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## State Water Resources Control Board

### APPLICATION FOR ONE EFFLUENT CONCENTRATION ALTERNATIVE TEST PROCEDURE FOR WHOLE EFFLUENT TOXICITY TESTING

December 14, 2023

The California State Water Resources Control Board (State Water Board) hereby applies for United States Environmental Protection Agency (U.S. EPA) Region IX review and approval of a limited-use alternative test procedure (ATP), for the use of one-effluent concentration when conducting whole effluent toxicity (WET) testing, pursuant to 40 Code of Federal Regulations part 136.5 (Aug. 28, 2017), referred to hereafter as "Part 136.5." This application is specific to acute or chronic WET tests in Table 1 of this application when using the Test of Significant Toxicity (TST) statistical approach (U.S. EPA, 2010) for analyzing the data. This request is being sought for all dischargers or facilities in the State of California and their associated laboratories.

#### **Procedures for an ATP Application within California [Part 136.5(a) &(b)]**

Part 136.5 defines who can request an ATP. Under Part 136.5 (a), "[a]ny person may request the Regional ATP Coordinator to approve the use of an alternate test procedure in the Region." Under Part 136.5 (b), the requester "shall first submit an application for limited use to the Director of the State agency having responsibility for issuance of NPDES permits within such State (*i.e.*, Permitting Authority). The Director will forward the application to the Regional ATP Coordinator with a recommendation for or against approval." The requestor is the State Water Board. The State Water Board, along with the Regional Water Quality Control Boards (Regional Water Boards), has responsibility for generation and issuance of National Pollutant Discharge Elimination System (NPDES) permits within California, and for oversight of the NPDES Quality Assurance Program Plan implementation.

The State Water Board Quality Assurance Officer has been granted authority by the Executive Director to submit the limited use ATP Application to the Executive Director. In accordance with Part 136.5 (b), the Executive Director will forward the application to the Regional ATP Coordinator with a recommendation for or against approval.

#### **Name and Address of Applicant [Part 136.5(c)(1)]**

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#### **Existing and Pending Permits [Part 136.5(c)(1)]**

E. JOAQUIN ESQUIVEL, CHAIR | EILEEN SOBECK, EXECUTIVE DIRECTOR

This ATP request is being sought for all dischargers or facilities (Attachment 1. Current Non-Storm Water NPDES Permits as of October 1, 2023; Attachment 2. Current Storm Water and General NPDES Permits as of October 1, 2023) and their associated laboratories (Attachment 3. Laboratories with ELAP Accreditation in WET methods as of December 1, 2023) in the State of California. This request also extends to California dischargers or facilities that may have a new, reissued, renewed, or reopened NPDES permit not listed in Attachment 1.

### **Description of the Requested ATP Parameter [Part 136.5(c)(2)]**

When conducting acute or chronic WET testing in Table 1, this ATP request is to allow for the testing of only a single effluent test concentration and the control, when the statistical approach required for permit compliance or study design is the TST.

### **Justification for using the ATP: Existing and Future Compliance Requirements [Part 136.5(c)(3)]**

The TST (a form of a statistical t-test) is a statistical approach which U.S. EPA has identified (U.S. EPA, 2010) as an option for use when analyzing WET data. In Appendix H (U.S. EPA, 2002b), U.S. EPA recommends a t-test when only testing one concentration of concern: "To statistically compare a control with one concentration, such as 100 percent effluent or the instream waste concentration, a t-test is the recommended analysis."

California requiring the use of the TST approach does not alter promulgated requirements of the test method, such as specified biological and laboratory procedures. As has been affirmed by U.S. EPA, the TST statistical approach can be used with current U.S. EPA approved test methods that require testing multiple concentrations of effluent.

The TST statistical approach determines whether an organism's response to a single concentration (for NPDES permits, referred to as the instream waste concentration or IWC) demonstrates a statistically significant difference from the response to control water.

The result of the TST statistical analysis is either a pass (not toxic) or a fail (toxic). Data from the other concentrations currently required to be conducted under WET test methods in 40 Code of Federal Regulations part 136.3 are not used in this analysis nor in determining whether the test organism response in the IWC and the control differ by a statistically significant amount. Therefore, testing multiple concentrations of effluent as a dilution series is an unnecessary cost and use of time and materials.

There are multiple approved NPDES permits in California requiring the TST statistical approach to determine compliance. As of November 2023, eight of the nine Regional Water Boards have issued NPDES permits requiring the use of the TST statistical approach in analyzing WET data for compliance with effluent limitations or to determine whether additional monitoring or a toxicity reduction evaluation is required. The State Water Board has required the use of the TST statistical approach in other NPDES permits. The State Water Board has included provisions requiring the use of the TST

approach in the California Department of Transportation general permit for storm water discharges (Order No. 2012-0011-DWQ).

