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# NPDES PERMIT NO. TX0054186
# RESPONSE TO COMMENTS

RECEIVED ON THE SUBJECT DRAFT NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT IN ACCORDANCE WITH REGULATIONS LISTED AT 40 CFR 124.17

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PERMIT ACTION: Final permit modification decision and response to comments received on the draft reissued NPDES permit publicly noticed on January 29, 2009.

DATE PREPARED: April 16, 2009

Unless otherwise stated, citations to 40 CFR refer to promulgated regulations listed at Title 40, Code of Federal Regulations, revised as of April 10, 2009.

SUBSTANTIAL CHANGES FROM DRAFT PERMIT MODIFICATION

There are changes from the draft NPDES permit modification publicly noticed on January 29, 2009.

1. The phrase "or below" was removed from sections at Modified Permit: pages 3 and 4 of Part II (Section D.2), page 4 of Part II (Section D.2.a.1.ii), page 11 of Part II (Section D.6.a), and page 12 of Part II (Section E.1.c).

2. A footnote has been added to Outfall 002 that states "When discharging" for all monitoring and reporting requirements.

3. Monitoring frequency for Outfall 002 is changed to daily when discharging.

4. Sample type for Outfall 002 is grab for all parameters.

5. Outfall 002 may use samples obtained from Outfall 001 for permit compliance purposes when Outfall 002 is discharging.

STATE CERTIFICATION

Letter from L'Oreal W. Stepney, Texas Commission on Environmental Quality (TCEQ) to Miguel I. Flores, Environmental Protection Agency (EPA) dated March 9, 2009, waiving state certification.

CONDITIONS OF CERTIFICATION

There are no conditions of state certification.

COMMENTS RECEIVED ON DRAFT PERMIT

Letter from Lauren Kalisek, attorney representing San Jacinto River Authority (SJRA) to Diane Smith (EPA) dated February 27, 2009.

INTRODUCTION (EPA)

The only comments received on the draft permit modification were those made by the permittee. The comments on the Modified Permit are categorized as follows: (1) copper monitoring (2) WET limits and WET testing requirements; (3) monitoring for Outfall 002; and (4) correction of information in the Fact Sheet, and typographical errors. The organization generally conforms to the order of the SJRA comment letter. EPA has summarized comments due to their length and complexity however we have included headings for SJRA's comments for ease of reference to the full comment letter that is attached. EPA responses are interjected within the text of SJRA's comments and are presented with the heading "EPA Response."

DEFINITIONS AND ABBREVIATIONS

2008 STE – San Jacinto River Authority Sublethal Toxicity Evaluation, The Woodlands Wastewater Treatment Plant No.1 submitted to the United States Environmental Protection Agency, November 2008. (See Appendix.)

Application – SJRA's NPDES Permit Application filed with EPA June 1, 2006, and related documents.

C. dubia – *Ceriodaphnia dubia*.

CFR – Code of Federal Regulations.

Chronic Freshwater Guidance – U.S. Environmental Protection Agency. Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms. Fourth Edition; October 2002.
(Available at http://www.epa.gov/waterscience/wet/disk3/ctf.pdf).

DMR – Discharge monitoring report.

EPA – Environmental Protection Agency.

Fathead Minnow – *Pimephales promelas*.

IC25 – 25-percent Inhibition Concentration. The toxicant concentration that would cause a 25 percent reduction in mean young per female for a C. dubia test population or a 25 percent reduction in mean growth for a Fathead Minnow test population.

IP – Procedures to Implement the Texas Surface Water Quality Standards. Document No. RG-194 (Revised). January 2003. (See Appendix.)

Interlaboratory Variability Study – U.S. Environmental Protection Agency, Office of Water. Final Report: Interlaboratory Variability Study of EPA Short-term Chronic and Acute Whole Effluent Toxicity Test Methods, Vol. 1. Document No. EPA 821-B-01-004. U.S. Environmental Protection Agency, Office of Water, Washington, D.C. (Available at http://www.epa.gov/waterscience/WET/finalwetv1.pdf).

MAL – Minimum Analytical Level.

mg/L – Milligrams per liter.

ml – Milliliter.

Modified Permit – NPDES Permit No. TX0054186 for WWTP No. 1 with proposed permit modifications issued by EPA on January 30, 2009.

NOEC – No Observed Effects Concentration.

NPDES – National Pollutant Discharge Elimination System.

PFD – The Administrative Law Judge's Proposal for Decision in TCEQ Docket No. 2003-1213-MWD; SOAH Docket No. 582-04-1194. (See Appendix.)

SJRA – The San Jacinto River Authority.

SOAH – The State Office of Administrative Hearings, Texas.

Standard Methods for the Examination of Water and Wastewater – American Public Health Association, American Water Works Association, and Water Environment Federation. Standard Methods for the Examination of Water and Wastewater. 19th Edition. 1995.

State Permit – The permit issued by the TCEQ on October 16, 2008 for WWTP No. 1. (See Appendix.)

TAC – Texas Administrative Code.

TCEQ – Texas Commission on Environmental Quality.

TCEQ Order – TCEQ's "Order Regarding Application by San Jacinto River Authority for Renewal of TPDES Permit No. 11401-001 in Montgomery County; TCEQ Docket No. 2003-1213-MWD; SOAH Docket No. 582-04-1194." (See Appendix.)

TCEQ Record – The record associated with TCEQ Docket No. 2003-1213-MWD; SOAH Docket No. 582-04-1194, including the hearing transcripts, SJRA's Exhibits, the Executive Director's Exhibits, the PFD, the TCEQ Order and the State Permit. (See Appendix.)

TIE – Toxicity Identification Evaluation.

TNRCC – Texas Natural Resource Conservation Commission (Predecessor to TCEQ)

TPDES – Texas Pollutant Discharge Elimination System.

TRE – Toxicity Reduction Evaluation.

TSD – Technical Support Document for Water Quality Based Toxics Control. Document No. EPA 505/2-90-001.

TSWQS – Texas Surface Water Quality Standards, 30 TAC §§ 307.1-307.10.

WERF Report – Warren-Hicks, Ph.D., William; Benjamin R. Parkhurst, Ph.D.; and Song Qian, Ph.D. Accounting for Toxicity Test Variability in Evaluating WET Test Results. Document No. 00-ECO-1. 2006. (See Appendix.)

WET Variability Document – U.S. Environmental Protection Agency, Office of Wastewater Management. Understanding and Accounting for Method Variability in Whole Effluent Toxicity Applications Under the National Pollutant Discharge Elimination System. Document No. EPA 833-R-0-003. 2000. (Available at http://www.toxicity.com/pdf/epa2000june.pdf.)

WET – Whole Effluent Toxicity.

WQS – Water Quality Standards

The Woodlands – the community served by WWTP No. 1.

WWTP No. 1 – The Woodlands Wastewater Treatment Plant No. 1 that is the subject of the Modified Permit.

WWTP No. 2 – The Woodlands Wastewater Treatment Plant No. 2.

## RESPONSE TO COMMENTS

### I. COPPER MONITORING REQUIREMENTS

SJRA Copper Comment 1:

The IP drafted by TCEQ establishes the procedures and methods by which the TSWQS are implemented through permitting. The IP clearly provides that, in establishing water quality based effluent limits and monitoring requirements, the "average concentration of the effluent data is . . . compared to the daily average limit" and if the "average of the effluent data equals or exceeds 70% but is less than 85% of the calculated daily average limit" monitoring is usually included as a permit condition for the parameter of concern.

EPA Copper Response 1:

The IP does not provide an exact mathematical relationship for percent of pollutant concentration and permit condition. As such, the IP allows the permit drafter to determine when permit conditions other than limits should be imposed in a permit. The discretion provided to the permit drafter is described in the same quotation cited by SJRA:

> "If the average of the effluent data equals or exceeds 70% but is less than 85% of the calculated daily average limit, monitoring for the toxic pollutant will *usually* be included as a condition in the permit." (emphasis added)

The inclusion of the word "usually" provides for discretion by the permit writer. There are no changes made to the Final Permit Modification based on this comment.

SJRA Copper Comment 2: SJRA does not consider screening based on a single data point as a valid regulatory policy. A single data point can always be an error as a result of contamination or flawed laboratory procedure. In addition, if a single data point controls the regulatory decision, the number of samples and length of the period of record are irrelevant. The potential impact of a discharge is dependent on the frequency and magnitude of the substance in the discharge. This should be considered when determining permit limits or monitoring requirements.

EPA Copper Response 2:

EPA cited in the Fact Sheet, Page 9, X(A)(d)(vi), that:

"...monitoring requirements is consistent with the CWA. Under CWA §308(a) and 402(b)(2), EPA has broad discretion to establish monitoring conditions in permits."

EPA believes that, in light of the concern with intermittent whole effluent toxicity issues at this facility, the requirement to monitor for a pollutant that is a known toxicant and which has been documented at elevated levels in the effluent is appropriate. There are no changes made to the Final Permit Modification based on this comment.

SJRA Copper Comment 3:

SJRA states that as part of the justification for the copper monitoring requirement, the Fact Sheet references a statement in a laboratory report for a TIE study conducted by SJRA. On page 8 of the Fact Sheet, it is stated:

"The report [the TIE report] does discuss that reductions in toxicity by activated carbon treatment is an indicator of the presence of an 'organic probably non-polar or metal such as zinc or copper'."

The intent of the statement in the laboratory report is misrepresented in the Fact Sheet. The statement is provided merely to inform the reader regarding the type of substances that might be removed by granular activated carbon, i.e., non-polar organics or metals. Zinc and copper are offered only as examples of the types of metals that may be removed. The statement is not intended to suggest that, in the case of the WWTP No. 1, the probable toxicant is a non-polar organic or zinc or copper. Other TIEs were conducted on samples of effluent from WWTP No. 1 that did not provide an indication that copper was a possible toxicant.

EPA Copper Response 3:

The report states that toxicity was reduced in the sample when an activated carbon treatment was applied. This could indicate the possible toxic presence of a 'metal' possibly copper. There is other evidence indicating that elevated levels of copper have been noted in the effluent. EPA is not concluding that this metal was copper, but EPA believes that obtaining additional information is prudent and reasonable.

No changes were made to the Final Permit Modification based on this comment.

SJRA Copper Comment 4:

SJRA believes that EPA's deviation from the IP and inclusion of a copper monitoring requirement based on a single data point is arbitrary and capricious and an abuse of EPA's discretion. EPA should delete the monitoring requirement for total copper in Part I, Item A.1 and modify the Fact Sheet accordingly.

EPA Copper Response 4:

EPA believes that the TSWQS, TCEQ IP and the CWA allow the permitting authority broad discretion in imposing a monitoring condition for a pollutant. Information made available by the permittee during the application process and previously discussed give EPA sufficient cause to include this monitoring requirement. The Final Permit Modification will have no changes made based on these comments.

## II. WET LIMITS AND WET TESTING REQUIREMENTS

EPA notes regarding the WET comments: SJRA has presented seven parts within the WET section of comments presented over 20 pages of text in its February 27, 2009 letter. For purposes of document management, the seven parts are presented in their original order and with the titles contained in the SJRA comment document. The parts are identified as A thru G in the following WET section with each part having comments and responses.

**SJRA Part A** Imposition of WET Limits (Part I Item A.1 at page 2; Part II Item E)

SJRA WET Comment 1: 2008 STE

EPA's inclusion of WET limits in the Modified Permit completely ignores the 2008 STE submitted by SJRA in November 2008 that concludes that SJRA's sporadic WET test failures are a result of the unusual ionic composition of the dissolved salts in the potable water supply for The Woodlands. The 2008 STE explains that variability of the test organisms' sensitivity to the ionic characteristics of the water supply, including high alkalinity and low hardness, is the cause of the reported test failures. The 2008 STE documents SJRA's three year study to characterize and identify the cause of its reported sublethal test failures, which included:

The information, analysis and conclusion of the 2008 STE all support the conclusion that rather than imposing WET limits, SJRA qualifies for an exemption from such limits. The definition of toxicity in the TSWQS excludes adverse effects caused by concentrations of dissolved salts, when the salts originate in the source water. EPA's failure to consider the 2008 STE in its permitting decision here is arbitrary and capricious and an abuse of discretion.

EPA WET Response 1:

EPA disagrees with the permittee's statement that its 2008 study "...explains that variability of the test organisms' sensitivity to the ionic characteristics of the water supply, including high alkalinity and low hardness, is the cause of the reported test failures." The study conclusion is conjectural and not supported by the data in the study, and apparently premised on the inability of the analyst to identify a specific toxicant causing the exceedances.

The study did not establish that well water that has been treated to attain drinking water quality and purity, then passed through homes, businesses and commercial establishments in a

community with a population of 88,000 people, then routed through a wastewater treatment plant is toxic solely due to the variability of health of the test organisms as relates to the concentrations of salts in the original well water. Even if it were so, the data presented by SJRA is, in almost every case, inconclusive with respect to demonstrating linkage between well water, effluent and sublethal toxicity. For example, on page V-2 of the 2008 Sublethal Toxicity Evaluation (STE) report, six sub-studies based on initial phase observations are listed:

- WET tests of mock effluent
- WET tests of the water supply
- Ion exchange studies
- Evaluations of the effect of colloidal solids
- Evaluations of the effect of conducting WET tests under a $CO_2$ atmosphere
- WET testing using the water flea, *Daphnia magna (D. magna)*

However the results of each of these studies are subsequently dismissed as inconclusive or otherwise not useful.

- WET tests of mock effluent – "The results of WET tests for mock effluent are inconclusive." (from Page VII-4)
- WET tests of the water supply – "As shown, the source water exhibited a range of responses from no effect, to sub-lethal effects, to lethal effects." (from Page VII-5)
- Ion exchange studies – "The Cause of the strong lethal and sublethal effects in the blank is unknown" and, more significantly, "The ion exchange studies provided only limited information regarding whether or not the ionic composition of the effluent is the cause of sublethal test failures." (from Page VII-11)
- Evaluations of the effect of colloidal solids – "Very little was learned from this study." (from Page VIII-1)
- Evaluations of the effect of conducting WET tests under a $CO_2$ atmosphere – "The character of the November sample is somewhat unclear. The November compliance test did not exhibit sublethal effects, but a baseline test of the November 12 sub-sample on December 4 exhibited a reduction in reproduction of 65%. However, in the test of the November sub-samples in ambient air during the February 26 study (which is equivalent to a baseline test), the November 12 sample had a higher rate of reproduction than the control. This result tends to support the premise that sublethal test results are highly variable." (from Page VIII-3)

  EPA NOTE – For a variety of reasons the results from these tests are not reliable.

  1. Samples used in all of these tests were all between three and thirteen weeks old, far past the maximum 72 hour holding time for WET tests. Any original sources of toxicity, especially any volatile compounds that may have been present in the original effluent, may have dissipated, broken down or otherwise been lost during storage.
  2. The tests were performed using 100% effluent and did not consider the allowed dilution. Use of moderately hard lab synthetic water to dilute the effluent, as required for permit compliance tests, would have ameliorated any toxic effects of the effluent, including those that may have been related to hardness and/or pH.

3. For the ambient air tests performed (Table VIII-3), four of the five effluent sub-samples tested demonstrated higher reproduction than the control, even though the pH was not manipulated.

- WET testing using the water flea, *Daphnia magna (D. magna)* – "As shown in Table VIII-4, the *D. magna* had 25% reduced reproduction in the effluent compared to the control. This suggests that *D. magna* is also sensitive to the ion composition of the effluent and is not a practical alternative to the *C. dubia* test." (from page VIII-7)

The chemical analyses section of the study is truncated – the metals analyses performed after 2006 do not include either zinc or copper. Previous analyses of these two metals indicate levels in SJRA's effluent that could cause and or contribute to sub-lethal toxic effects to *C. dubia*. (See "Toxicity of copper, lead and zinc mixtures to *Ceriodaphnia dubia* and *Daphnia carinata*, N.L. Cooper, et al, Ecotoxicology and Environmental Safety, 72, 2009, pp. 1523-1528)

The study also cites similarities between sublethal test failure rates between WWTP No.1, WWTP. No. 2 and mock effluent, however there are not enough comparable test results to validate this conclusion. Over the nine month period between November, 2006 and July 2007 ten mock effluent tests were performed (STE, Page VII-3, Table VII-3). During that period only one test was performed for WWTP No. 2 (STE, Page IX-6, Table IX-3). Seven tests were performed on effluent from WWTP No.1 during the period (STE, Page IV-4, Table IV-2). Further, the results reported in the tables referenced above are inconsistent with respect to comparability. Results reported in Table IV-2 are given only as P/F (Pass or Fail); results reported in Table VII-3 are given as % Difference from Control, and results reported in Table IX-3 are given as % Effluent NOEC. EPA believes that there is no factual basis for the study's summary statement (STE, Page X-3) that "The weight-of-evidence of the STE studies supports a conclusion that the sporadic C. dubia sublethal test failures at WWTP No. 1 are due to the variability in the sensitivity of test organisms to the unusual ionic composition of the groundwater that serves as the water supply for The Woodlands."

EPA also disagrees that the SJRA effluent would qualify for any type of exemption from permit controls that might be allowable via 30 TAC § 307.3(a)(65). That exemption allowance at 30 TAC § 307.2(a)(65) was developed with specific respect to potential toxicity in discharges from facilities in areas of South and West Texas whose water supplies contain lethally toxic levels of total dissolved solids (TDS, or, dissolved salts) and which discharge to streams of similar salinity characteristics. The source water serving the Woodlands community is not comparable to those water supplies; the Woodlands community is not near the water supplies that supported those exemption allowances. EPA and TCEQ have made these allowance exceptions in only a very few situations (e.g., industrial facilities discharging to a saline creek in South Texas and to the Pease River in northwest Texas) where there is a clear and obvious similarity and connection between the TDS levels, ionic constituents and the relative ratios of those ions in the influent, effluent and receiving stream. This has not proven to be the case for SJRA and Panther Creek.

A review of WET data for other major POTWs nearby (within a five mile radius of SJRA Woodlands No. 1 and also using the Chico, Evangeline and Jasper aquifers for their public water supplies) yielded two facilities. For at least the last five years of data reviewed, both facilities

(Shenandoah / TX0093564 and Southern Montgomery County Municipal Utility District / TX0024759) have reported passing all tests (including both the lethal and sub-lethal endpoints) in 100% effluent.

Finally, even if there might be an ionic imbalance issue, and it was situation that was permissible under the TCEQ water quality standards and implementation procedures, SJRA's toxicity data do not support their conclusions. SJRA has reported significant sub-lethal effects at all effluent dilutions, including the lowest concentration tested, 23%. This effluent concentration was diluted with moderately hard lab synthetic water, yielding a test solution of 23% effluent and 77% moderately hard lab synthetic lab water. SJRA has presented no evidence which could conceivably support a relationship between toxicity in effluent dilutions as low as 23% effluent and the ionic composition of the city's water supply. In addition, a lab performing TIE analyses for SJRA suggested organics and/or copper, however analysis of copper was subsequently discontinued.

There are no changes made to the Final Permit Modification based on this comment.

