted at lower effect levels depending on the outcome of Part III, Section A-6."*