In addition, the U.S. EPA has issued NPDES permits requiring the TST as the statistical approach. Examples of NPDES permits issued to Tribes in California that require use of the TST:

- Jamul Indian Village; Hollywood Casino WWTP; Jamul, CA - NPDES Permit No. CA0084284
- Tish Non-Community WWTP, Loleta, CA - NPDES Permit No. CA0084282
- Santa Ynez Band of Chumash Indians WWTP, Santa Ynez, CA - NPDES Permit No. CA0050008

Under the State Water Board's State Policy for Water Quality Control: Toxicity Provisions (Toxicity Provisions), the Water Boards shall require use of the TST by all non-storm water NPDES dischargers and certain storm water NPDES dischargers upon the next permit issuance, reissuance, renewal, or reopening (to address toxicity requirements) after the effective date of the Toxicity Provisions. To comply with the Toxicity Provisions, additional NPDES permits are expected to require use of the TST in the future.

#### **Justification for using the ATP: Precedent for a State-Wide Limited Use ATP [Part 136.5(c)(3)]**

There is a precedent for this application and approval of a state-wide limited use alternative test procedure for the use of one effluent concentration and a control. In 1986 (prior to the current ATP application language defining "limited-use" and "nationwide use" ATPs), the North Carolina Department of Natural Resources requested approval of an alternative test procedure to test one effluent concentration and a control when using the t-test. After review of North Carolina's request and submittal, U.S. EPA Region III approved North Carolina's statewide test procedure utilizing the alternative test condition. This was limited to the State of North Carolina, and not the entire U.S. EPA Region III.

From U.S. EPA's letter to North Carolina Department of Natural Resources 12-17-1986:

"We encourage the use of the *Ceriodaphnia* Pass/Fail Mini-Chronic Bioassay Procedure as a routine requirement in State- issued NPDES permits."

U.S. EPA reaffirmed the approval of North Carolina's use of the alternate test procedure for one effluent concentration in their response to comments regarding the August 17, 2015 Permit Quality Review (U.S. EPA, 2015b): "The EPA acknowledges its prior approval for North Carolina's Alternate WET test procedures ...."

#### **Justification for using the ATP: Economic Discussion [Part 136.5(c)(3)]**

WET testing is an important tool for water quality assessment because it provides a comprehensive assessment of the effects of known toxicants, unknown toxicants, and the synergistic effects of multiple toxicants in water. WET testing is a less expensive alternative for assessing suitable water quality than analyzing for all potential toxicants

in surface water or effluent.

When the permit or study requires using the TST statistical approach, only the results from the control and IWC treatments are used to determine whether the effluent or test sample is toxic.

The current U.S. EPA WET test requirements for testing five effluent concentrations plus a control generates data that are not analyzed nor necessary for determining whether the effluent is toxic at the IWC. The effort in collecting the additional volume of sample, shipping, handling, creating the dilution series, growing and feeding the organisms, and counting the results add unnecessary expense. This requested ATP reduces the resources and cost of the toxicity test method when compared to testing five effluent concentrations and a control as currently required by WET test methods.

The State Water Board conducted a survey of a subset of California laboratories for costs associated with each WET test per species for conducting both five effluent concentrations and one effluent concentration (Attachment 4. Summary of Aquatic Toxicity Test Costs). In all cases where data were available, there were significant cost savings when conducting the one effluent concentration test design compared to the five effluent concentration test design. For example, for the *Ceriodaphnia dubia* chronic test, potential savings ranged from \$141 to \$692, with an average savings of \$243 per test. This estimate does not take into account the costs associated with collecting, handling, and shipping samples for a five effluent concentration test design. Additional cost savings are expected from a reduction in the volume of samples collected, handled, and shipped when conducting the one effluent concentration test design compared to the five effluent concentration test design.

In addition to quantifiable cost savings, there is an additional economy achieved. Certain WET test species are difficult to rear, and sometimes are in short supply for laboratories. This eliminates the waste of those species by not testing the four additional concentrations and the corresponding replicates.

#### **Detailed Description of Proposed ATP [136.5(c)(4)]**

The proposed ATP is to use aquatic toxicity test methods approved in 40 CFR 136.3 and identified in Table 1 of this application with an alternative test condition when using the TST for analyzing the data. In all cases, the alternative test condition is to test only one effluent (IWC) concentration, and not to create and test the currently required four additional dilutions of the effluent, when the statistical approach required for permit compliance or study design is the TST. The requested alternative test condition of one effluent concentration applies to the species in Table 1 of this application, which have determined acceptable maximum false positives (defined as beta when using the TST statistical approach) and false negatives rates (or alpha when using a TST statistical approach) (U.S. EPA, 2010; State Water Board, 2020). Table 1 describes the current test condition applicable to the species and the corresponding requested alternative test condition to test only one effluent concentration. All other current U.S. EPA approved test method requirements applicable to each species and found in the referenced manuals must be met, including test acceptability criteria (TAC).

#### **Comparability Data [136.5(c)(5)]**

Under this proposed ATP, besides the control and IWC (permitted effluent concentration of concern) the additional effluent dilutions do not need to be created and tested. All other test conditions and TAC in the method manuals must be met for the applicable species. Since the WET ATP test method conditions and TAC for the control and permitted concentration of concern are exactly the same as the part 136.3 test method conditions and TAC, performance of the proposed ATP compared to the performance of the reference method are inherently the same with the exclusion of the additional four dilution concentration treatments.