SJRA WET Comment 2: Deviation from IP

The IP only provides for the imposition of lethal WET limits and, then, only in specific cases. The commenter argues that the IP serves as the guiding document establishing how permit limits and requirements are developed to maintain TSWQS. The IP, not the TSD, is the appropriate policy to follow in making a reasonable potential determination as required in 40 CFR 122.44. The commenter argues that the IP has been approved by EPA, and EPA provides no justification for deviation from it. EPA fails to explain how its previous legal evaluation of the IP was incorrect or what circumstances may have changed since 2002 warranting its policy reversal. EPA's failure to abide by the written policy it has approved and implemented in its review of permits for TSWQS, and in the creation of this specific Modified Permit, is arbitrary and capricious and an abuse of its discretion.

EPA WET Response 2:

EPA explained the legal and regulatory status of the IP document and how it operates in the Fact Sheet of the proposed permit modification. EPA develops draft permits to comply with approved State WQS, including designated uses, criteria to protect those uses, and anti-degradation policies, and is therefore not bound by any state guidance or policies that recommend considerations in permitting decisions. Therefore, although EPA will make all efforts to follow the processes provided in the IP, it is not constrained by the Texas IP. EPA has not approved the IP as a revision to State water quality standards under CWA section 303(c). SJRA argues that the Texas IP does not require WET limits for sublethal effects (as opposed to lethal effects). The IP, however, is neither State law nor regulation. The WQS are State law and the WQS protect aquatic life against both lethal and sublethal toxic effects of wastewater discharges. Texas WQS provide that total toxicity limits (WET limits) may be a condition of the permit if toxicity biomonitoring results (WET tests) indicate that the discharge exceeds total toxicity restrictions. 30 Tex. Admin. Code § 307.6(e)(2)(D). Thus, it is clear that, regardless of

the language of the IP, the TSWQS themselves require WET limits in the permit if the discharge has demonstrated sublethal toxicity.

With respect to SJRA's claim that EPA approved the IP, EPA acknowledges that it did comment on and conditionally "approve" the IP as part of the Continuing Planning Process (CPP) required under 40 CFR 130.5(c) and the Memorandum of Agreement between TNRCC and EPA. The State, however, never officially adopted the IP as State WQS and has not revised the IP to meet all of the outstanding conditions in EPA's "approval." TCEQ has not submitted and EPA has not approved the IP as a duly adopted State WQS. See 40 CFR 131.21 (New or revised WQS do not go into effect until they are duly adopted by the state and EPA approves such new or revised standards. The Texas WQS codified at Tex. Admin. Code Chapter 307 remain the applicable and binding WQS, notwithstanding the State policy accommodations in the Texas IP. Thus, EPA must ensure that the WET limits are consistent with the EPA-approved State WQS.

In support of this position, page 2 of the Texas IP document states:

> "This is a guidance document and should not be interpreted as a replacement to the rules. The Texas Surface Water Quality Standards may be found in 30 Texas Administrative Code (TAC) Sections (§§) 307.1-.10.).
>
> When there is a conflict between WQS and other TCEQ rule, the WQS prevail.
>
> §307.2. Description of Standards
>
> * * *
>
> (i) Effect of conflict or invalidity of rule.
>
> * * *
>
> (2) To the extent of any irreconcilable conflict between provisions of this chapter and other rules of the commission, the provisions of this chapter shall supersede.
> Texas Admin. Code § 307.2(i)(2)."

According to this language in the Texas WQS, the WQS supersede any other Texas rule where there is a conflict, and thus would certainly supersede this guidance, even if it were a TCEQ rule.

There are no changes made to the Final Permit Modification based on this comment.

SJRA WET Comment 3: TCEQ Record

EPA's inclusion of WET limits in the Modified Permit directly conflicts with the TCEQ's specific findings of fact and conclusions of law made after an evidentiary hearing conducted before the Texas State Office of Adjudicatory Hearings (SOAH) in 2005 regarding TCEQ's renewal and issuance of the State Permit and the inclusion of a WET limit in that permit.

The commenter also claims that for permitted discharges in Texas, the "reasonable potential" review mandated by 40 CFR 122.44(d)(1)(v) is found in the IP, and that the IP procedures are

not the TSD Reasonable Potential Calculation contained in Appendix G of the Fact Sheet. EPA's deviation from the IP in this case, and its failure to consider or apply the TCEQ Record, including specific findings of fact and conclusions of law established by TCEQ, constitutes an abuse of EPA's discretion and is arbitrary and capricious. EPA cannot simply ignore the extensive TCEQ Record and TCEQ Order addressing the imposition of WET limits in SJRA's permit. Copies of documents comprising the TCEQ Record are submitted as an Appendix to these comments and are incorporated herein for all purposes.

EPA WET Response 3:

The matter before the SOAH concerned test failures only for lethal effects to the C. dubia test species. This permitting action did not consider those WET test results in its determination of reasonable potential. Of the sixty tests performed for C. dubia and eighteen peformed for P. promelas, EPA also dismissed from consideration several other WET test results (reported as test failures) on the basis that the data appeared questionable. This data was from one C. dubia test (12/02/05) and two sub-lethal test failures for P. promelas (12/03 and 03/04) both of which occurred almost five years prior to this evaluation. The test data for C. dubia clearly shows significant sub-lethal toxic effects demonstrated in one-third of the sixty tests reported.

EPA disagrees that it has changed any rules or requirements or has addressed any issue in an arbitrary and/or capricious manner. Region 6 has attempted to apply permit conditions that meet the minimum requirements of the Texas water quality standards and federal NPDES permitting regulations, both of which have been in place and unchanged for many years with respect to WET. SJRA's argument that EPA must adhere to the Texas WQS IP, which are in this case contrary to (and in conflict with) the water quality standards themselves, is without a legal basis.

Following our respective interpretations of both State and federal rules, EPA and TCEQ agreed and presented testimony to the evidentiary hearing that WET limits in the case of SJRA were appropriate. TCEQ does not have an EPA-approved method of determining reasonable potential for WET compliant with its WQS. EPA has communicated this fact, as well as the inadequacy of the State's IP with respect to implementing WET limits based on sublethal effects, to TCEQ and the regulated community on numerous occasions since February, 2005 [see attached EPA letters dated 03/10/09, 08/11/08, 05/16/07, 04/03/07, 03/09/06 (2 letters this date), 05/05/06, 03/18/05 and 02/24/05, and WET workshop agenda for 01/19-20/06].

EPA regulations at 40 CFR 122.44(d)(1) require permitting authorities to perform a reasonable potential analysis for WET and include WET limits in permits based on a finding that reasonable potential for toxic discharges exists. The regulations require that permits protect WQS. All of Region 6's state's WQS provide protection specifically against both lethal and sublethal affects to aquatic life. As a result of a national "Permitting for Environmental Results" (PERS) assessment initiated by EPA national headquarters in June, 2003, EPA Region 6 and its states were found to be less than fully successful in implementation of the WET program. As a result of this review, EPA national headquarters issued action items for elements of the NPDES programs where improvement was needed. EPA national headquarters directed Region 6 "to include acute limits and chronic limits including sublethal effects in permits where WET reasonable potential is demonstrated." Region 6 modified its WET procedures to this concern in

2005 (EPA issues all permits in New Mexico). In response to the Region's efforts two of our states, Louisiana and Arkansas, have submitted and EPA has approved appropriate revisions to their WET implementation procedures. To date TCEQ has not moved forward to implement an acceptable procedure.

There are no changes made to the Final Permit Modification based on this comment.

SJRA WET Comment 4: TSD

EPA bases its reasonable potential analysis on the TSD. The calculation procedure in the TSD results in a requirement for a permit limit if there is ever a single test failure, regardless of how many tests are conducted and regardless of the time period covered. The commenter states that that this is an unreasonable to impose WET limits based on a single test failure. The procedures in the IP for determining when permit limits are required are clearly superior.

EPA WET Response 4:

EPA does base its reasonable potential calculation procedure on the EPA TSD approach. EPA's conclusions are not based on a "single test failure." SJRA's own study explained the number and percentage of test failures reported by SJRA in its compliance discharge monitoring reports:

> "Sublethal WET test failures in the C. dubia test have occurred in 35% of the WET tests conducted since January 2004. Since the critical dilution was increased to 85% in January 2006, the WET test failure rate has been 43%." (STE, Page IV-1)

EPA believes that it would be unreasonable to conclude that all toxicity in every one of SJRA's many test failures is due to test variability, variations in the health of test organisms in test cultures, or other factors over which SJRA has no control. EPA disagrees that only repeated and high levels of test organism lethality can serve as the basis for WET test limits to protect against acute and sub-lethal toxicity. As previously stated, the TCEQ IP is inadequate with respect to determining reasonable potential and providing protection of aquatic life provided for in the Texas WQS, and EPA continues efforts to work with TCEQ to implement the necessary revisions to the IP.

There are no changes made to the Final Permit Modification based on this comment.

SJRA WET Comment 5 (Part A): Instream Impacts

EPA states that it has concluded, based on the rate and magnitude of sublethal test failures that "actual exceedances of the State's narrative water quality standard for the protection of aquatic life have already occurred." Section X.B.6 also contains a statement that SJRA's discharge "in fact causes non-attainment of the State's narrative WQS." EPA offers no factual support for these statements. There are no data presented documenting adverse impacts on aquatic life in the receiving stream for WWTP No. 1's discharge. The existence of an impairment cannot be

inferred from the WET test results because existing studies of relationships between WET tests of effluent and instream biological communities do not demonstrate that, when the only WET test failures are sublethal and infrequent, there is an associated impairment of the instream biological community.

EPA WET Response 5 (Part A):

EPA acknowledges that the Agency (and SJRA) has not conducted or identified in-stream biological tests (comparing baseline to current conditions) to demonstrate actual impairment caused by SJRA's discharge. The EPA Technical Support Document for Water Quality Based Toxics Control (EPA, 1991) reads "EPA's water quality criteria are not threshold levels above which definite measurable instream effects are always expected. Rather, the criteria embody conservative assumptions such that small excursions above the criteria should not result in measurable environmental impacts upon the biota. The data indicate that if the ambient water quality criteria are met, then the biota in the receiving water system will be protected from unacceptable impacts caused by the chemical of concern." The NPDES waste water discharge program regulations were established to *prevent* toxic discharges that may reasonably be expected to lead to an exceedance of the water quality standard. This principal is critical to EPA criteria development for all pollutants. Additionally, the Texas WQS do not require that actual harm that must be observed and remedied through WET limits, but rather require prediction of and protection from such adverse effects.

With respect to whole effluent toxicity, an exceedance of the State's narrative water quality standard for the protection of aquatic life, as well as non-attainment of the State's narrative water quality standard, occurs when a test failure occurs. The Texas water quality standards state:

> Chronic total toxicity, *as determined from biomonitoring of effluent samples*, will be precluded in all water in the state with existing or designated aquatic life uses except in mixing zones and at flows less than critical low-flows, in accordance with §307.8 of this title.

It is not necessary to present data that documents actual instream effects for discharges from SJRA's WWTP No.1. Actual instream data are not required prior to imposing limits to protect aquatic life for *any* pollutant or pollutant parameter.

SJRA WET Comment 5 (Part B):

EPA and others have conducted a large number of studies to establish the extent to which WET test results are predictive of instream impacts on aquatic life. There are no studies that have shown that intermittent failures of only the sublethal endpoint are predictive of instream impacts. In fact, in a report published by EPA in July 1999, prepared by Victor De Vlaming and Teresa J. Norberg-King (A Review of Single Species Toxicity Tests: Are the Tests Reliable Predictors of Aquatic Ecosystem Community Responses? EPA/600/R-97/114) the authors concluded on page 24.

> We appear to be approaching consensus that when significant lethality (and in the case of effluents, assuming accurate dilution has been considered) is seen in toxicity tests, there is a very high potential of aquatic ecosystem impairment. As this connection is accepted, we continue to struggle with the idea that sublethal effects on indicator species can result in detectable adverse ecosystem responses.

EPA WET Response 5 (Part B):

The reference to the quote from EPA/600/R-97/114 must be viewed in context, including the date of the document. The authors describe some of the then-current views within the aquatic toxicologist community based on data and studies available using WET test methods released by EPA in 1991. Those methods have since been revised and improved in several revisions, resulting in much improved data reliability. More importantly, the authors were at this point discussing shortcomings in the use of only one test species to assess the condition of the entire aquatic community in a stream. EPA repeats this same concern several times in its Technical Support Document for Water Quality-Based Toxics Control, 1991 (TSD) - and this is one of the reasons EPA Region 6 requires testing of at least two species.

This does not negate the appropriateness of including WET limits based on sublethal effects. SJRA attacks the scientific validity of sublethal WET testing and limits. SJRA argues that the IP approach, requiring enhanced monitoring and TRE work where there is a WET test failure, is scientifically better than requiring a WET limit. While EPA recommends these actions as the response to any toxicity test failure, it does not do so in lieu of requiring a limit or requiring compliance with a WET limit any more than we do for any other pollutant.

In addition, in Edison vs. EPA, EPA successfully defendend its promulgation of standardized and validated WET tests against a series of challenges, including whether the WET tests were representative. Edison Electric Institute v. EPA, 391 F.3d 1267 (D.C. Cir. 2004). In the Edison Electric Institute case, the Court specifically held that with regard to WET limits (including sublethal limits).

> EPA's decision was informed by years of scientific studies, negotiation, and public notice-and-comment, and it represents the agency's expert judgment regarding the implementation of the aims of the Clean Water Act. Petitioners have not demonstrated that EPA ignored relevant record evidence, contradicted its own policies without explanation, or otherwise acted arbitrarily and capriciously. Edison Electric Institute v. EPA, 391 F.3d 1267, 1274 (D.C. Cir. 2004).

The Court also specifically mentions "chronic toxicity," the testing of which measures, among other things, sublethal effects.

> The role of state permitting authorities also should allay the concern, which petitioners express, that the correlation between laboratory toxicity and instream impacts grows weaker at lower levels of toxicity. Before implementing a test method, EPA must establish that the measured characteristic bears a rational relationship to real-world conditions; the available studies reasonably support

> such a conclusion with regard to chronic toxicity. EPA, Technical Support Document for Water Quality-Based Toxics Control 8 (Mar. 1991) (finding likelihood that data may be explained by randomness, rather than actual correlation, to be 0.1%). Petitioners are worried that they might be subject to excessive restrictions; such limits, however, would be imposed by local authorities, and are not part of the rulemaking under review in this case. The WET test methods offer only a means of measuring compliance with those limits-individual dischargers remain free to challenge their permits, on a case-by-case basis, if they believe that local authorities are regulating at a level that poses only a minimal risk to aquatic life. Id. at 1273.

SJRA may challenge its permit based upon a claim that a particular test failure was not valid, but SJRA cannot challenge its permit on the basis that sublethal WET testing methods in general are not scientifically supported.

SJRA WET Comment 5 (Part C):

SJRA is unaware of any studies since 1999 that have reached a different conclusion (i.e. "that sublethal effects on indicator species can result in detectable adverse ecosystem responses"). In fact, a recent study by the Water Environment Research Foundation [Evaluation of WET Testing as an Indicator of Aquatic Health in Effluent-Dominated Streams: A Pilot Study. 03-ECO-2T. by Jerry Diamond, James Stribling (2007)] found that, "WET test results [of effluent] exhibited few relationships with [instream] bioassessment results, and could not usually predict instream effects even when incorporating actual effluent dilution." It is notable that, in this study, most of the C. dubia and Fathead Minnow WET test failures were sublethal rather than lethal.

EPA WET Response 5 (Part C):

Several non-EPA works published prior to 1999 examined relationships between chronic toxicity (including sublethal effects) and detectable adverse effects in streams. In particular, a study of North Carolina streams found high agreement between chronic WET test results and instream biological conditions (Eagleson, et al, "Comparison of Measured Instream Biological Responses with Responses Predicted Using the *Ceriodaphnia dubia* Chronic Toxicity Test, Environmental Toxicology and Chemistry, Vol. 9, pp 1019-1028, 1990).

> Instream toxicity was predicted with whole effluent toxicity tests. These results were then compared to the observed instream response of the aquatic community. Forty-three comparisons were conducted in freshwater flowing systems using Ceriodaphnia dubia chronic toxicity test procedures and standardized qualitative sampling of benthic macroinvertebrates. In 88% of the comparisons there was agreement between both measures. These data suggest that the use of effluent toxicity testing results as a regulatory tool is effective and appropriate. Comparisons used whole effluent toxicity

> limitations similar to those being written in North Carolina's NPDES permits for discharge to surface waters.

There are also several errors in SJRA's assessment of the Water Environment Research study. First the study itself explicitly warns against drawing such conclusions, as is clearly stated in section 3.10, on page 3-8.

> The foregoing analyses of WET tests and associated quality control analyses conducted in this pilot study *suggest several findings of relevance to the design of a future study* that examines quantitative relationships between WET test results and instream biological condition. Some of these findings are process-related as opposed to technical but are equally important in terms of how WET testing should be conducted in such a study and the types of MQOs (measurement quality objectives) that can reasonably be required. *It is important to note that this was a pilot study with relatively few facilities and laboratories participating. Therefore, one must be cautious in extrapolating the findings observed here to facilities and laboratories in general.* (emphasis added)

In addition, SJRA fails to note that the study states that results for *Ceriodaphnia dubia*, the test species of concern in this permit action, were the least problematic of the three species used in the study's WET testing. The study species showing the greatest toxicity and number of associated problems was an alga, *Selenastrum capricornutum*. Permits issued in EPA Region 6, including the permit for SJRA, do not require this test or test species. Finally, after much wider comparative testing over a period of several years, Ohio EPA determined that bioassessment and WET data did not correlate well – and that WET often *underestimates* instream effects, i.e. biological assessments find impairment that was not predicted by WET testing. In addition, EPA has established policy on independent applicability, which requires permit limits based on the most sensitive criteria a State has established, whether chemical, WET or biocriteria (bioassessment).

There are no changes made to the Final Permit Modification based on this comment.

SJRA WET Comment 6:

The commenter documents that both the NOEC and IC approach are identified as equally acceptable in EPA guidance documents. They provide numerous detailed technical arguments as to why IC should be considered as the preferred approach. Please see comment letter for specific arguments.

EPA WET Response 6:

EPA Region 6, as part of its NPDES oversight of implementing the WET program for its 1100 major dischargers, believes that using NOEC as the endpoint in permits is the best approach to ensuring compliance with the Texas aquatic life criteria. TCEQ, similar to the other four states

in EPA Region 6, has established the NOEC test data evaluation as a condition in all permits issued since Texas was authorized to administer the NPDES permitting program in 1995. Prior to then, EPA Region 6 issued the NPDES permits for Texas and all of those permits also established NOEC data analysis. Since 1989, for the over 500 major discharge permits in Texas, and 1100 in EPA Region 6 States, most have been issued with chronic testing requirements and all of those have established NOEC data analysis. No NPDES permits with chronic testing requirements have been issued with point-estimate data analysis (e.g., IC25) requirements. In response to annual queries on revising the data analysis approach, the NPDES permitting authorities in EPA Region 6, including TCEQ, have elected to retain NOEC analysis.

The test design revisions adopted by Region 6 in 1996 are those given on page 3-10 of EPA's June 2000 guidance document "Understanding and Accounting for Method Variability in Whole Effluent Toxicity Applications Under the National Pollutant Discharge Elimination System," cited by the Petitioner. These changes included narrowing the effluent dilution ratios, using a narrower dilution factor of 0.75 rather than 0.50, and increasing the number of replicates per treatment. This approach, plus the permit requirement that the effluent critical dilution be one of the concentrations tested, ensures that NOEC testing in EPA Region 6 provides a reliable analysis of the data.

EPA has not approved the full "South Carolina PE approach," as referenced in the comments, even for South Carolina. The 40% benchmark has been disallowed as not being adequately protective. The balance of the South Carolina approach is an IC25 (point estimate testing), which that State has adopted for its use. Texas and the other four States in EPA Region 6 have elected to continue using the NOEC approach (hypothesis testing), which is equally supported by EPA's WET test methodologies. EPA Region 6 believes that the hypothesis test as conducted in EPA Region 6 and which measures effects at the actual instream waste concentration tested (the critical dilution), is a more appropriate means of measuring permit compliance than a point-estimate test, which extrapolates an effluent concentration value (not an effluent concentration that was actually used in the test) based on a percent effect.

EPA also disagrees with the comment that an IC25 is more rigorous or appropriate than the NOEC as performed in Region 6. With respect to the SJRA comment regarding EPA's use of a 0.75 dilution series in order to establish the effluent concentrations to be tested, this is the same factor used by TCEQ and the other EPA Region 6 States. The referenced fact sheet statement was included as partial explanation for a program revision EPA undertook many years ago to strengthen the WET test data analysis by reducing the ratio between effluent dilutions (the relative "distance" between effluent concentrations of 100% and 75% is less than the "distance" between effluent concentrations of 100% and 50%.) This approach is long-recognized and included on page 14 in the Quality Assurance section of the EPA promulgated WET test method manual.

> 4.14.6 It should be noted here that the dilution factor selected for a test determines the width of the NOEC-LOEC interval and the inherent maximum precision of the test. As the value of the dilution factor decreases, the width of the NOEC-LOEC interval increases, and the inherent maximum precision of the test decreases. Therefore, when a dilution factor of 0.3 is used, the NOEC could be considered to

> have a relative variability as high as ± 300%. With a dilution factor of 0.5, the NOEC could be considered to have a relative variability of ± 100%. As a result of the variability of different dilution factors, USEPA recommends the use of the dilution factor of 0.5 or greater. As previously noted, the EPA Region 6 (and TCEQ) approaches employ a dilution factor of 0.75.

Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, 4th ed. EPA 821-R-02-013 (USEPA 2002a), page 14.

EPA's WET test method manuals clearly establish that both NOEC and IC provide acceptable endpoints for the purpose of demonstrating compliance with NPDES permit requirements. The WET test method manual referenced above states:

> 8.10.1 The tests recommended for use in determining discharge permit compliance in the NPDES program are multi-concentration, or definitive, tests which provide (1) a point estimate of effluent toxicity in terms of an IC25, IC50, or LC50, or (2) a no-observed-effect-concentration (NOEC) defined in terms of mortality, growth, reproduction, and/or teratogenicity and obtained by hypothesis testing.
> Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, 4th ed. EPA 821-R-02-013 (USEPA 2002a), page 36.

Thus, it is clear that either the IC25 method or the NOEC method will provide scientifically valid WET data analysis. It is entirely within the scientific discretion of the permitting authority to determine which test and analysis to use. In 1989, EPA as the Regional permitting authority, made a scientific determination based on the WET testing methods manuals and the TSD that the NOEC test analysis was the most appropriate test evaluation criteria for the permits for which Region 6 was the permitting authority. The Region re-affirmed its policy in the Region's 2005 WET procedures document. EPA Region 6 and the States in Region 6 have repeatedly chosen to use the NOEC for WET test reporting and have integrated the methodology into their State WQS because the procedures are familiar and generate tests results that are useful and meaningful in the context of those standards.

There are no changes made to the Final Permit Modification based on this comment.

**SJRA Part C.** Use of Test Results Below the Critical Dilution (Part II Items D&E at pgs 2-16)

SJRA WET Comment 7:

NOEC should not be retained as the endpoint for chronic tests. However, if it is, all permit provisions dependent on a determination of NOEC and or the evaluation of test results, should be revised to delete the phrase "and below" and "or below"; including, the following sections of the Modified Permit: pages 3 and 4 of Part II (Section D.2), page 4 of Part II (Section D.2.a.1.ii),

page 11 of Part II (Section D.6.a), and page 12 of Part II (Section E.1.c) and any other provisions where the phrases appear.

EPA WET Response 7:

The phrase "or below" has been removed as requested. However, EPA has added a requirement to report information where the standard statistical analysis indicates significant toxic effects at effluent concentrations of 25%, 33%, 44%, or 59%, regardless of whether significant toxic effects were indicated at the critical dilution of 78%.

The Final Permit Modification will remove the phrase "or below" from the WET section as requested.

**SJRA Part D.** Compliance Determination for Chronic Tests (Part I Item A.1. at p.2 ; Part II. Item E.3.c)

SJRA WET Comment 8: Limits for Other Chronic Toxicants

Permit limits for other parameters that are included to control instream chronic toxicity are not set such that it is a permit violation if there is a single-sample exceedance of the concentration required to maintain WQS at the critical dilution. Typically, the concentration required to maintain WQS applies a 30-day average concentration limit. Since chemical parameters can be analyzed daily, this could be an average of tests performed on 24-hour composite samples, and this limit could be calculated based on as many as 30 samples. The permit limit for a single 24-hour composite sample is twice the 30-day average limit, typically. And the limit for a grab sample is typically three times the limit for the 30-day average. It should also be noted that test results for chemical analyses are substantially less variable than results for WET tests.

EPA WET Response 8:

EPA disagrees. Any single exceedance of a permit limit, for any pollutant chemical or WET, constitutes a permit violation. EPA may use enforcement discretion in how it responds to the violation, including the magnitude of the violation(s) and whether multiple violations occurred during the reporting period. EPA issued guidance on the issue of single WET limit violations in 1995 - "EPA does not recommend that the initial response to a single exceedance of a WET limit, causing no known harm, be a formal enforcement action with a civil penalty" (see EPA Memo "National Policy Regarding Whole Effluent Toxicity Enforcement", 08/14/95, attached). As the commenter states, chemical analyses are generally performed at a much higher frequency than WET testing thus allowing for a statistical estimate. For WET testing which is analyzed on a less frequent basis, every three months at best, it does not make sense to perform such manipulation of test and compliance results.

With regards to the variability associated with WET testing, WET is comparable to the variability associated with chemical analyses. This was noted in the text and footnote 4 on page 7 in Edison Electric Institute v. EPA, 391 F.3d 1267 (D.C. Cir. 2004):

> EPA, on the other hand, finds that the data support the conclusion that these WET test methods exhibit a degree of precision compatible with numerous chemical-specific tests already in use. We credit EPA's conclusions on this point.
>
> and.
>
> [4] The preferred metric for assessing precision is the coefficient of variation (CV), which measures the extent to which multiple measurements tend to depart from their average value. The greater the CV, the less precise the measurement. By computing the CV using toxicity units (TUcs) rather than the percentages originally recorded by EPA, petitioners arrive at a grossly inflated result. For example, analyzing reference toxicant data, Interlaboratory Study at 81-82 tbl.9.8, EPA's approach yields a CV of approximately 0.43—well within the range of EPA's other approved tests, Memorandum from Marion Kelly, EPA Engineering and Analysis Division 1 (Oct. 16, 2002) (CVs of approved chemical methods range from 0.03 to 0.64, and CVs of organic methods from 0.12 to 1.04). Petitioners' approach: however, using the distorting TUc scale, results in a CV of 1.47—more than triple the correct value.
> Edison Electric Institute v. EPA, 391 F.3d 1267, 1274 (D.C. Cir. 2004).

There are no changes made to the Final Permit Modification based on this comment.

SJRA WET Comment 9: Lethal and Sublethal Tests Require Different Regulatory Approaches

Because of differences in test variability and the frequent inability of permittees to conduct a successful sublethal TRE, the sublethal WET permit limits should be different than the lethal WET permit limits.

EPA WET Response 9:

EPA disagrees. SJRA does not identify where EPA Region 6 has "...recognize[d] that a sublethal WET test cannot be implemented the same as a lethal WET test." When Region 6 began implementing sublethal TRE requirements in 2005, it developed the referenced permitting practices as part of an interim approach during a period when concerned parties (e.g., State permitting agencies, the regulated community and labs) began to transition toward enforceable WET testing, including WET limits for sub-lethal toxicity. EPA Region 6 did not intend that that interim regulatory accommodation, which was not accommodated nationally by other permitting authorities, would continue indefinitely. EPA Region 6 believes toxicity should be addressed as quickly and completely as possible in order to prevent exceedances of the State WQS.

See also WET comment 8 for a response to the issue of variability.

There are no changes made to the Final Permit Modification based on this comment.

SJRA WET Comment 10: Predictability of Instream Impacts

The reasonableness of considering a single test failure a permit violation is also called into question when one considers the lack of evidence linking a single test failure to instream biological impacts. A WERF study published in 1999 [Diamond, J., C. Daley, and T. Moore, Evaluating Whole Effluent Toxicity Testing as an Indicator of Instream Biological Condition, Project 95-HHE-1] found that the relationship between WET test failures and instream biological impairments was more likely to exist if a discharger failed at least 25% of their tests. As discussed above, there are no studies that have shown that intermittent failures of only the sublethal endpoint are predictive of instream impacts.

EPA WET Response 10:

EPA disagrees. As in its previous comment on instream impacts, EPA disagrees with the premise that even a single sub-lethal violation represents an acceptable level of discharger compliance, much less a 25% failure rate. [See WET Comment Response 5]

There are no changes made to the Final Permit Modification based on this comment.

SJRA WET Comment 11: Test Variability

Establishing a regulatory requirement that every test must pass is inconsistent with the known variability of the C. dubia test, particularly the reproduction test. Such a standard cannot be achieved regardless of the diligence of the permittee. Compliance should be based on a median value of tests conducted over a 12-month period.

EPA WET Response 11:

EPA disagrees that a 12 month median limit for WET would be consistent with Texas WQS for toxicity. Toxic waste water discharges impair aquatic life and ecosystems on a daily basis and must be addressed as quickly as is reasonably possible. In relative terms, receiving streams are already at a serious ecological disadvantage due to the relative infrequency of WET testing, where only a single test is required to represent the presence or absence of toxicity over a three month period. Such infrequent testing means that the toxicity of discharges from a facility is evaluated for only 3 days out of 90, or about only 3% of the time. Further, as previously explained generalized challenges to both test variability and using test results for purposes of compliance with NPDES permit limits have already been presented to and rejected by the D.C. Circuit. EPA provided a detailed discussion of the variability issue in the Fact Sheet for this permit.

With respect to the proposal for an annual averaging for a WET limit, the stochastic nature of toxic excursions at wastewater treatment plants are influenced by many factors (e.g., inputs of toxic materials to the sewer systems, rain events, and the timing of various other upsets). As such, it is expected that if toxicity is observed in the effluent from a wastewater treatment plant that is operating normally, it may occur on a periodic and episodic basis, as evidenced by toxicity at the SJRA facility. Because only a small portion of the effluent is tested to determine toxicity (three days a month under a monthly chronic testing scheme), there is a significant concern that any toxicity detected in such tests is representative of longer-term toxic impacts to the receiving stream. The damage associated with such impacts is done at the time of discharge. As such, even though annual averaging of test results may appear to indicate no net impacts or exceedances of the WET limits, the periodic excursions of WET limits are of significant concern and should not be discounted. In fact, the period required for recovery of stream systems is expected to require up to a year or more (TSD, pages 29, 36, 72, 98, 134). Therefore, it is necessary to continue to monitor and limit whole effluent toxicity on a more frequent basis in order to prevent longer-term impacts that might be masked by an annual averaging period.

There are no changes made to the Final Permit Modification based on this comment.

**SJRA Part E.** WET Testing Reporting Requirements (Part I Item A.1 at p. 2; Part II Item E.3.b. at p. 16)

SJRA WET Comment 12:

Provide definitions for the terms used.

- Lowest 30-day Average Minimum
- 7-day Minimum
- Daily Average Minimum

Provide for the possibility of reporting more than one test during a reporting period. The repeated use of the words "lowest" and "minimum" in the Reporting Requirements suggest that in the event that SJRA conducts more than one test in a reporting period, EPA is only interested in the lowest NOEC observed and that only the lowest NOEC is to be reported. The section implies that any additional tests demonstrating effluent quality different than the lowest NOEC are basically ignored by EPA and should not be reported.

EPA WET Response 12:

The permit already allows averaging, as appropriate, within the reporting period (once per quarter). The terms "lowest and "minimum" are self-explanatory, have been used for over ten years in numerous permits with WET limits and have never been deemed problematic by other permittees. "Lowest" means the lowest NOEC value, lethal or sublethal, measured in a compliance test for the species during the reporting period (see example below) That value, as directed, is entered into the DMR 7-DAY MINIMUM column. The DMR DAILY AVERAGE

MINIMUM column is used to report the averaged NOEC values, if more than one test was performed for the species during the reporting period.

Reporting Period Results – C. dubia

TEST No. 1 2 3

$NOEC_{(SL)}$ **32%** 76% 76% (32+76+76) / 3 = 186/3 = **62**

The 7-DAY MINIMUM = **32%**
The DAILY AVERAGE MINIMUM = **62%**

While the DMR form only allows one event to be posted per reporting period, the permit instructs the permittee that additional tests may be, but are not required to be, reported with (i,e., attached to) the DMR. A letter explaining the attached test data should also be attached, but is not required. However, when a test failure occurs, the permit automatically increases the testing frequency from once per quarter to once per month, with the results to be reported each month. Permittees are not required to test more frequently than once per month, but they are certainly not prohibited from doing so. Permittees must report the results and include copies of the tests for all additional tests initiated.

There are no changes made to the Final Permit Modification based on this comment.

**SJRA Part F.** WET Compliance Schedule (Part I Item B. at p.4)

SJRA WET Comment 13:

If, however, EPA persists in imposing WET limits and disregarding the TSWQS, the compliance schedule should be revised. Currently, Part I.A of the permit (footnote 10 on page 2) specifies that the WET limits are effective beginning three (3) years after the "permit effective date." The permit effective date is set forth in the permit as November 1, 2007, the date the permit was initially issued. Therefore, the compliance period would end October 31, 2010, slightly over a year and one-half from now. The implementation of the WET limit provisions in the permit was delayed, pending the results of the appeal to the Environmental Appeals Board. The three-year compliance period should not begin until final action is taken with respect to the WET limits.

EPA WET Response 13:

WET limits and the compliance schedule remain in the permit. However, the compliance period for WET will commence with this permit's date of modification. This statement was in the draft and no changes are needed to be made in the Final Permit Modification.

**SJRA Part G.** Trigger for Sublethal TRE, Fathead Minnow (Part II Item II.D.2.a.iii at p.4)

SJRA WET Comment 14:

Section II.D.2.a.iii addresses when a TRE is required if there are sublethal failures of the Fathead Minnow test. This provision should be reworded to state,

> "If any two of the three additional tests demonstrates 40% sublethal effects at the highest dilution tested, the permittee . . . ."

In addition, this paragraph specifies that the Sublethal Effects TRE initiation date will be the test completion date of the "first" failed retest. Since the TRE is not required until there is a second failed retest, this sentence should be revised to establish the TRE initiation date as the test completion date of the second failed retest.

EPA WET Response 14:

The provision has not been revised and SJRA has not explained why the provision should be so revised. All significant toxic effects should be investigated to the maximum level reasonably possible. EPA disagrees with, and SJRA does not provide support for, the statement that "It is not possible to do the TIE studies that are typically necessary to perform a TRE unless there is at least a 40% reduction in the sublethal response, in the highest effluent dilution."

In addition, the permit's TRE requirements for the fathead minnow only establish under what circumstances a sub-lethal TRE must be performed (i.e., only after 3 test sub-lethal failures in a 4-month period). The permit TRE conditions do not include any requirement to perform toxicant identification evaluation (TIE) studies or to identify the specific pollutant(s) responsible for the toxicity. The permit conditions do require the permittee to take measured steps that will lead to reducing the toxicity found in the discharge.

There are no changes made to the Final Permit Modification based on this comment.

## III. OUTFALL 002 MONITORING CLARIFICATION AND CHANGES

SJRA Outfall 002 Summary Comment:

SJRA Outfall 002 Comment 1:

All monitoring and reporting requirements are specified as applicable only "when discharging."

EPA Outfall 002 Response 1:

EPA concurs with the request. The Final Permit Modification shall have a footnote added to Outfall 002 that states "When discharging" for all monitoring and reporting requirements.

SJRA Outfall 002 Comment 2:

Flow is measured continuously when discharging from Outfall 002.

EPA Outfall 002 Response 2:

See Response 1 above.

SJRA Outfall 002 Comment 3:

For all parameters where 24-hour composite samples are required ($CBOD_5$, TSS, and $NH_3$-N), 24-hour composite samples collected at Outfall 001 are sufficiently representative of the discharge quality at Outfall 002. (Samples for Outfall 001 and Outfall 002 are collected at the same location.) Permit limits for each outfall apply to the sample that is representative of both outfalls. Additionally, TRC, pH, and DO measurements for Outfall 001 are sufficiently representative of the discharge quality for Outfall 002. Permit limits for each outfall apply to the sample that is representative of both outfalls.

EPA Outfall 002 Response 3:

EPA concurs with the request with condition. The normal operation of the facility has five-day sampling requirements. The facility uses a 24-hour sampler collecting composite samples for each of those five days. As long as Outfall 002 discharges during the time that the sampler devices are collecting composite samples for Outfall 001, EPA concurs with the request. The samples collected will be representative of both outfalls.

The facility has stated that discharges from Outfall 002 will however be infrequent in both the number of consecutive days and the flow duration per day. Discussions with SJRA have confirmed that discharge to Outfall 002 is by a pump operated by SJRA. Further communications reveal that flow is pumped to Lake Harrison only when the golf course requests it.

With the more restrictive permit limits for Outfall 002 for $CBOD_5$, $NH_3$-N and DO, EPA wants to ensure that discharges into Lake Harrison meet those limitations. Under the infrequent time and limited duration of discharge into Lake Harrison, the Final Permit Modification will require that a sample be obtained each day a discharge is made to Lake Harrison thru Outfall 002. Since SJRA controls the pump, coordination with the golf course would allow the facility to discharge to Lake Harrison during the normal five-day sample schedule when the automatic samplers are in operation. If discharges must be made on either Saturday and/or Sunday however, then samples shall be taken on each day as needed. Since the pump time may be less than a 24 hour time

frame, instead of requiring 24-hour composite samples for TSS, $CBOD_5$ and $NH_3$-N, EPA shall allow grab samples, identical to the other limited parameters for the outfall.

The Final Permit Modification will have a change showing that samples are required each day of discharge into Lake Harrison from Outfall 002. The Final Permit Modification will also show that grab samples type for all parameters is grab samples and that samples taken from the automatic sampler used for Outfall 001 may be used.

SJRA Outfall 002 Comment 4:

Samples are only required once per week on normal workdays of Monday through Friday for all parameters except flow when discharging from Outfall 002.

EPA Outfall 002 Response 4:

EPA does not concur with this request. See EPA Outfall 002 Response 3 above. Since under normal five day operations, the sampling for Outfall 002 is taken at the same time as Outfall 001 and the effluent concentrations for Outfall 002 are more stringent than for Outfall 001, there is no additional burden on the facility for that period of time. EPA Outfall 002 Response 3 above presented the case for discharges to Outfall 002 during Saturday and Sunday. Those added conditions are to ensure compliance with the more restrictive permit limitations for the infrequent and non continuous discharges into Lake Harrison.