**Table 1. Summary of Existing and Requested Test Conditions**

U.S. EPA Toxicity Test Method	Method Reference	Test Condition and Requested Alternative Test Condition
<b>Chronic Freshwater Methods</b>		
<i>Ceriodaphnia dubia</i> (water flea) Survival and reproduction	U.S. EPA 2002b (EPA- 821-R-02-013)	<b>Page 165 #17. Test concentrations: Effluents: 5 and a control (required minimum)</b> <b>Requested Alternative Test Condition: Test concentrations: Effluents: 1 and a control (required minimum)</b>
<i>Pimephales promelas</i> (fathead minnow) Survival and growth	U.S. EPA 2002b (EPA- 821-R-02-013)	<b>Page 76 #18. Test concentrations: Effluents: 5 and a control (required minimum)</b> <b>Requested Alternative Test Condition: Test concentrations: Effluents: 1 and a control (required minimum)</b>
<i>Selenastrum capricornutum</i> (green alga) Growth	U.S. EPA 2002b (EPA- 821-R-02-013)	<b>Page 211 #15. Test concentrations: Effluents: 5 and a control (required minimum)</b> <b>Requested Alternative Test Condition: Test concentrations: Effluents: 1 and a control (required minimum)</b>
<b>Chronic East Coast Marine Methods</b>		
<i>Menidia beryllina</i> (inland silverside) Survival and growth	U.S. EPA 2002c EPA-821-R-02-014	<b>Page 179 #19. Test concentrations: Effluents: 5 and a control (required)</b> <b>Requested Alternative Test Condition: Test concentrations: Effluents: 1 and a control (required minimum)</b>
<i>Americamysis bahia</i> (mysid) Renamed from <i>Mysidopsis bahia</i> Survival and growth	U.S. EPA 2002c EPA-821-R-02-014	<b>Page 242 #19. Test concentrations: Effluents: 5 and a control (required)</b> <b>Requested Alternative Test Condition: Test concentrations: Effluents: 1 and a control (required minimum)</b>
<b>Acute Freshwater Methods</b>		

U.S. EPA Toxicity Test Method	Method Reference	Test Condition and Requested Alternative Test Condition
<i>Ceriodaphnia dubia</i> (water flea); Survival	U.S. EPA 2002a (EPA- 821-R-02-012)	<b>Page 52 #18. Test concentrations: Effluents: 5 and a control (required minimum)</b> <b>Requested Alternative Test Condition: Test concentrations: Effluents: 1 and a control (required minimum)</b>
<i>Daphnia magna</i> (water flea); <i>Daphnia pulex</i> (water flea); Survival	U.S. EPA 2002a (EPA- 821-R-02-012)	<b>Page 54 #18. Test concentrations: Effluents: 5 and a control (required minimum)</b> <b>Requested Alternative Test Condition: Test concentrations: Effluents: 1 and a control (required minimum)</b>
<i>Pimephales promelas</i> (fathead minnow) Survival	U.S. EPA 2002a (EPA- 821-R-02-012)	<b>Page 56 #18. Test concentrations: Effluents: 5 and a control (required minimum)</b> <b>Requested Alternative Test Condition: Test concentrations: Effluents: 1 and a control (required minimum)</b>
<i>Oncorhynchus mykiss</i> (rainbow trout) <i>Salvelinus fontinalis</i> (brook trout) Survival	U.S. EPA 2002a (EPA- 821-R-02-012)	<b>Page 58 #18. Test concentrations: Effluents: 5 and a control (required minimum)</b> <b>Requested Alternative Test Condition: Test concentrations: Effluents: 1 and a control (required minimum)</b>
<b>Acute Marine Methods</b>		
<i>Americamysis bahia</i> (mysid) Renamed from <i>Mysidopsis bahia</i> Survival	U.S. EPA 2002a (EPA- 821-R-02-012)	<b>Page 60 #18. Test concentrations: Effluents: 5 and a control (required minimum)</b> <b>Requested Alternative Test Condition: Test concentrations: Effluents: 1 and a control (required minimum)</b>

## Summary

The State Water Board requests that U.S. EPA approve the limited-use ATP for the use of one-effluent concentration when conducting WET testing as described in this application. This request is being sought for all dischargers or facilities in the State of California and their associated laboratories. Approval of this ATP will reduce laboratory and permittee's expenses when using the TST statistical approach for analyzing the data.

Please do not hesitate to contact Andrew Hamilton, State Water Board QA Officer, at [Andrew.Hamilton@waterboards.ca.gov](mailto:Andrew.Hamilton@waterboards.ca.gov) with any questions regarding this application.

Attachments:

Attachment 1. Current Non-Storm Water NPDES Permits as of October 1, 2023

Attachment 2. Current Storm Water and General NPDES Permits as of October 1, 2023

Attachment 3. Laboratories with ELAP Accreditation in WET Methods as of December 1, 2023

Attachment 4. Summary of Aquatic Toxicity Test Costs

cc: (Sent via e-mail.)

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