There are no changes made to the Final Permit Modification based on this comment.

## IV. CORRECTION OF INFORMATION IN THE FACT SHEET AND TYPOGRAPHICAL ERRORS

SJRA noted Typographical or Factual Data Errors (TFDE) in the Fact Sheet or draft permit.

SJRA TFDE Comment 1:

Permit - Part I Item A.1 at page 2. The two sections on "Effluent Characteristics" for WET include a parenthetical "See Part II, Section F." These references should be revised to state, "See Part II, Section E."

EPA TFDE Response 1:

EPA concurs and the Final Permit Modification will be changed to "See Part II, Section E."

SJRA TFDE Comment 2:

Fact Sheet - Population Information, Item VIII at page 2. The population of The Woodlands is approximately 88,000.

EPA TFDE Response 2:

Noted in the administrative record.

SJRA TFDE Comment 3:

Fact Sheet - Discussion of Permit Limits and Monitoring Requirements for Outfall 002 - Item X.3 at page 5. The last sentence of the second paragraph should be revised to clarify that limits applicable to Outfall 002 do not apply to Outfall 001 on days that discharge occurs at Outfall 002.

EPA TFDE Response 3:

The two outfalls each have their own set of limits and no changes to the Final Permit Modification are needed as a result of this comment.

SJRA TFDE Comment 4:

Fact Sheet - Item X4.b at page 6. This paragraph suggests that biomonitoring requirements apply to Outfall 002 which is inconsistent with the Modified Permit. This language should be clarified.

EPA TFDE Response 4:

The paragraph in question in the fact sheet is discussing critical dilution only. The paragraph does not mention biomonitoring in any regard. Biomonitoring conditions were not included in the draft permit for Outfall 002.

No changes are required to the Final Permit Modification based on this comment.

EPA TFDE Comment 5:

During the review of the Final Permit Modification, an omission in Section E of Part II of the Permit was found. The following item, "1. SCOPE AND METHODOLOGY" was left out just above subpart "a" at the top of the section. The omission has been corrected in the Final Permit Modification.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TX 75202-2733

JUL 24 2009

CERTIFIED MAIL: RETURN RECEIPT REQUESTED (P 7007 2560 0002 7737 2933)

REPLY TO: 6WQ-NP

San Jacinto River Authority
Donald R. Sarich, Division Manager
P.O. Box 7537
Woodlands, TX 77387

Re: Application to Discharge to Waters of the United States Permit No. TX0054186 San Jacinto River Authority, Woodlands POTW No. 1.

Dear Mr. Sarich:

This package constitutes EPA's final permit decision for the above referenced facility. Enclosed are the responses to comments received during the public comment period and the final permit. According to EPA regulations at 40 CFR 124.19, within 30 days after a final permit decision has been issued, any person who filed comments on that draft permit or participated in the public hearing may petition the Environmental Appeals Board to review any condition of the permit decision.

Should you have any questions regarding the final permit, please feel free to contact Laurence Giglio of the NPDES Permits Branch at the above address or by telephone: (214) 665-6639, by fax: (214) 665-2191, or by E-mail: giglio.larry@epa.gov. Should you have any questions regarding compliance with the conditions of this permit, please contact the Water Enforcement Branch at the above address or by telephone: 214-665-6468.

Sincerely yours,

Bill Luthans
Acting Director
Water Quality Protection Division

Enclosures

cc w/enclosures:

L'Oreal Stepney, Water Quality Director, TCEQ

RECEIVED
JUL 31 2009
San Jacinto River Authority
The Woodlands Division

Documents referenced in EPA Response to Comments

San Jacinto River Authority, NPDES Permit No. TX0054186

Attachment 1

Page 10 – Toxicity of copper, lead and zinc mixtures to *Ceriodaphnia dubia* and *Daphnia carinata,* N.L. Cooper, et al, Ecotoxicology and Environmental Safety, 72, 2009, pp. 1523-1528

Attachment 2

Page 13 – EPA letters dated 03/10/09, 08/11/08, 05/16/07, 04/03/07, 03/09/06 (2 letters this date), 05/05/06, 03/18/05 and 02/24/05, and WET workshop agenda for 01/19-20/06].

Attachment 3

Page 18 – EPA's National Policy on Independent Applicability

Attachment 4

Page 21 – EPA's National Policy Regarding Whole Effluent Toxicity Enforcement

# Response to Comments Attachment 1

Page 10 – Toxicity of copper, lead and zinc mixtures to *Ceriodaphnia dubia* and *Daphnia carinata,* N.L. Cooper, et al, Ecotoxicology and Environmental Safety, 72, 2009, pp. 1523-1528
San Jacinto River Authority, NPDES Permit No. TX0054186

Ecotoxicology and Environmental Safety 72 (2009) 1523–1528

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# Toxicity of copper, lead, and zinc mixtures to *Ceriodaphnia dubia* and *Daphnia carinata*

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ABSTRACT

Acute and chronic bioassays were conducted to determine the effects of copper, lead, and zinc mixtures on *Ceriodaphnia dubia* and *Daphnia carinata*. Copper, lead, and zinc combined at up to 5.2, 4.5, and 51.8 μg/L, respectively, did not cause significant mortality during acute exposures, although mixtures of 10.6, 9, and 101.1 μg/L and higher resulted in 65–100% mortality. Binary combinations of Cu+Zn (1.3+13.0 μg/L) and Cu+Pb (1.3+1.1 μg/L) and ternary combinations of Cu+Pb+Zn (1.3+1.1+13.0 μg/L) had a significant effect on reproduction of *C. dubia*. Toxic units and associated confidence intervals were calculated to characterize the nature of metal interactions. In most cases, and based on confidence intervals encompassing a value of 1, most of the metal interactions would be classified as additive. However, a more than additive effect was indicated by the acute tests for both species exposed to Cu+Pb, for *D. carinata* exposed to Cu+Zn, and for *C. dubia* exposed to all three metals.



## 1. Introduction

Industrial and municipal wastewaters and urban stormwater commonly contain combinations of metals such as copper, lead, and zinc in addition to organic residues, all of which may be directly or indirectly released into aquatic receiving systems (Logan and Wilson, 1995; Woods et al., 2002; Otitoloju, 2003; Ross et al., 2003; Birch et al., 2004; Gobeil et al., 2005). As a result, contamination of aquatic ecosystems by mixtures of pollutants is of increasing concern worldwide (Shaw et al., 2006). Unfortunately, water quality guidelines/criteria that establish limits to chemical releases are usually derived from acute and/or chronic bioassays with individual contaminants and so may fail to predict interactions and associated effects of chemicals in mixture (Birge et al., 1992; Parrott and Sprague, 1993; Otitoloju, 2003; Shaw et al., 2006).

Several models have been developed to predict mixture toxicity for both organic and inorganic contaminants (Marking, 1977; Durkin, 1981; Konemann, 1981; Birge et al., 1992; Haas and Stirling, 1994; Logan and Wilson, 1995), and these have commonly indicated additive effects (mixture toxicity is equal to the toxicity that would be expected if the proportional, independent contributions of each toxicant were simply added; Mahar and Watzin, 2005). Recent studies however, have demonstrated that while concentration addition is common, synergistic (more than additive) effects are also often being reported (Franklin et al., 2002; Otitoloju, 2002; Woods et al., 2002). For example, Forget et al. (1999) determined that binary and ternary combinations of pesticides (carbofuran, dichlorvos, malathion) and metals (arsenic, cadmium, copper) exhibited synergistic lethal effects on the marine microcrustacean, *Tigriopus brevicornis*, and Woods et al. (2002) found that chlorpyrifos, profenofos, and endosulfan in binary and ternary combinations had synergistic effects on acute survival of *Ceriodaphnia dubia*. In addition, Kraak et al. (1994) assessed the impact of copper, cadmium, and zinc on the filtration rate of the zebra mussel, *Dreissena polymorpha*, and found synergistic effects for copper and cadmium in mixture. It is the enhanced/synergistic mixture effects that are of the greatest concern for exposed organisms, since these results indicate that toxicity guidelines for individual chemicals could underestimate the overall exposure effect, and therefore would not be protective.

The purpose of this study was to evaluate the acute and chronic single-chemical and mixture effects of three common trace metal contaminants—copper, lead, and zinc—on the cladocerans, *Daphnia carinata* and *C. dubia*. The metal concentrations used bracket the current water quality guidelines for Australia and New Zealand (ANZECC, 2000) and the United States (2002a), and are also similar to levels previously observed in urban stormwater samples collected from selected locations in Adelaide, South Australia (Bidwell and Kumar, unpublished data; Kumar et al., 2002). The objective was then to compare bioassay results with metal guidelines for each region to determine the degree of protection the guidelines would have afforded to the species.

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## 2. Materials and methods

### 2.1. Metal exposures

Acute (48-h) bioassays with copper, lead, and zinc alone and in binary and ternary mixtures were conducted with *C. dubia* and *D. carinata*. Chronic bioassays (7 d) using the metal combinations were also conducted with *C. dubia*. Bioavailable metal exposure concentrations ranged from 1.3 to 81 μg/L for Cu, 1.1 to 69 μg/L for Pb, and 13.0 to 821 μg/L for Zn, with moderately hard water as the diluent. At comparable water hardness (100 mg/L $CaCO_3$), the current water quality guideline level concentrations for these metals in Australia and New Zealand (trigger values) and the United States (Criterion Continuous Concentrations—CCCs) are 3.5 and 9 μg/L Cu, 13.6 and 2.5 μg/L Pb, and 20 and 120 μg/L Zn, respectively (ANZECC, 2000; USEPA, 2002a).

### 2.2. Test procedures

Mass cultures of *C. dubia* and *D. carinata* were maintained in 1 L beakers in a constant-temperature room (25±1 °C) with a 16 h light: 8 h dark photoperiod using white fluorescent lamps. Cultures of *C. cf. dubia* were originally obtained from the Centre for Ecotoxicology, Environment Protection Authority, New South Wales, Australia, and cultures of *D. carinata* were collected from the Department of Environment and Conservation, New South Wales, Australia. The cladoceran species used in this study are native to Australia. Both species were maintained in formulated moderately hard water (80–100 mg/L as $CaCO_3$) prepared according to USEPA (2002b). The culture media for *C. dubia* was supplemented with 2 μg/L selenium (as $Na_2SeO_4$). Daphnids were fed 3 mL of tri-algal mixture of *Pseudokirchneriella subcapitata*, *Chlamydomonas* sp., and *Ankistradesmus* sp., ($10^6$–$10^7$ cells/mL) in addition to 2 mL of a mixture of yeast, cereal leaves, and trout chow (YCT; USEPA, 2002b). Culture water was renewed three times weekly.

Toxicity tests were conducted under the same controlled environmental conditions as used for culturing. Water quality parameters (pH, temperature, dissolved oxygen, conductivity, and water hardness as total $CaCO_3$) were measured at the beginning and the end of acute tests and before and after each renewal during chronic tests. At least three replicates from each concentration and controls were selected randomly for these measurements.

Procedures for conducting acute lethal and chronic tests were based on those described by the USEPA (2002b, c). Static acute tests were initiated by randomly distributing five neonates in each of four replicate beakers per concentration. Chronic tests were initiated by placing one neonate in each of ten replicates per concentration. Survival of brood females and production of young were used as the response variables in the chronic tests.

Metal stock solutions for all tests were prepared by dissolving analytical grade copper sulfate, zinc sulfate, and lead nitrate (Fisher Scientific Inc, Pittsburg, PA) in distilled water. The same stock solutions were used throughout the tests. For mixture toxicity tests, stock solutions of each metal were mixed just prior to renewals to give desired concentrations. Water samples were collected on Day 1, 4, and 7 to determine total metal concentrations during various mixture chronic exposures. Water samples were analysed using a Perkin Elmer Analyst 700 atomic absorption spectrometer (Perkin Elmer Inc., Wellesley, MA). Calibration standards for each metal were made by serially diluting stock solutions with reagent grade water (Perkin Elmer Inc.) and check standards were run along with samples. Detection limits for lead, copper, and zinc were 0.5 μg/L. Bioavailable metal concentrations were calculated based on measured total metal concentrations using the methods outlined in Appendix A of the USEPA Water Quality Criteria (USEPA, 2002a).

### 2.3. Statistical analyses

Median lethal concentrations (LC50 values) were calculated using the trimmed Spearman–Karber method (Hamilton et al., 1977). For chronic tests, the numbers of neonates from the first three broods were expressed per individual and these mean values analysed. Data were tested for normality and homogeneity of variance using Toxstat (1994). Statistical significance was determined at $\alpha = 0.05$. An analysis of variance (ANOVA) with Bonferroni (unequal replicates) or Dunnetts tests (equal replicates) was used to compare treatments and controls. An estimate of the value causing 50% reduction in the number of young produced per female (EC50) was also calculated (Toxstat, 1994).

Toxic interactions were characterized by calculating toxic units (and their corresponding confidence intervals) based on the LC50 or EC50 estimates from bioassays with mixtures and single metals (Spehar and Fiandt, 1986). Specifically, toxic units were derived by dividing the LC or EC50 estimate from the mixture by the corresponding estimate from the individual metal test. If fractions of the individual toxic effects in a mixture equal 1.0, a strictly additive action is indicated; if the total is less than 1.0, the action is more than additive and if it is greater than 1.0, the action is less than additive (Spehar and Fiandt, 1986). For example, the 48-h LC50 for *C. dubia* exposed to copper and zinc alone and in mixture was 18.0 and 208.8 and 6.11 and 72.4 μg/L, respectively. Toxic unit values for this mixture were calculated by dividing 6.11 by 18.0 for copper and 72.4 by 208.8 for lead resulting in values of 0.34 for copper and 0.35 for lead. When combined (0.34+0.35 = 0.69) the value is less than 1.0, indicating that the mixture is more than additive (synergistic). Categorization of the toxic interactions (antagonistic, additive, synergistic) in this study was determined based on whether the confidence intervals for toxic units overlapped 1.0. The LC50/EC50 values and toxic unit analyses were based on bioavailable metal concentrations.

## 3. Results

### 3.1. Water chemistry

Water quality parameters were consistent throughout the tests, ranging as follows: temperature—25.3±0.5 °C; DO—88.3±17.5% saturation; pH—7.5±0.3; conductivity—350.2±38.7 μS/cm; hardness—82.4±6.1 mg/L as $CaCO_3$. For all bioassays, the measured total metal concentrations were within 10% of the nominal concentrations at all times. Bioavailable metal concentrations are used in all reported data that follow (Table 1).

### 3.2. Acute survival

Survival of *C. dubia* and *D. carinata* in acute exposures to metals mixed at different concentrations is presented in Table 2. No significant effects on survival of the daphnids were observed in exposures with all three metal concentrations at or below the current Australian and US water quality values. There was also no significant effect observed at the 5.2 μg/L Cu–4.5 μg/L Pb–51.8 μg/L Zn treatment even though the copper and zinc concentrations exceeded the Australian limits and the lead concentration exceeded the US limits. Survival was significantly reduced in all treatments containing 10.6 μg/L Cu–9.0 μg/L Pb–101.1 μg/L Zn and higher. In these mixtures, at least two of the metals, exceeded the Australian and US limits.

### 3.3. Chronic survival

As with the acute exposures, survival of *C. dubia* was not significantly affected by chronic exposure to any treatments (single metals or binary and ternary mixtures) in which the concentration of the constituents did not exceed either the Australian or the US water quality criteria (Table 3). In some treatments, there was also no effect on survival even though individual metal levels significantly exceeded one or both of the limits. For example, 90% of the test organisms survived the 7-d exposure to 9.0 μg/L Pb, which is 3.6 times higher than the US guideline for that metal. Survival in the 5.2 μg/L copper+51.8 μg/L zinc mixture was also 90% even though both of these levels exceed the respective Australian guideline values. In contrast, survival

**Table 1**
Average nominal, measured, and bioavailable concentrations (μg/L) of copper, lead, and zinc during various exposures.

| Nominal concentration | Measured total concentration (bioavailable concentration) | | |
|---|---|---|---|
| | Copper | Lead | Zinc |
| Control | 1.0 (0.8) | 1.1 (1.1) | 2.0 (2.0) |
| (2.5)/2.5[a] | 3.3 (1.9) | 3.3 (1.1) | 13.2 (13.0) |
| 2.5/25[a] | 2.7 (2.6) | 2.6 (2.1) | 25.5 (25.1) |
| 5.0/50[a] | 5.4 (5.2) | 5.5 (4.5) | 52.5 (51.8) |
| 10.0/100[a] | 11.0 (10.6) | 11.0 (9.0) | 102.5 (101.1) |
| 20.0/200[a] | 21.3 (20.5) | 21.9 (17.9) | 219.5 (216.4) |
| 40.0/400[a] | 40.7 (39.1) | 42.6 (34.9) | 410.7 (405.0) |
| 80.0/800[a] | 84.1 (80.7) | 83.9 (68.7) | 832.5 (820.9) |

[a] Values followed by slash represent nominal concentrations for zinc. Values in parenthesis are the calculated bioavailable concentrations of each metal.

was impaired in the 4.5 µg/L lead+51.8 µg/L zinc treatment, with the lead concentration below the respective Australian levels. Survival was also impaired in all ternary treatments that had a metal level exceeding the Australian or US regulatory limits.

### 3.4. Chronic reproduction

There was no significant difference in the number of neonates produced in the three broods by the *C. dubia* control groups from any of the bioassays conducted, with average production ranging from 18.6 and 20.5 neonates per daphnid (Table 4). Reproduction of *C. dubia* was significantly impaired in single metal exposures for both copper and zinc at concentrations below both the Australian and US guideline levels for these metals. Similarly, a reproductive effect from exposure to lead alone was observed at a concentration below the Australian value for this metal. Impaired reproduction was also observed in all binary mixtures of copper and lead (≥1.3 µg/L for Cu and ≥1.1 µg/L for Pb) and copper and zinc (≥1.3 µg/L for Cu and ≥13.0 µg/L for Zn) and in all ternary combinations of the metals. These effects were observed at concentrations well below the regulatory limits for both countries.

### 3.5. Metal interactions

In order to evaluate the joint action of the metals, an estimate of the median lethal effect concentration (LC50 and EC50) was calculated for metals as single entities and in mixture (Table 5). For the acute exposures, copper was the most toxic to both species followed by zinc and then lead, with *C. dubia* being more sensitive than *D. carinata*. For chronic effects on *C. dubia* reproduction, copper was again the most toxic, followed by lead, then zinc.

The median effect concentrations were also used to calculate toxic units as a way to characterize metal interactions in the mixtures (Table 6). Using this approach, a more than additive effect (synergistic) effect (ΣTU for mixture constituents <1) was indicated by the acute tests for both species exposed to Cu+Pb and for *D. carinata* exposed to Cu+Zn, while a less than additive interaction was indicated for both organisms in acute exposure to Pb+Zn. Acute exposure to the mixture of all three metals leads to a more than additive effect on *C. dubia*. For reproduction of *C. dubia*, the sum of the toxic units indicated a less than additive effect for Pb+Zn, Cu+Zn, and Cu+Pb+Zn combinations during the chronic exposure. For acute survival of *C. dubia* exposed to Cu+Zn, the sum of toxic units was less than 1, but the confidence intervals for these interactions overlapped 1.0, so an additive effect would be assigned to the interaction. Similarly, a more than additive effect

**Table 2**
Survival of *C. dubia* and *D. carinata* in 48-h acute exposures to copper, lead, and zinc.

| Bioavailable metal concentration (µg/L) | | | 48-h Survival (%) | |
|---|---|---|---|---|
| Cu | Pb | Zn | *C. dubia* | *D. carinata* |
| 1.0 | 0.1 | 2 | 100 | 100 |
| 1.3 | 1.1 | 13.0 | 90 | 90 |
| 2.6 | 2.1 | 25.1[a] | 100 | 80 |
| 5.2[a] | 4.5[b] | 51.8[a] | 90 | 85 |
| 10.6[a] | 9.0[a] | 101.1[a] | 35 | 45 |
| 20.5[a,b] | 17.9[a,b] | 216.4[a,b] | 5[c] | 30[c] |
| 39.1[a,b] | 34.9[a,b] | 405.0[a,b] | 0[c] | 0[c] |
| 80.7[a,b] | 68.7[a,b] | 820.9[a,b] | 0[c] | 0[c] |

[a] Concentration exceeds Australian Water Quality Guideline trigger value (95% level of protection, hardness of 100 mg/L $CaCO_3$).
[b] Concentration exceeds US Criterion Continuous Concentration.
[c] Survival significantly different from control at $\alpha = 0.05$.

**Table 3**
Survival of *C. dubia* in a 7-d chronic bioassay of copper, lead, and zinc alone and in combinations.

| Bioavailable metal concentration (µg/L) | | | 7-d Survival (%) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Cu | Pb | Zn | Cu | Pb | Zn | Cu+Pb | Cu+Zn | Pb+Zn | Cu+Pb+Zn |
| 1.0 | 0.1 | 2 | 100 | 100 | 90 | 100 | 90 | 100 | 100 |
| 1.3 | 1.1 | 13.0 | 100 | 100 | 100 | 80 | 90 | 100 | 100 |
| 2.6 | 2.1 | 25.1[a] | 80 | 100 | 100 | 90 | 90 | 90 | 90 |
| 5.2[a] | 4.5[b] | 51.8[a] | 80 | 100 | 80 | 80 | 90 | 60[c] | 60[c] |
| 10.6[a] | 9.0[a] | 101.1[a] | 60[c] | 90 | 70[c] | 50[c] | 70[c] | 50[c] | 30[c] |
| 20.5[a,b] | 17.9[a,b] | 216.4[a,b] | 40[c] | 30[c] | 10[c] | 50[c] | 70 | 40[c] | 0[c] |

[a] Concentration exceeds Australian Water Quality Guideline trigger value (95% level of protection, hardness of 100 mg/L $CaCO_3$).
[b] Concentration exceeds US Criterion Continuous Concentration.
[c] Survival significantly different from control at $\alpha = 0.05$.

**Table 4**
Average (±SD, $n = 10$) number of neonates produced per brood female *C. dubia* in a 7-d chronic bioassay of copper, lead, and zinc alone and in combination.

| Bioavailable metal concentration (µg/L) | | | 7-d Reproduction | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Cu | Pb | Zn | Cu | Pb | Zn | Cu+Pb | Cu+Zn | Pb+Zn | Cu+Pb+Zn |
| 1.0 | 0.1 | 2 | 19.3±2.6 | 20.5±3.4 | 19.9±2.2 | 19.8±2.3 | 18.9±2.6 | 18.6±2.7 | 19.2±2.6 |
| 1.3 | 1.1 | 13.0 | 13.1±3.1 | 17.4±3.5 | 12.1±5.1[c] | 8.3±5.6 | 8.3±3.9[c] | 13.4±4.5 | 8.0±3.7[c] |
| 2.6 | 2.1 | 25.1[a] | 8.4±4.1[c] | 16.8±3.3 | 9.4±5.9[c] | 8.4±4.1[c] | 5.3±3.5[c] | 6.8±5.4 | 5.8±4.1[c] |
| 5.2[a] | 4.5[b] | 51.8[a] | 8.0±5.0[c] | 11.6±5.6 | 8.5±5.8[c] | 4.2±3.9[c] | 4.7±1.9[c] | 5.6±6.4[c] | 4.7±3.2[c] |
| 10.6[a] | 9.0[a] | 101.1[a] | 3.4±3.4[c] | 6.2±7.5[c] | 6.1±0.7[c] | 2.3±2.8[c] | 2.1±4.9[c] | 2.1±3.2[c] | 0.9±1.5[c] |
| 20.5[a,b] | 17.9[a,b] | 216.4[a,b] | 2.7±4.5[c] | 1.7±3.4[c] | 0.1±0.3[c] | 2.0±2.5[c] | 1.3±1.5[c] | 4.3±5.7[c] | 0.0±0.0[c] |

[a] Concentration exceeds Australian Water Quality Guideline trigger value (95% level of protection, hardness of 100 mg/L $CaCO_3$).
[b] Concentration exceeds US Criterion Continuous Concentration.
[c] Reproduction significantly different from control at $\alpha = 0.05$.

**Table 5**
48-h LC50 values (*C. dubia* and *D. carinata*) and 7-d $EC_{50}$ values (*C. dubia* reproduction) for copper, lead, and zinc individually and in binary and tertiary mixtures.

| Metal combinations | *C. dubia* | | *D. carinata* |
|---|---|---|---|
| | 48-h LC50 (μg/L) | 7-d EC50 (μg/L) | 48-h LC50 (μg/L) |
| Copper | 18.0 (14.7–21.8) | 1.8 (1.6–2.1) | 37.5 (29.1–47.5) |
| Lead | 208.8 (160.1–272.2) | 5.1 (3.5–7.5) | 444.0 (330.2–597.1) |
| Zinc | 173.5 (130.6–232.4) | 21.8 (11.5–30.3) | 339.8 (263.4–438.6) |
| Copper+lead | 6.11 (4.9–7.6) | 1.1 (0.8–1.6) | 10.2 (7.9–13.2) |
| | 72.4 (54.4–98.5) | 0.9 (0.6–2.2) | 114.4 (87.4–159.4) |
| Copper+zinc | 6.72 (3.7–12.3) | 1.1 (0.9–1.4) | 16.7 (12.3–22.6) |
| | 67.5 (37.0–123.3) | 11.2 (5.4–16.9) | 145.8 (107.9–197.3) |
| Lead+zinc | 109.7 (83.4–147.8) | 1.6 (1.0–2.5) | 240.1 (174.8–326.5) |
| | 93.0 (67.7–129.2) | 20.0 (9.6–29.2) | 182.0 (138.7–238.8) |
| Copper+lead+zinc | 3.9 (3.1–5.0) | 0.9 (0.7–1.3) | 13.1 (9.5–18.0) |
| | 32.6 (24.7–49.9) | 0.9 (0.6–1.5) | 148.2 (106.6–205.9) |
| | 55.8 (39.7–77.2) | 10.6 (5.1–15.2) | 114.2 (83.1–157.0) |

Numbers in parentheses are 95% confidence intervals.

**Table 6**
Toxic units derived from acute and chronic bioassays with *C. dubia* and *D. carinata* exposed to binary and tertiary combinations of metals.

| Metal combinations | *C. dubia* | | *D. carinata* |
|---|---|---|---|
| | Acute (μg/L) | Chronic (μg/L) | Acute (μg/L) |
| Copper+lead | 0.34 (0.33–0.35) | 0.58 (0.47–0.72) | 0.27 (0.26–0.28) |
| | 0.35 (0.34–0.36) | 0.18 (0.16–0.29) | 0.26 (0.26–0.27) |
| Sum | 0.69 (0.67–0.71) | 0.76 (0.63–1.06) | 0.53 (0.52–0.55) |
| Copper+zinc | 0.37 (0.25–0.56) | 0.58 (0.51–0.68) | 0.45 (0.42–0.48) |
| | 0.39 (0.28–0.53) | 0.52 (0.47–0.56) | 0.43 (0.41–0.45) |
| Sum | 0.76 (0.53–1.09) | 1.10 (1.00–1.24) | 0.88 (0.83–0.93) |
| Lead+zinc | 0.53 (0.52–0.54) | 0.32 (0.28–0.34) | 0.54 (0.53–0.55) |
| | 0.54 (0.52–0.56) | 0.92 (0.83–0.96) | 0.54 (0.53–0.55) |
| Sum | 1.07 (1.04–1.10) | 1.24 (1.11–1.30) | 1.08 (1.06–1.10) |
| Copper+lead+zinc | 0.22 (0.21–0.23) | 0.58 (0.53–0.64) | 0.35 (0.32–0.38) |
| | 0.16 (0.15–0.18) | 0.18 (0.16–0.20) | 0.32 (0.32–0.34) |
| | 0.32 (0.30–0.35) | 0.48 (0.44–0.50) | 0.34 (0.32–0.36) |
| Sum | 0.70 (0.68–0.76) | 1.24 (1.13–1.34) | 1.02 (0.96–1.08) |

Numbers in parentheses are 95% confidence intervals.

was suggested for reproduction of *C. dubia* exposed to Cu+Zn; however the confidence intervals for these interactions also overlapped with 1.0; so an additive effect would be assigned to this interaction as well.

## 4. Discussion

In the present study, no significant effects on acute survival occurred for either *C. dubia* or *D. carinata* when exposed to single metals at or below the Australian trigger or US water quality criteria values (CCC), indicating protection of these organisms under single exposure conditions for short durations (48 h). As with the acute studies, no effects on *C. dubia* 7-d (chronic) survival occurred below the ANZECC trigger or USEPA CCC values. The effect concentrations determined in this study are within ranges found in previous studies assessing the impact of metals on cladocerans; 7–78 μg/L Cu (Naddy et al., 2002; Banks et al., 2003; Mahar and Watzin, 2005; Boeckman and Bidwell, 2006), 19–>2700 μg/L Pb (Spehar and Fiandt, 1986; Schubauer-Benigan et al., 1993; Jak et al., 1996), 1.2–416 μg/L Zn (Schubauer-Benigan et al., 1993; Gillespie et al., 1999; Hyne et al., 2005; Mahar and Watzin, 2005; Shaw et al., 2006).

Of interest to note is the wide range of toxicity values determined in this and prior studies assessing the impacts of metals on cladoceran species. Shaw et al. (2006) attributed some of this inter-laboratory variability to different source populations and differences in culture and test design/techniques. Another potential cause, water hardness (which was not standardized in the results presented from previous research), has also been observed in previous studies to contribute to large variations in toxicity data, with sensitivity to organisms increasing as hardness decreased (Naddy et al., 2003; Sciera et al., 2004). Other water chemistry factors, including pH, alkalinity, and the presence of dissolved organic carbon have also been determined to have a significant effect on the toxicity of metals to cladocerans (De Schamphelaere and Janssen, 2002, 2004; Paquin et al., 2002; Santore et al., 2001; Hyne et al., 2005), with these effects differing significantly between metals and water chemistry parameters (Hyne et al., 2005) Additionally, species sensitivity could be a factor, as previous studies comparing toxicant sensitivity between cladocerans have determined that *Daphnia* sp. are generally more tolerant to pollutants than *Ceriodaphnia* sp. This increase of tolerance has been attributed to *Daphnia* possibly being adapted to withstand more severe fluctuations in environmental conditions that may provide a greater ability to tolerate toxicant stress (Koivisto, 1995; Shaw et al., 2006).

In the present study, 48-h acute survival of *C. dubia* and *D. carinata* exposed to mixtures of lead, zinc, and copper was not significantly reduced when levels of all metals fell below either the US or Australian regulatory limits. Survival was also not affected in some exposures that had a single metal concentration exceeding either the Australian or US regulatory values. A similar result was observed for the *C. dubia* 7-d survival data, with no effects on survival occurring when all metal exposure concentrations fell below the CCC and trigger values.

Of greater importance are those cases in which the concentration of a mixture constituent was below its regulatory value but the mixture had an effect. For example, the treatment at which acute survival effects were first observed, 11 μg/L Cu+11 μg/L Pb+102.5 μg/L Zn, included at least one metal that fell below a trigger value or a CCC (copper and zinc for the Australian trigger values and copper and lead for the US CCC). Survival was also impaired in the 5.5 μg/L Cu+5.4 μg/L Pb+52.5 μg/L treatment from the 7-d *C. dubia* chronic test, even though the levels of both copper and zinc in this mixture were below their respective trigger values and lead was below the CCC value.

This issue became even more pronounced for the *C. dubia* reproduction data, where effects were observed in metal combinations with all constituent levels below their guideline values. Effects of some individual metals were also observed even when their levels were below the US or Australian limits. For example, the metal concentrations in the binary mixture of copper and zinc were 7 × and nearly 10 × less than the hardness-adjusted CCC for these metals. The implication here is that regulatory limits for individual metals may not be sufficiently protective, particularly when the element is occurring in a mixture. It must be noted however, that in recent studies water hardness has been found to have negligible effects on copper toxicity to cladocerans (De Schamphelaere and Janssen, 2002; Hyne et al., 2005; Markich et al., 2005). As a result Markich et al. (2005) suggest that the hardness-corrected algorithm developed as part of the ANZECC guidelines (ANZECC, 2000) is not recommended for assessing copper toxicity to *Ceriodaphnia* or other sensitive freshwater species, including other cladocerans. If this algorithm is not used then the guideline value for copper in freshwater systems is 1.4 μg/L rather than the 3.5 μg/L used in this study. In terms of this

study this would result in no significant effects on *C. dubia* reproduction at copper (single metal exposure) concentrations below the Australian guideline levels. In the mixtures assessed in this study however, even at this lower guideline concentration of 1.4, there is still a significant impact on reproduction for all metal combinations. As one of the aims of this paper was to compare the current guidelines for each region as is, we decided to present our results with the hardness corrections in place.

In the present study, LC50 and EC50 data were used to determine the interactions of metals on the basis of reproduction for *C. dubia*. Using this approach, a more than additive effect was indicated by the acute tests for both species exposed to Cu+Pb, for *D. carinata* exposed to Cu+Zn, and for *C. dubia* exposed to all three metals in mixture. For *C. dubia* reproduction an additive effect was observed for Cu+Pb, while interactions tended toward less than additive for Cu+Zn, Pb+Zn, and Cu+Pb+Zn.

Our findings are similar to those determined in other studies on mixture effects in cladocerans. Mahar and Watzin (2005) assessed the impacts of mixtures of copper, zinc, and diazinon on *C. dubia* survival and reproduction, and determined that for the binary mixture of copper and zinc there was less than additive effects on survival, but for reproduction a more than additive effect was observed. Spehar and Fiandt (1986) assessed the impact of the maximum acceptable toxicant concentrations (MATCs, based on the 1986 EPA Water Quality Criteria; USEPA, 1986) of a mixture of six metals (arsenic, cadmium, chromium, copper, mercury, and lead) on *C. dubia* acute survival and reproduction. The authors found nearly strictly additive effects for the metal mixture on acute survival and reproduction at the MATC concentrations. However, adverse effects on daphnid reproduction were observed at one third the MATC concentrations when in a mixture, indicating that single-chemical water quality criteria were not sufficient to protect some species when other toxicants are present. Shaw et al. (2006) compared toxicity of four daphnid species (*C. dubia*, *D. magna*, *D. ambigua*, and *D. pulex*) to mixtures of zinc and cadmium. Differences in response were observed when zinc was held at the LC15 value and combined with cadmium at the LC50 and LC85 values. In general the responses indicated less than additive effects under these conditions with the exception of *D. magna*, which had greater than additive effects at the LC15 value for each metal and additive effects for all other combinations.

Metal interactions may be influenced by the species being tested, the combination of metals, or water quality (European Inland Fisheries Advisory Commission, 1980; Kraak et al., 1994; Preston et al., 2000; Hagopian-Schlekat et al., 2001; Otitoloju, 2002). Spehar and Fiandt (1986) indicated that the same combination of metals (arsenic, cadmium, chromium, copper, mercury, and lead) showed different interactive effects depending on both the species exposed and the endpoint tested. These authors found that acute exposure of fathead minnows (*Pimephales promelas*) to metal mixtures resulted in more than additive effects whereas chronic exposures were less than additive. However, when daphnids were used as the test organism the effects were almost strictly additive and nearly strictly additive for acute and chronic exposures, respectively (Spehar and Fiandt, 1986).

## 5. Conclusion

The development of water quality guidelines/criteria is a continuous process that needs to be revised periodically as new data become available. In the present study, adverse effects were observed in mixtures of metals at water quality guideline levels, which indicate the importance of considering chemical interactions in water quality management. The effects of mixtures at sublethal levels are of particular importance since chronic exposures may be allowed to persist continuously in some natural environments and these may affect some aquatic biota.

The data generated in this study reiterate the results of previous studies that have reported effects of metal mixtures on aquatic species even when individual metal concentrations are at maximum acceptable concentrations or are at no-observable effect concentrations (Spehar and Fiandt, 1986; USEPA, 2003). In addition, these results reinforce statements made by previous authors that longer duration exposures and toxicity tests examining mixture effects need to be considered when determining guideline levels for contaminants (Spehar and Fiandt, 1986; Biesinger et al., 1986).

## Acknowledgments

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# Response to Comments Attachment 2

Page 13 – EPA letters dated 03/10/09, 08/11/08, 05/16/07, 04/03/07, 03/09/06 (2 letters this date), 05/05/06, 03/18/05 and 02/24/05, and WET workshop agenda for 01/19-20/06].

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TX 75202-2733

MAR 10 2009

Mr. Dan Eden, Deputy Director
Office of Permitting and Registration (MC-122)
Texas Commission on Environmental Quality
P.O. Box 13087
Austin, TX78711-3087

Dear Mr. Eden:

Thank you for the opportunity to review and comment on the draft proposals Texas Commission on Environmental Quality (TCEQ) has developed with respect to the "Procedures to Implement the Texas Surface Water Quality Standards" (IPs) guidance document. Our detailed comments are included as an attachment to this cover letter.

In February 2005, the Environmental Protection Agency Region 6 (EPA) initiated a process, in conjunction with its National Pollutant Discharge Elimination System (NPDES)-authorized State counterparts, to come into full compliance with federal regulations applicable to implementation of whole effluent toxicity (WET) under the NPDES system and the Clean Water Act (CWA). As we have previously discussed, the CWA requires, at a minimum, that authorized States implement procedures to 1) assess reasonable potential for WET during permit development, and 2) include WET limits in permits where reasonable potential for WET is demonstrated through toxicity testing, based on lethal or sub-lethal effects.

Over the past four years, EPA and TCEQ have coordinated closely in their efforts to ensure that NPDES requirements are met. EPA has provided training, materials and documentation regarding the minimum federal requirements for WET, and both agencies have engaged in numerous conference calls and meetings at the staff and management levels to bring resolution to this issue. We have also met with several groups representing the public and regulated community interests. EPA has twice extended its WET program revision date, most recently to June 30, 2008, to accommodate TCEQ. EPA previously provided comments on TCEQ's proposed IP WET revisions by letter dated May 23, 2008. Subsequent to those comments, and following further discussions with TCEQ, I personally met with staff and management at EPA Headquarters and advanced on TCEQ's behalf an alternative proposal for determining WET reasonable potential.

Based on EPA's review of the IP revisions for WET released by TCEQ in the public meeting on January 7, 2009, on which we are now providing comment, we are concerned about an apparent widening of the gap between what EPA is comfortable with, and what TCEQ is proposing. For example, "Option 2" in TCEQ's previous IP proposal has been eliminated from

the most recent proposal. As discussed previously, Option 2 was the only approach proposed by TCEQ which EPA believed, with more definition, might have provided a basis for an approvable method of determining reasonable potential for WET. As previously stated, EPA cannot approve the approach TCEQ is currently considering for its WET reasonable potential determination. In addition, as previously discussed in EPA's May 23, 2008, comments on TCEQ's revised IPs, and as reiterated in the attachment to this letter, there are a number of other WET implementation issues with which EPA has serious concerns.

We look forward to continuing work with you and your staff on the protection of water resources. If you have any questions, please contact me at (214) 665-7101 or have your staff contact Claudia Hosch at (214)-665-6464 (Email: hosch.claudia@epa.gov).

Sincerely,

Larry Wright for

Miguel I. Flores
Director
Water Quality Protection Division

Enclosure

cc: Tiemann Sidney, TCEQ

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TX 75202-2733

AUG 11 2008

**CERTIFIED MAIL: RETURN RECEIPT REQUESTED (7007 1490 0000 3068 9334)**

Dan Eden, Deputy Director
Office of Permitting, Remediation and
Registration
Texas Commission on Environmental Quality
P.O. Box 13087
Austin, TX 78711-3087

Dear Mr. Eden Dan

As you are aware, the Environmental Protection Agency (EPA) Region 6 initiated a process with its State counterparts in February 2005, to come into full compliance with the State and Federal regulations applicable to the State-authorized National Pollutant Discharge Elimination System (NPDES) implementation of whole effluent toxicity (WET) requirements. These minimal requirements consist of 1) a procedure to assess reasonable potential (RP) for WET during permit development (40 CFR §122.44(d)(1)(ii)) and 2) where reasonable potential for WET is demonstrated (based on lethal and/or sub-lethal effects), the inclusion of WET limits in permits.

EPA Region 6 originally established January 2007, as the date for States to adopt appropriate procedures and/or regulatory requirements to ensure that permits will control WET in effluent discharges consistent with applicable Federal and State requirements. Several States requested additional time, citing the need to implement appropriate regulatory changes. In my letter of May 16, 2007, I extended the date to June 30, 2008, to accommodate this request. This deadline is consistent with direction from EPA Headquarters as noted in the April 3, 2007, memorandum from James A. Hanlon, previously provided to the Texas Commission on Environmental Quality (TCEQ).

As you know, the Arkansas and Louisiana Departments of Environmental Quality (ADEQ and LDEQ) have both chosen to adopt EPA's Technical Support Document (TSD) approach; however it is our understanding that the TCEQ is revising its water quality standards implementation procedures to address RP and to include sub-lethal WET limits in permits. We would appreciate an update indicating the status of those efforts, approaching milestone targets, and the expected date of completion. While we understand that the TCEQ is in the process of developing its own approach to assessment of RP, and we are willing to assist you in its development, the option of using EPA's approach as outlined in the TSD remains available. However, until TCEQ has an EPA-approved methodology in place, we will utilize the TSD approach as the basis for evaluating draft TCEQ discharge permits. If our preliminary review indicates that RP for WET exists, we will notify TCEQ of our preliminary concerns via a general objection to the draft permit.

In order for EPA to determine whether draft TCEQ discharge permits meet the applicable requirements, the following information is required as part of the package submitted to EPA Region 6:

1) A summary of all WET data reported for the five-year period prior to permit application, including passing tests, failing tests, tests reported as invalid, and the laboratory conducting the testing. The report format should include each test date, the NOEC/LOEC for lethal effects, and the NOEC/LOEC for sub-lethal effects (for chronic testing).

2) The WET RP analysis should be included as an attachment to the permit fact sheet. The RP procedure should show all calculations and data used. If RP is found to exist but a WET limit is not included, the permit fact sheet must, consistent with our permitting regulations, explain clearly and in detail why the limit is not included and how the proposed action will ensure compliance with the applicable State water quality standards and federal regulations. Any special considerations or instances where a test result has been modified or changed should be noted.

EPA Region 6 remains committed to providing support and technical assistance as its States move to adopt the necessary procedures and/or regulatory revisions to ensure that the States will control WET in effluent discharges consistent with applicable Federal and State requirements. Please advise me as to the status of the regulatory changes TCEQ is developing. Should you have any questions regarding the issues set forth in this letter please contact me or have your staff contact Claudia Hosch at 214-665-6464 or via e-mail at: hosch.claudia@epa.gov.

Sincerely yours,

Miguel I. Flores
Director
Water Quality Protection Division

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TX 75202-2733

MAY 16 2007

Mr. Dan Eden, Deputy Director
Office of Permitting, Remediation and Registration (MC-122)
Texas Commission on Environmental Quality
P.O. Box 13087
Austin, TX 78711

Subject: Revisions to Whole Effluent Toxicity (WET) Components of the Environmental Protection Agency (EPA) National Pollutant Discharge Eliminations System (NPDES) Program

Dear Mr. Eden:

In February 2005, I initiated an effort whereby each of our Region 6 States was to work with Region 6 to develop requirements to establish WET limits for sub-lethal effects (e.g., growth or reproduction), where required by applicable water quality standards, to fully comply with NPDES regulations at 40 CFR Part 122.44(d)(l). My March 9, 2006, letter to you stated my concern that failure to fully adopt all WET requirements in a timely manner places both the Texas Commission on Environmental Quality and Region 6 at risk with respect to administration of the NPDES permitting program. As an integral part of this effort, I requested that Region 6 States begin to develop a mutually acceptable strategy directed toward implementing a predictive approach to determining reasonable potential for whole effluent toxicity (WET). I established a target date for States to be in full compliance by January 2007. In support of this effort, Region 6 has provided training and technical assistance to its States, permittees, WET labs and contractors, and has developed a WET permitting strategy which has been made publicly available. Unfortunately, in the two years provided, none of the Region 6 States authorized to administer the NPDES permitting program has completed the tasks necessary to achieve full compliance with the applicable federal regulations, or with the individual State water quality standards which ensure protection of aquatic life. With the exception of Louisiana, no State has submitted a draft of proposed revisions.

I recently received a memorandum from the Office of Wastewater Management (OWM) on this program deficiency. Pursuant to this memo, Region 6 is establishing a date of June 30, 2008, for its States to complete all tasks necessary, to establish an EPA-approvable method of predicting reasonable potential for WET limits based on lethal and/or sub-lethal effects. I ask that you provide within 30 days a written response to me which includes all pertinent actions you have completed to date and a timeline including dates and activities by which these tasks will be

performed to meet the deadline established by the EPA Office of Water memo. In the interim, EPA Region 6 will continue to object to permits where a WET limit is not included in the permit and reasonable potential exists based on an effluent toxicity testing history of reported multiple lethal and/or sub-lethal WET test failures (i.e. significant lethal or sub-lethal effects demonstrated at or below the effluent critical dilution).

Region 6 is committed to working closely with you to answer questions, resolve impediments to State NPDES WET program revisions and to provide any support you and your staff may need to implement these requirements. If you have questions or would like to discuss this further you may call me or your staff may contact Claudia Hosch at (214) 665-6464 or via e-mail at hosch.claudia@epa.gov.

Sincerely,

Miguel I. Flores
Director
Water Quality Protection Division

Enclosure

Identical State-specific letters sent to:

Ms. Mary Leath, ADEQ
Mr. Chuck Brown, LDEQ
Mr. Derek Smithee, OWRB
Mr. Jon Craig, ODEQ

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

4/3/07

OFFICE OF WATER

**MEMORANDUM**

**SUBJECT:** Permitting for Environmental Results (PERs) Update

**FROM:** for James A. Hanlon, Director
Office of Wastewater Management

**TO:** Miguel Flores, Director
Water Quality Protection Division, Region VI

Thank you for your memo of March 1, 2007, responding to our February 2, 2007 request for regional progress updates on NPDES program areas identified through the Permitting for Environmental Results (PER) process as not fully meeting the basic program requirements. While progress has been substantial overall, Region 6 has not met the established target for full implementation of the whole effluent toxicity (WET) program by its NPDES-authorized States.

As you will recall, in December 2004, the Region committed to full implementation of the 1989 NPDES regulations for WET at 40 CFR 122.44(d)(1) by January 2007. The two-year delay was granted at the request of Region 6 in order to allow Region 6 NPDES-authorized States time to make appropriate program document revisions and complete public participation and any legislative processes that might be necessary. The primary program deficiencies identified for Region 6 and its States are: 1) the lack of a reasonable potential determination method that is predictive, rather than reactive, and 2) the failure to include WET limits in permits based on the reasonable potential for sub-lethal toxicity where required by State water quality standards.

According to past Region 6 PER action item updates, Region 6 began fully implementing the 1989 NPDES WET regulations in Federal permits upon issuing its NPDES WET Permitting Strategy to all of its States in May 2005. Region 6 also began fully implementing the NPDES WET regulations in its Regional permits for New Mexico. In its most recent PER status update, Region 6 reported that the Louisiana Department of Environmental Quality (LDEQ) is expected to fully implement the WET regulations by mid-2007. However, the update noted that other Region 6 States have not made similar progress in implementing the regulations. We are concerned with the status of NPDES program revisions for Arkansas, Texas, and Oklahoma, none of which have committed to completion dates for full implementation of the NPDES WET regulations. As previously noted, NPDES permits, including State-issued permits, must fully implement all applicable State and Federal NPDES regulations.

Region 6 should contact its State counterparts to establish a formal timeline that includes all actions to date and the future interim actions and dates that will ensure full compliance with the relevant Federal regulations by no later than June 2008. Please submit this information along with your plan of action for any States that do not commit to full implementation of the NPDES WET program by June 2008. After this date, Region 6 should take the necessary steps including exercising its authority to object to any State permit that does not fully implement EPA NPDES regulations and to issue Region 6 Federal permits for State agencies that fail to make the appropriate permit revisions. During the interim, Region 6 should continue its current practice of objecting to permits where a facility's toxicity testing history clearly indicates the reasonable potential for WET.

cc: Judy Davis, OWM
William Honker, R6
Claudia Hosch, R6
Willie Lane, R6
Phillip Jennings, R6
David Gillespie, R6 ORC
Linda Boornazian, WPD
Thomas Laverty, WPD
Patrick Bradley, WPD
Pooja Parikh, OGC
Lee Schroer, OGC
Marcus Zobrist, WPD
Laura Phillips, WPD

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TX 75202-2733

MAR 09 2006

Ms. L'Oreal Stepney, Director
Water Quality Division (MC-145)
Texas Commission on Environmental Quality
P.O. Box 13087
Austin, TX 78711-3087

Dear Ms. Stepney:

The Environmental Protection Agency (EPA) appreciates the opportunity to provide recommendations on the upcoming revision of the document titled, *Procedures to Implement the Texas Surface Water Quality Standards.* Our comments are enclosed and include several items that were not resolved in the current version. EPA provided recommendations for the revision of the *Texas Surface Water Quality Standards* in December 2005.

We look forward to continuing work with you and your staff on the protection of water resources. If you have any questions, please contact Jane at (214) 665-7135, Claudia at (214) 665-6464 or staff in the NPDES Permits Branch or Ecosystems Protection Branch

Sincerely,

Sharon Tracy Parrish
for Jane B. Watson, Ph.D.
Chief
Ecosystems Protection Branch (6WQ-E)

Claudia Hosch
Claudia Hosch
Chief
NPDES Permits Branch (6WQ-P)

cc: Sidne Tiemann, TCEQ - Water Quality Assessment Section (MC-150)

**EPA recommendations for revisions to**
***Procedures to Implement the Texas Surface Water Quality Standards***

**General Comment**

The proposed revisions include a number of instances where case-by-case decisions will be made. The Environmental Protection Agency (EPA) recognizes the need for flexibility in regulatory permitting decisions and has no objection to the State establishing implementation on a case-by-case basis where there are special conditions or circumstances. However, since permit conditions in State-administered National Pollutant Discharge Elimination System (NPDES) programs must adhere to both state water quality standards and the Clean Water Act (CWA), EPA believes it is important to include a general statement in the Implementation Procedures clearly establishing that case-by-case permitting decisions are subject to EPA approval (e.g., Page 44, Deriving Permit Limits for Human Health Protection; Page 52, Once-Through Cooling Water Discharges; Page 62, Alternate Analytical Test Methods; Page 66, Screening Procedures and Permit Limits for Total Dissolved Solids; Page 77, (WET) Test Frequency; Page 91, TDS Toxicity in Chronic and 48-Hour Acute Tests; Page 91, Toxicity Attributable to Ammonia).

**Determining Water Quality Uses and Criteria**

Page 3, Unclassified Waters. EPA recommends revising the second sentence under "Perennial Waters" as follows: "In accordance with results from statewide ecoregion studies, the critical low flow in unclassified perennial streams in the eastern and southern portions of Texas (shown as area "A" on Figure 1, page 6) may be modified ~~are assigned dissolved oxygen criteria~~ as described in 30 TAC §307.7(b)(3)(A)(ii)" and in the section of this document entitled "Eastern and Southern Portions of the State" on page 10. The caption for figure 1 should also be modified.

Where a discharge creates a perennial flow in an intermittent stream, the reach below the discharges should be assumed to have an aquatic life use and protected at the appropriate level for conventional and toxic pollutants. The federal regulation at 40 CFR §131.10(g)(2) for designation of uses states "natural, ephemeral, intermittent or low flow conditions or water levels prevent the attainment of the use, unless these conditions may be compensated for by the discharge of sufficient volume of effluent discharges without violation of State water conservation requirements to enable uses to be met." EPA recommends that the additional language be included in the Implementation Procedures to address this issue.

**Antidegradation**

Page 26, General Provisions (last paragraph); page 27, Applicability to Specific Parameters "Listings based on narrative standards"; and, page 28, Procedures for Discharges to Listed Water Bodies (first paragraph). These provisions include language that is inconsistent with the federal regulations cited at 40 CFR §122.44(d) and 40 CFR §131.12. Limitations must control

all pollutants that may be discharged at levels that will cause or contribute to an exceedance of a state water quality standard. In addition, the antidegradation policy must be implemented so that the quality of waters necessary to support designated and presumed uses are maintained. Therefore, in these cases, controls (i.e., permit limitations) to prevent additional loadings from new and existing dischargers are required if the listed pollutant is present in the effluent.

**Mixing Zones and Critical Conditions**

Pages 40-43, Critical Conditions for Aquatic Life Protection. As discussed above, where an effluent discharge creates a perennial flow, the reach below the discharges should be assumed to have an aquatic life use.

**Toxic Pollutants**

Pages 51-85. We recommend that TCEQ consider the development of policy and procedures related to implementation of bioaccumulative pollutants which may accumulate in bottom sediments and fish tissue. This is particularly important since existing human health criteria are derived using bioconcentration factors rather than bioaccumulation factors.

Pages 62-67, Establishing Permit Limits for Toxic Pollutants without Criteria. When calculating permit limits for toxic pollutants without criteria, the state should screen the reported value against both the MAL (if available) and a screening value (to protect aquatic life, human health or both) in order to evaluate the water quality significance. If the reported value can be quantitatively supported (i.e., the methodology was appropriate to arrive at a definitive value below the "default MAL"), monitoring and permit limits should be considered.

Pages 67-70, Correcting for Background Concentrations. We recommend including sources of background data in this section. Permit writers should evaluate readily available sources of ambient data, such as TCEQ's Surface Water Quality Monitoring database, to determine if background data for appropriate parameters are available for permit development.

**Whole Effluent Toxicity Testing (Biomonitoring)**

As proposed by EPA Region 6 in several letters and meetings during 2005, EPA believes it is necessary for TCEQ to revise its whole effluent toxicity (WET) permitting procedures. This will require that TCEQ modify its implementation procedures to ensure full compliance with federal regulations at 40 CFR §122.44(d)(1) with respect to developing a predictive reasonable potential process for WET limits and to begin incorporating WET limits for sub-lethal effects (such as growth and/or reproduction). EPA expects TCEQ permits to be issued with the required changes by January 2007. EPA is working on updates to the various WET language templates and these will be provided for TCEQ's review and comment in the near future. Since the TCEQ water quality standards already provide for protection of aquatic life at the sub-lethal effects, the implementation procedures should be revised with respect to WET limits for sub-lethal effects.

Pages 101-102, Applicability. EPA recommends that TPDES permits for minor dischargers include WET testing (and limits as appropriate) where: 1) reasonable potential for instream toxicity exists due to the discharge of potentially toxic levels of chlorine, ammonia, or other toxic compounds, and, 2) the facility discharges directly to a receiving stream designated as critical habitat for, or is known to support an aquatic species listed as threatened or endangered.

Regarding chlorine discharges from minor facilities, TPDES permits for minor privately-owned treatment works (POTW) discharge facilities often include a requirement that the facility maintain a total chlorine residual of 1- 4 mg/l prior to final discharge. Minor POTWs that discharge these levels of residual chlorine to receiving waters without significant dilution constitute a serious potential for instream toxicity. EPA regulations do not exclude minor discharges from toxicity requirements. EPA and TCEQ have addressed potential toxicity from minor discharges, so a precedent exists to support modifications to the Implementation Procedures.

EPA's Post Third-Round NPDES Permitting Strategy prioritizes permit issuance and limits with the first priority being facilities with known or suspected toxicity problems. Chlorine is specifically mentioned in the following excerpt:

> Chlorine: Permits for facilities with the potential for a continuous discharge of chlorine will include water quality-based effluent limits for Total Residual Chlorine. Water quality-based limits will be derived from the state water quality standards giving consideration to appropriate dilution factors, state implementation procedures or federal criteria if no state standard has been approved.

TCEQ should revise the Implementation Procedures and permitting practices to include either WET testing or dechlorination requirements and total residual chlorine limits for those minor POTW (< 1.0 MGD design flow) facilities which may pose a toxic threat based on available dilution. We believe that a basis for this modification already exists on page 101 in the Implementation Procedures in the following bullets for domestic discharges:

> The [TCEQ] requires WET testing of domestic wastewater dischargers that have any of the following conditions:
> - an average permitted flow of 1 MGD or greater
> - a final phase of their permit with a design flow of 1 MGD or greater
> - an approved pretreatment program with significant industrial users discharging into their collection systems
> - **the potential to cause toxicity in the receiving water.** [emphasis added]

Pages 105-107, WET Testing Frequencies. This section should be clarified to reflect that the minimum WET monitoring frequency starts out at once per quarter for each new permit cycle (i.e., every fifth year). It should also be clarified to reflect that the frequency reduction does not apply to facilities which were previously monitoring for the life of the permit at a frequency of once per quarter.

Page 111, Toxicity Reduction Evaluations (TREs). This section should be revised to clarify the process by which a sub-lethal TRE and limits will be required. An approach similar to that used for lethality effects would be appropriate.

Pages 113-114, Toxicity Control Measures. This section should be revised to explain how TCEQ will assess reasonable potential for WET limits for lethal and sub-lethal effects in a manner that meets all applicable state and federal requirements. The state's current practice for establishing WET limits does not meet the requirements of the CWA or federal regulations at 40 CFR §122.44(d)(1)(ii) and (iv). The regulation is specific in requiring a reasonable potential determination during permit development and including WET limits where reasonable potential exists. The discharge of toxics in toxic amounts is to be controlled to preclude instream toxicity, that is, permit limits must be placed in NPDES permits to ensure toxic discharges which may impact aquatic life do not occur. The current WET permitting procedures allow multiple toxic events to occur before a multi-year toxicity study is performed, followed by a compliance schedule of, usually, three years, before a permit limit becomes effective. To allow permittees time to become familiarized with WET and toxicity studies, EPA Region 6 followed this practice when it first began implementing WET requirements in permits. However this practice does not comply with the permitting regulations, and Region 6 can no longer support its use. Region 6 has developed and is using a predictive reasonable potential determination procedure that it believes meets the minimum federal requirements. TCEQ may use this procedure or develop an equivalent one for EPA's review.

Pages 113-114, Toxicity Control Measures (Chronic and 48-Hour Acute). Please note that federal regulations at 40 CFR §122.44.d.1(v) require the permitting authority to demonstrate in the permit fact sheet that the chemical-specific (CS) limit or best management practice (BMP) is adequate to prevent toxicity before it can be substituted for a WET limit. Where a CS or BMP is substituted for a WET limit, the WET testing frequency must be adequate to ensure that the alternate limit is working.

Page 125, Toxicity Attributable to Diazinon. Under item 2, TCEQ should clarify that effluent monitoring for Diazinon must be performed concurrently with WET testing to ensure that data collected is meaningful. In the last paragraph, TCEQ must clarify that if sub-lethal or lethal toxicity persists, the permittee will resume the TRE. TCEQ may also want to include a discussion regarding the use of piperonyl butoxide (PBO) to neutralize Diazinon toxicity when an additional toxicant is suspected. (Also see comment below for Table 9)

**TPDES Storm Water Permits**

Page 130, Discharges to Impaired Waters. Under "Constituents of Concern," language in the first paragraph must be revised to read "...TMDL or TMDL implementation plan is only eligible..." to ensure compliance with federal regulations and to ensure that permits for reissuance or major amendments for existing dischargers include TMDL requirements. If a

TMDL has been approved by EPA, permits must be issued in accordance with the TMDL, regardless of whether a separate implementation plan will be developed. Permits must establish controls where the discharge of pollutants have the reasonable potential to cause or contribute to the impairment of the water body. In addition, permits must also establish conditions to ensure consistency with the requirements of an approved water quality management plan approved by EPA, as cited in 40 CFR §122.44(d)(6).

**Site-Specific Standards and Variances**

Page 135, Coordinating with EPA. The provision states that EPA will confer with the U.S. Fish and Wildlife Service. It is not clear if this term refers to the review of the permit, the variance or both items. Although EPA coordinates with the Services on draft TPDES permits, consultation under §7 of the Endangered Species Act is still required on revisions to water quality standards where there may be an effect on federally listed species. It may not be possible to complete ESA consultation on the variance within the 45-day review period of the draft permit. A determination of "approvable" can usually be made within 45 days. Also, the public comment period on the TPDES permit must be completed before EPA approves a variance to the water quality standards.

Page 136, Temporary Standards and page 139, UAAs for Typical Sites. The provisions for Temporary Standards and UAAs are acceptable; however, an important part from 40 CFR §131.10(g) has not been included in the bullets for "natural, ephemeral or low-flow conditions or water levels prevent the attainment of the use." The federal regulation includes the above language plus the following "unless these conditions may be compensated for by the discharge of sufficient volume of effluent discharges without violation of State water conservation requirements to enable uses to be met." EPA recommends that the additional language be included in the Implementation Procedures and will consider this factor in review of temporary standards and UAAs.

Pages 143-144, Site-specific Numeric Standards for Aquatic Life (Bioavailability of specific toxic substances of concern, as determined by water-effect ratio tests or other analyses approved by the agency). TCEQ may wish to include some of the recent policy decisions such as use of the streamlined method for saltwater WERs and use of 48-hour tests with *Americamysis bahia* with copper nitrate as the spiking solution

Page 146, Site-Specific Standards for Total Toxicity (Indigenous aquatic organisms that may have different responses to particular toxic materials). It would be useful to cite the updated procedures for recalculating aquatic life criteria found in Appendix B of EPA's guidance document, *Interim Guidance on Determination and Use of Water-Effect Ratios for Metals*, EPA-823-B-94-001, 1994.

**Appendix C**

Table 3 - Locations of Federally Endangered and Threatened Aquatic and Aquatic-Dependent Species in Texas.

One of TCEQ's response comments on an earlier version of the Implementation Procedures stated that Table 3 represented only the critical concern species/watersheds plus the piping plover. The Implementation Procedures should acknowledge this limitation and that other aquatic and aquatic-dependant species are found in Texas. If Table 3 is based on the *Hydrologic Database for Federally-Listed and Candidate Species* in Texas, several inland water bodies where the interior least tern, the piping plover or the whooping crane have found should be added. These include the water bodies in the following segments: 0201, 0202, 0203, 0204, 0205, 0206, 0207, 0214, 0804 and 0805.

The 2005 "Hydrologic database" includes several unclassified water bodies in segments 1427 and 1430 for the Barton Springs salamander. Also, "Toyah Creek" (segment 2311) should be included in Reeves County for the Pecos Gambusia. The interior least tern may be associated with water bodies in segments 2303, 2304, and 2305. For the Devils River minnow, the "Hydrologic database" also lists Pinto Creek and Pinto Springs in segment 2304 and the following unclassified water bodies in segment 2309: Dolan Creek, Dolan Spring, Finegan Spring, Pecan Spring, and Phillips Creek. Toyah Creek in segment 2311 is listed for the Pecos Gambusia. The Pecos assimnea snail was listed as endangered in August 2005 and critical habitat has been designated in Diamond Y draw and East Sandia spring in segment 2311.

Table 8 - Minimum Analytical Levels for Permit Application Screening and Table 9 - Analytical Methods for the Determination of Pollutants Regulated by 30 TAC §307.6.

EPA Headquarters and Region 6 are nearing completion of an updated list of Minimum Quantification Limits (MQLs). Clean techniques for mercury and other metals (method 1600 series), pesticides, and volatile and semivolatile organics are included to replace less sensitive methods. We recommend including the revised MQLs in both Tables 8 and 9 and will provide this document under separate cover as soon as it is available.

TCEQ must either revise Table 8 and Table 9 to incorporate EPA method 614 (MAL, 0.1 ug/l; MDL, 0.012 ug/l) or include this method on page 125, Toxicity Attributable to Diazinon.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TX 75202-2733

MAR -9 2006

Ms. L' Oreal Stepney, Director
Water Quality Division (MC-145)
Texas Commission on Environmental Quality
P.O. Box 13087
Austin, TX 7871l

Subject: Revisions to Whole Effluent Toxicity components of the TPDES program

Dear Ms. ~~Stepney~~ L'Oreal:

In my letter dated February 24, 2005, I requested that each State work with Region 6 to develop a mutually acceptable strategy directed toward implementing a predictive approach to determining reasonable potential for whole effluent toxicity (WET). I also requested the Region 6 states to begin developing requirements to establish WET limits for sub-lethal effects (e.g., growth or reproduction), where required by applicable water quality standards, to fully comply with NPDES regulations at 40 CFR Part 122.44(d)(1).

As you know, EPA Office of Water's Permitting for Environmental Results (PER) process identified the lack of these program components as a significant weakness in the Region 6 NPDES permitting program. To ensure the program is in full compliance with Federal regulations, Region 6 and its states must incorporate these permitting practices into their NPDES permits.

During the transitional period, EPA has been actively supporting our states through various activities, including: Region 6 / State WET meeting (April 6, 2005); technical assistance visits to each state agency on revising its rules and implementation procedures; public outreach via presentations at the annual meetings for the New Mexico Municipal Wastewater Association, the Oklahoma City MS4 conference and the Arkansas Environment Federation; and a two-day state of the science NPDES WET workshop at Region 6 in Dallas. Region 6 is committed to working closely with you to answer questions, resolve impediments to State NPDES WET program revisions and to provide any support you and your staff may need to implement these requirements.

I am enclosing a copy of the final EPA Region 6 NPDES WET Implementation Strategy. It has been implemented in EPA Region 6 issued permits since May 2005. I encourage TCEQ to adopt a similar strategy to be implemented in TPDES permits.

Please provide me with a status update, by April 1, 2006, on the WET revision initiative within your agency, including identification of milestones that will allow TCEQ to complete the tasks necessary to implement the revisions in NPDES permits issued beginning January, 2007. Failure to fully adopt all WET requirements in a timely manner places both the TCEQ and Region 6 at risk with respect to administration of the NPDES permitting program. My staff and I are fully committed to assisting TCEQ in any way we can in developing and implementing your strategy. If you have questions or would like to discuss this further you may call me or your staff may contact Claudia Hosch at (214) 665-6464 or via e-mail at hosch.claudia@epa.gov.

Sincerely,

Miguel I. Flores
Director
Water Quality Protection Division

Enclosure

cc: Mr. Martin Maner, ADEQ
Mr. Chuck Brown, LDEQ
Ms. Marcy Leavitt, NMED
Mr. Derek Smithee, OWRB
Mr. Jon Craig, ODEQ

**EPA Region 6 WET Permitting Strategy**

**May, 2005**

This strategy is designed to implement regulatory requirements established in 1989 and guidance developed since that time. The Clean Water Act and federal regulations at 40 CFR § 122.44(d)(1) establish the basis for whole effluent toxicity (WET), or biomonitoring, requirements for wastewater discharge permits issued under the NPDES permitting program. The applicable federal regulations require that the permitting authority determine, during the permit development period, whether the reasonable potential exists for an effluent to cause or contribute to an excursion above a State's narrative or numeric criterion for the protection of aquatic life. If reasonable potential is found to exist, WET limits must be included in the permit. A chemical-specific limit may be established in lieu of a WET limit where the permitting authority demonstrates, in the fact sheet, that the chemical limit will preclude toxicity at unacceptable levels. All available, valid and relevant information will be used in making permitting decisions. EPA Region 6 WET permitting practices follow the current agency policy on independent applicability.

References to sub-lethal effects in this document apply only to chronic testing. Where the permit establishes 7-Day Chronic test requirements, the reasonable potential analysis will be performed for both lethal and sub-lethal effects. Where the permit establishes 48-Hour Acute test requirements, the reasonable potential analysis will be performed on lethal effects.

Applicability

WET requirements are established for all Region 6 discharges classified as majors (e.g., POTW $\geq$ 1.0 mgd design flow) with the exception of once-through, non-contact cooling water discharges to which no chemical treatment is added. WET requirements will also be applied on a case-by-case basis to minor discharges with known or suspected toxic potential, or which are designed to discharge $\geq$ 0.5 mgd with a chlorine residual. As an option in such cases, WET testing may not be required if the permittee agrees to a compliance schedule to install dechlorination to meet a non-detect total residual chlorine limit.

Reasonable Potential

As applicable, reasonable potential to cause or contribute to an exceedance of State narrative criteria for the protection of aquatic life will be determined by the method established in EPA's Technical Support Document for Water Quality-based Toxics Control, EPA/505/2-90-001, second printing (see Box 3-2, page 53). This approach is also provided in federal regulations pertaining to wastewater discharges into the Great Lakes, at 40 CFR § 132, Appendix F, Procedure 6. Where a facility does not intend to significantly alter the effluent quality or quantity during the permit term, has a critical dilution of 90% or greater, has performed quarterly testing and has demonstrated no significant lethal or sub-lethal effects during the previous five-year period, a finding of no reasonable potential may be made.

WET Limits

A WET limit is a permit control required where the reasonable potential exists for an exceedance of the State water quality criteria for protection of aquatic life and a specific toxicant has not been identified and controlled via a toxicity reduction evaluation (TRE). If, during permit development, reasonable potential is found to exist for lethal and/or sub-lethal effects, WET limits will be included in the permit. A compliance schedule of up to three years duration can be included. The minimum monitoring frequency for species under a WET limit is once per quarter for the life of the permit. WET limits may be removed from a permit after the first five years in effect, based on a demonstration of no lethal or sub-lethal affects during that period.

Monitoring Frequencies

Facilities with WET Limits

Normally, the minimum monitoring frequency for species under a WET limit is once per quarter for the first five years after a WET limit goes into effect.

Major Dischargers

For major dischargers, the *minimum* monitoring frequency for WET is once per quarter for the invertebrate and vertebrate test species, with a potential reduction in testing frequency after completing one year of testing with no lethal or sub-lethal effects (see Region 6 WET Monitoring Frequency Guidance, 06/30/00). Some facilities pose a more significant concern (e.g., POTWs $\geq$ 20 mgd and petroleum/chemical refineries) and have historically been required to perform WET monitoring on a quarterly basis, for at least one test species, for the life of the permit. The minimum WET monitoring frequency reduction option does not apply to these discharges.

Minor Dischargers

Testing frequencies for minor dischargers and dischargers with a critical dilution of <1.0% will be established on a case-by-case basis.

All Dischargers

When a test failure occurs, the monitoring frequency will automatically increase to once per month for the next three months. The purpose of this testing is to determine whether toxicity is present at a level and frequency that will provide toxic samples to use in performing a toxicity reduction evaluation (TRE). The additional tests are not performed for the purpose of confirming whether the original test failure was 'real.' If no additional test failures occur during the three-month period, the testing frequency will return to once per quarter for the life of the permit or until another test failure occurs. If multiple intermittent test failures occur, a TRE may be required, and the testing frequency may be increased for the affected test species.

Toxicity Reduction Evaluations / Toxicant Identification Evaluations (TREs/TIEs)

Where reasonable potential is not demonstrated and the permit is issued with WET monitoring requirements only, the permit will contain trigger language to require a TRE. A TRE is a 28-month study to identify sources and controls for toxicants in effluents. A TIE is a set of effluent manipulations that is used to identify specific toxic compounds in a sample known to be toxic. EPA does require TREs but does not typically require TIEs. Generally, permittees are allowed latitude in choosing how they proceed through a TRE and come into compliance. A TRE will usually result in either WET limits (if a specific toxicant is not identified, confirmed and controlled), or chemical limits. In some cases a best management practice (BMP) may be included as a permit control. If additional testing indicates that a chemical-specific limit or a BMP does not result in controlling toxicity, and reasonable potential exists; the permit then will be revised to include WET limits.

Lethal Effects

Region 6 will implement TREs and limits for lethal effects as it has historically. A TRE for lethal effects is triggered by failure in a scheduled test followed by failure in one or more tests performed during the following period of increased frequency.

Sub-Lethal Effects

Due to the potential difficulty of resolving toxicity related, in some cases, to identifying toxicants responsible for sub-lethal effects, EPA Region 6 will take a graduated approach to TREs and implementation of WET limits where significant sub-lethal effects are demonstrated only in effluent concentrations greater than 75% effluent. Where significant effects are demonstrated at effluent concentrations of 75% or less, aggressive TREs have demonstrated a high degree of success. While TREs may still be required, Region 6 will implement limits for sub-lethal limits at the 80% effluent level at this time. A TRE for sub-lethal effects is triggered by failure in a scheduled test followed by sub-lethal failures in two or more tests performed during the following period of increased frequency.

IN ADDITION:

1. Where WET testing has demonstrated a significant toxic effect within two years of the RP determination made during permit development, and the facility has not completed significant relevant improvements, a WET limit will be incorporated into the permit because that data would still be valid and representative, and would indicate that reasonable potential continues to exist.

2. Where there are < 10 test results per species at the time of permitting; and RP is found to exist based solely on the paucity of data, the Agency and permittee may agree to include a permit condition to allow up to twelve months to develop the additional test data necessary to perform another RP determination, using all the data, to determine whether a WET limit is necessary or not.

3. State agencies authorized to administer the NPDES permitting program will decide whether to change results reporting from NOECs to Toxic Units (TUs). EPA Region 6 recommends the use of TUs to simplify the reasonable potential calculation.

4. EPA will consider an alternative WET reasonable potential determination procedure should an agency authorized to administer the NPDES permitting program formally submit one for review. EPA anticipates no basis to delay permitting decisions pending such reviews/revisions.

STATE, SJRA & their consultants attended

# US EPA Region VI WET Workshop
## 19-20 January 2006
## Day 1

| | |
|---|---|
| 8:00-8:10 | Introduction and Course Logistics<br>Miguel Flores, EPA R6 Water Division Director<br>Phil Jennings, WET Coordinator |
| 8:10-9:00 | Introduction, Standards, Regulatory Requirements<br>Debra Denton, US EPA, Region 9, San Francisco, CA |
| 9:00-10:00 | EPA Perspective on Permit Development and Reasonable Potential for WET Limits<br>Debra Denton, US EPA, Region 9, San Francisco, CA |
| 10:00-10:15 | Break |
| 10:15-10:45 | State Perspective on Permit Development<br>Matt Matthews, NC DENR, Raleigh NC |
| 10:45-11:15 | Permittee Perspective on Permit Development<br>Phil Dorn, Shell Global Solutions, Inc., Houston, TX. |
| 11:15-11:45 | Questions & Discussions |
| 11:45 -1:00 | Lunch |
| 1:00-1:45 | US EPA Compliance and Enforcement<br>Debra Denton, US EPA, Region 9, San Francisco, CA |
| 1:45-2:15 | Toxicity Reduction Evaluation (TRE) Overview Lethal / Sub-Lethal<br>Scott Hall, Advent – Environ, Brentwood, TN |
| 2:15-2:45 | TIE Characterization, Phase I Lethal / Sub-Lethal<br>Wayne McCulloch, EA EST, Sparks, MD |
| 2:45-3:15 | Phase I Theoretical Data<br>Wayne McCulloch, EA EST, Sparks, MD |
| 3:15-3:30 | Break |
| 3:30-4:15 | TIE Characterization, Phases II and III Lethal / Sub-Lethal<br>Wayne McCulloch, EA EST, Sparks, MD |
| 4:15-5:00 | POTW & Industrial Case Study –Sub-lethal Effects w/ Ceriodaphnia dubia and Pimephales promelas<br>Scott Hall, Advent – Environ, Brentwood, TN |

## US EPA Region VI WET Workshop
## 19-20 January 2006
## Day 2

| | |
|---|---|
| 8:00-8:10 | Recap of the Previous Day's Highlights<br>Phil Jennings, US EPA, Region VI |
| 8:10-8:50 | WET Statistics Overview<br>Debra Denton, U.S. EPA, Region 9 |
| 8:50-10:00 | Common Difficulties Encountered in WET Data Analysis: Analysis and Identification of Concentration Response Curves<br>Pat Downey, FTN Associates, Little Rock, AR<br>Biological Interference in Fathead Minnow Chronic Tests<br>Pat Downey, FTN Associates, Little Rock, AR |
| 10:00-10:20 | Break |
| 10:20-11:30 | Common Questions Related to WET Data Interpretation: False Positive and Negative Test Results<br>Pat Downey, FTN Associates, Little Rock, AR<br>Statistical and Biological Significance<br>Scott Hall, Advent – Environ, Brentwood, TN<br>Intra- and Inter-test Variability<br>Scott Hall, Advent – Environ, Brentwood, TN |
| 11:30-12:15 | Perspectives on WET Data Analysis and Interpretation<br>USEPA - Debra Denton, U.S. EPA, Region 9 |
| 12:15-1:15 | Lunch |
| 1:15-2:40 | Perspectives on WET Data Analysis and Interpretation<br>Matt Matthews, NC DENR, Raleigh NC |
| 2:40-3:00 | Questions & Discussions |
| 3:00-3:15 | Break |
| 3:15-3:35 | Case Study – Minimal Toxicity Necessary for an Effective Toxicity Identification Evaluation<br>Wayne McCulloch, EA EST, Sparks, MD |
| 3:35-4:00 | Case Study - Textile with TDS and Surfactants<br>Matt Matthews, DENR, Raleigh, NC |
| 4:00-5:00 | Questions/Final Issues |

RL EPA-SETAC WET Course - January 19-20, 2006

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MAY - 5 2005

TO: Marcus Devine, ADEQ
Dr. Mike McDaniel, LDEQ
Mr. Ron Curry, NMED
Mr. Steve Thompson, ODEQ
Derek Smithee, OWRB
Mr. Glen Shankle, TCEQ

I would like to thank you for your agency's participation in our April 6, 2005, meeting on the upcoming revisions to our regional approach to whole effluent toxicity (WET). The open and frank discussions on a predictive assessment for determining reasonable potential for WET limits, WET limits for sub-lethal effects, and concerns about specific issues in EPA's "Draft National Whole Effluent Toxicity WD Implementation Guidance" (December 28,2004) were appreciated and helpful to my staff. I believe that implementing these requirements is critical for our agencies to meet our water quality and program integrity objectives. I look forward to working together as we move to full implementation of the basic WET program and compliance with federal regulations specific to permitting for WET.

Now that the initial informational session is completed, it is our intent to begin working individually with your representatives to develop a plan that fits your State's needs. I anticipate that this initiative will proceed simultaneously on several fronts, as there will be issues for administrative, enforcement and water quality as well as the permitting and toxicity groups. Phillip Jennings, the Region 6 WET coordinator, will be working directly with appropriate staff as designated by you in response to my February 24, 2005, letter to begin identifying tasks and to develop a time line for implementation. In addition, at the suggestion of your representatives at our April 6, 2005, meeting Region 6 is moving forward with an open workshop this fall to provide information and training on toxicity studies for sub-lethal effects in WET tests.

Again, thank you for your agency participation now and in the future to act on this area of improvement in our NPDES programs. If you have questions or would like to discuss any concerns further, please call me at (214) 665-7101, or reply directly to Willie Lane at (214) 665-8460 or via e-mail at lane.willie@epa.gov.

Sincerely yours,

Original signed by William K. Honker.

Miguel I. Flores
Director
Water Quality Protection Division

cc:

bcc: Branch Reading File 6WQ-P ✓
Division Reading File 6WQ ✓
John Blevins 6EN ✓

**042805:pj:C:\2004\WET Strategy\042805 followup Miguel letter.wpd**

CONCURRENCE: **Lane (6WQ-PP)** ✓ Hill (6WQ-P)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TX 75202-2733

MAR 18 2005

Carl Parrott
Water Quality Division
Oklahoma Department of Environmental Quality
P.O. Box 1677
707 North Robinson
Oklahoma City, OK 73101-1677

Dear Mr. Parrott:

In his letter of February 24, 2005, Miguel Flores requested that our states designate a point of contact and consider your agency's participation in a meeting to begin the process of updating the Region and State approaches to permitting of whole effluent toxicity (WET). We have received responses from each State agency and I am pleased to invite you, as a designated state representative, to meet and discuss the related issues and concerns. EPA's primary issues include using a predictive approach to determine when WET limits are necessary in an NPDES permit, establishing WET limits for sub-lethal effects, and how we work together to implement these requirements in Region 6.

| | |
|---|---|
| Function: | State/EPA WET Implementation Meeting |
| Date: | Wednesday, April 6, 2005 |
| Time: | 9:30 AM - 4:30 PM |
| Location: | EPA Region 6, 12th Floor, Texas Conference room |
| Contact: | Phillip Jennings (214.665.7538 or jennings.phillip@epa.gov) or Willie Lane (214.665.8460 or lane.willie@epa.gov) |

In addition, Phil Jennings, co-chair of the EPA workgroup that developed the draft "National Whole Effluent Toxicity (WET) Implementation Guidance" document, will be available to hear concerns and provide clarification on the document. Due to public response, the comment period has been extended to March 31, 2005.

We will be sharing a draft agenda with you soon. We look forward to working with you in this effort. If you have any questions regarding the meeting please feel free to contact me at 214.665.7101, or contact Willie Lane or Phillip Jennings as provided above.

Sincerely,

Troy Hill, P.E.
Acting Chief
Permits Branch

Dear (Addressee):

In his letter of February 24, 2005, Miguel Flores requested that our states designate a point of contact and consider your agency's participation in a meeting to begin the process of updating the Region and State approaches to permitting of whole effluent toxicity (WET). We have received responses from each State agency and I am pleased to invite you, as a designated state representative, to meet and discuss the related issues and concerns. EPA's primary issues include using a predictive approach to determine when WET limits are necessary in an NPDES permit, establishing WET limits for sub-lethal effects, and how we work together to implement these requirements in Region 6.

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We will be sharing a draft agenda with you soon. We look forward to working with you in this effort. If you have any questions regarding the meeting please feel free to contact me at 214.665.7101, or contact Willie Lane or Phillip Jennings as provided above.

Sincerely,

/ s /
Troy Hill, P.E.
Acting Chief
Permits Branch

Addressees: ADEQ - Mo Shafi
LDEQ - Lenny Young
ODEQ - Carl Parrott
OWRB - Phil Moershel
NMED - Glenn Saums
TCEQ - Jim Davenport

bcc: Branch Copy

03/18/05|PJennings|C:\2004\WET Strategy\meetinginvite.wpd

# Whole Effluent Toxicity (WET) Program Revisions
## State/EPA Technical Meeting
## Wednesday, April 6, 2005

| | |
|---|---|
| 9:30 - 09:45 | Welcome and Opening Remarks |
| 9:45 - 10:45 | Predictive Reasonable Potential Determination |
| 10:45 - 11:00 | Break |
| 11:00 - 12:00 | WET limits for Sub-Lethal Effects |
| 12:00 - 1:30 | Lunch |
| 1:30 - 2:00 | Application - Majors, Minors, Stormwater, Intermittent Discharges |
| 2:00 - 3:00 | Concerns and Impacts (EPA, States, Regulated Community) |
| 3:00 - 3:15 | Break |
| 3:15 - 4:00 | Permit Language Revisions<br>Frequency Increases and Triggers<br>Toxicity Reduction Evaluation Trigger<br>Retain or drop from standard language?<br>When to do (lethal vs sub-lethal)?<br>Compliance Schedules<br>Reversal of Predicted WET Limit<br>WET Limit Removal |
| 4:00 - 4:30 | Lab Capability and Quality |

State / EPA WET Implementation Meeting
Wednesday, April 6, 2005

| | Name | Organization | Phone | Email |
|---|---|---|---|---|
| 1 | Kim Gunderson | LDEQ | 225-219-3113 | kim.gunderson@la.gov |
| 2 | Bruce Fielding | LDEQ | 225-219-3006 | bruce.fielding@la.gov |
| 3 | Melissa Reboul | LDEQ | 225-219-3054 | melissa.reboul@la.gov |
| 4 | NANCY CAIN | ODEQ | 405-702-8190 | Nancy.CAIN@deq.state.ok.us |
| 5 | Carl Parrott | ODEQ | 405-702-8142 | carl.parrott@deq.state.ok.us |
| 6 | Jeanette Cosden | ODEQ | 405-702-8162 | Jeanette.cosden@deq.state.ok.us |
| 7 | Phil Mocnshel | OWRB | 405 530 8752 | phmocnshel@owrb.state.ok.us |
| 8 | Sandy Span | NMED | 505-827-0417 | sandy_spann@nmenv.state.nm.us. |
| 9 | Brian Clem | ADEQ | 501-682-0663 | clem@adeq.state.ar.us |
| 10 | MC Shafii | ADEQ | 501-682-0616 | Shafii@adeq.state.ar.us |
| 11 | Jim Davenport | TCEQ | 512-239-4585 | jdavenpo@tceq.state.tx.us |
| 12 | Bill Honker | EPA | 214-665-3187 | honker.william@epa.gov |
| 13 | Troy Hill | EPA | 214-665-6647 | HILL.TROY@EPA.GOV |
| 14 | Wayne Love | EPA | 214-665-8460 | LOVE.WAYNE@EPA.GOV |
| 15 | Phil Jennings | EPA | 214-665-7538 | jennings.phillip@EPA.gov |
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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TX 75202-2733

FEB 24 2005

Mr. L'Oreal Stepney, Director
Water Quality Division (MC-145)
Texas Commission on Environmental Quality
P.O. Box 13087
Austin, TX 78711-3087

Dear Mr. Stepney:

In response to the recently released EPA guidance document, *"Draft National Whole Effluent Toxicity (WET) Implementation Guidance"* (December 28, 2004) and recommendations resulting from the Permitting for Results (PERs) process, EPA Region 6 is reviewing its policies on implementation of the whole effluent toxicity (WET) component of the National Pollutant Discharge Elimination System (NPDES) permitting program. Specifically, the areas of review are: utilization of sub-lethal effects (such as growth or reproduction) for establishing WET limitations and development of predictive reasonable potential determination procedures for ascertaining when WET limits must be included in an NPDES permit.

Region 6 would like to work with our State partners together and individually, in the process of developing an implementation strategy. I am soliciting your Agency's comment on how we may arrive at a mutually acceptable strategy to reach the goal of incorporating these requirements into each State's NPDES permitting implementation procedures. To facilitate this action we are proposing a regional working session to be scheduled by early April for all parties to meet and discuss the implementation of these elements into permits issued in Region 6.

I ask that you respond to this request by March 7, 2005, by providing names of individuals in your agency to work on this initiative. If you have questions or would like to discuss this further, please call me at (214) 665-7101, or reply directly to Willie Lane at (214) 665-8460 or via e-mail at lane.willie@epa.gov.

Sincerely yours,

Miguel I. Flores
Director
Water Quality Protection Division

San Jacinto River Authority, NPDES Permit No. TX0054186

# Response to Comments Attachment 3

## Page 18 – EPA's National Policy on Independent Applicability

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF WATER

**MEMORANDUM**

SUBJECT: Final Policy on Biological Assessments and Criteria

FROM: Rick Brandes, Chief
Water Quality and Industrial
Permits Branch (EN-336)

TO: Regional Permits Branch Chiefs (I-X)

I have enclosed for your information and use a copy of the recently issued "Policy on Biological Assessments and Criteria". This policy was signed by Tudor Davies on June 19, 1991. The content of the policy is also stated in the Technical Support Document for Water Quality-based Toxics Control.

One aspect of the policy expresses that water quality standards are to be independently applied. This means that any single assessment method (chemical criteria, toxicity testing, or biocriteria) can provide conclusive evidence that water quality standards are not attained. Apparent conflicts between the three methods should be rare. They can occur because each assessment method is sensitive to different types and ranges of impacts. Therefore, a demonstration of water quality standards nonattainment using one assessment method does not necessarily require confirmation with a second method; nor can the failure of a second method to confirm impact, by itself, negate the results of the initial assessment.

If you have any questions about the policy, please call Jim Pendergast at FTS 475-9536 or Kathy Smith at FTS 465-9521.

Attachment

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

MEMORANDUM

OFFICE OF WATER

SUBJECT: Transmittal of Final Policy on Biological Assessments and Criteria

FROM: Tudor T. Davies, Director
Office of Science and Technology (WH-551)

TO: Water Management Division Directors
Regions I-X

Attached is EPA's "Policy on the Use of Biological Assessments and Criteria in the Water Quality Program" (Attachment A). This policy is a significant step toward addressing all pollution problems within a watershed. It is a natural outgrowth of our greater understanding of the range of problems affecting watersheds from toxic chemicals to physical habitat alteration, and reflects the need to consider the whole picture in developing watershed pollution control strategies.

This policy is the product of a broad-based workgroup chaired by Jim Plafkin and Chris Faulkner of the Office of Wetlands, Oceans and Watersheds. The workgroup was composed of representatives from seven EPA Headquarters offices, four EPA Research Laboratories, all 10 EPA Regions, U.S. Fish and Wildlife Service, U.S. Forest Service, and the States of New York and North Carolina (see Attachment B). This policy also reflects review comments to the draft policy statement issued in March of 1990. Comments were received from three EPA Headquarters offices, three EPA Research Laboratories, five EPA Regions and two States. The following sections of this memorandum provide a brief history of the policy development and additional information on relevant guidance.

## Background

The Ecopolicy Workgroup was formed in response to several converging initiatives in EPA's national water program. In September 1987, a major management study entitled "Surface Water Monitoring: A Framework for Change" strongly emphasized the need to "accelerate development and application of promising biological monitoring techniques" in State and EPA monitoring programs. Soon thereafter, in December 1987, a National Workshop on Instream Biological Monitoring and Criteria reiterated this

recommendation but also pointed out the importance of integrating the biological criteria and assessment methods with traditional chemical/physical methods (see Final Proceedings, EPA-905/9-89/003). Finally, at the June 1988 National Symposium on Water Quality Assessment, a workgroup of State and Federal representatives unanimously recommended the development of a national bioassessment policy that encouraged the expanded use of the new biological tools and directed their implementation across the water quality program.

Guided by these recommendations, the workgroup held three workshop-style meetings between July and December 1988. Two major questions emerged from the lengthy discussions as issues of general concern:

ISSUE 1 - How hard should EPA push for formal adoption of biological criteria (biocriteria) in State water quality standards?

ISSUE 2 - Despite the many beneficial uses of biomonitoring information, how do we guard against potentially inappropriate uses of such data in the permitting process?

Issue 1 turns on the means and relative priority of having biological criteria formally incorporated in State water quality standards. Because biological criteria must be related to local conditions, the development of quantitative national biological criteria is not ecologically appropriate. Therefore, the primary concern is how biological criteria should be promoted and integrated into State water quality standards.

Issue 2 addresses the question of how to reconcile potential apparent conflicts in the results obtained from different assessment methods (i.e., chemical-specific analyses, toxicity testing, and biosurveys) in a permitting situation. Should the relevance of each be judged strictly on a case-by-case basis? Should each method be applied independently?

These issues were discussed at the policy workgroup's last meeting in November 1988, and consensus recommendations were then presented to the Acting Assistant Administrator of Water on December 16, 1988. For Issue 1, it was determined that adapting biological criteria to State standards has significant advantages, and adoption of biological criteria should be strongly encouraged. Therefore, the current Agency Operating Guidance establishes the State adaptation of basic narrative biological criteria as a program priority.

With respect to Issue 2, the policy reflects a position of "independent application." Independent application means that any one of the three types of assessment information (i.e., chemistry, toxicity testing results, and ecological assessment) provides conclusive evidence of non-attainment of water quality

standards regardless of the results from other types of assessment information. Each type of assessment is sensitive to different types of water quality impact. Although rare, apparent conflicts in the results from different approaches can occur. These apparent conflicts occur when one assessment approach detects a problem to which the other approaches are not sensitive. This policy establishes that a demonstration of water quality standards nonattainment using one assessment method does not require confirmation with a second method and that the failure of a second method to confirm impact does not negate the results of the initial assessment.

Review of Draft Policy

The draft was circulated to the Regions and States on March 23, 1990. The comments were mostly supportive and most of the suggested changes have been incorporated. Objections were raised by one State that using ecological measures would increase the magnitude of the pollution control workload. We expect that this will be one result of this policy but that our mandate under the Clean Water Act to ensure physical, chemical, and biological integrity requires that we adopt this policy. Another State objected to the independent application policy. EPA has carefully considered the merits of various approaches to integrating data in light of the available data, and we have concluded that independent application is the most appropriate policy at this time. Where there are concerns that the results from one approach are inaccurate, there may be opportunities to develop more refined information that would provide a more accurate conclusion (e.g., better monitoring or more sophisticated wasteload allocation modelling).

Additional discussion on this policy occurred at the Water Quality Standards for the 21st Century Symposium in December, 1990.

What Actions Should States Take

This policy does not require specific actions on the part of the States or the regulated community. As indicated under the Fiscal Year 1991 Agency Operating Guidance, States are required to adopt narrative biocriteria at a minimum during the 1991 to 1993 triennial review. More specific program guidance on developing biological criteria is scheduled to be issued within the next few months. Technical guidance documents on developing narrative and numerical biological criteria for different types of aquatic systems are also under development.

Relevant Guidance

There are several existing EPA documents which pertain to biological assessments and several others that are currently under development. Selected references that are likely to be important in implementing this policy are listed in Attachment

Please share this policy statement with your States and work with them to institute its provisions. If you have any questions, please call me at (FTS) 382-5400 or have your staff contact Geoffrey Grubbs of the Office of Wetlands, Oceans and Watersheds at (FTS) 382-7040 or Bill Diamond of the Office of Science and Technology at (FTS) 475-7301.

Attachments

cc: OW Office Directors
Environmental Services Division Directors, Regions I-X

Attachment A

# Policy on the Use of Biological Assessments and Criteria in the Water Quality Program

May 1991

## Contents

## Statement of Policy

To help restore and maintain the biological integrity of the Nation's waters, it is the policy of the Environmental Protection Agency (EPA) that biological surveys shall be fully integrated with toxicity and chemical-specific assessment methods in State water quality programs. EPA recognizes that biological surveys should be used together with whole-effluent and ambient toxicity testing, and chemical-specific analyses to assess attainment/nonattainment of designated aquatic life uses in State water quality standards. EPA also recognizes that each of these three methods can provide a valid assessment of designated aquatic life use impairment. Thus, if any one of the three assessment methods demonstrate that water quality standards are not attained, it is EPA's policy that appropriate action should be taken to achieve attainment, including use of regulatory authority.

It is also EPA's policy that States should designate aquatic life uses that appropriately address biological integrity and adopt biological criteria necessary to protect those uses. Information concerning attainment/nonattainment of standards should be used to establish priorities, evaluate the effectiveness of controls, and make regulatory decisions.

Close cooperation among the States and EPA will be needed to carry out this policy. EPA will provide national guidance and technical assistance to the States; however, specific assessment methods and biological criteria should be adopted on a State-by-State basis. EPA, in its oversight role, will work with the States to ensure that assessment procedures and biological criteria reflect important ecological and geographical differences among the Nation's waters yet retain national consistency with the Clean Water Act.

## Definitions

Ambient Toxicity: Is measured by a toxicity test on a sample collected from a waterbody.

Aquatic Community: An association of interacting populations of aquatic organisms in a given waterbody or habitat.

Aquatic Life Use: Is the water quality objective assigned to a waterbody to ensure the protection and propagation of a balanced, indigenous aquatic community.

Biological Assessment: An evaluation of the biological condition of a waterbody using biological surveys and other direct measurements of resident biota in surface waters.

Biological Criteria (or Biocriteria): Numerical values or narrative expressions that describe the reference biological integrity of aquatic communities inhabiting waters of a given designated aquatic life use.

Biological Integrity: Functionally defined as the condition of the aquatic community inhabiting unimpaired waterbodies of a specified habitat as measured by community structure and function.

Biological Monitoring: Use of a biological entity as a detector and its response as a measure to determine environmental conditions. Toxicity tests and biosurveys are common biomonitoring methods.

Biological Survey (or Biosurvey): Consists of collecting, processing, and analyzing a representative portion of the resident aquatic community to determine the community structure and function.

Community Component: Any portion of a biological community. The community component may pertain to the taxonomic group (fish, invertebrates, algae), the taxonomic category (phylum, order, family, genus, species), the feeding strategy (herbivore, omnivore, carnivore), or organizational level (individual, population, community association) of a biological entity within the aquatic community.

Habitat Assessment: An evaluation of the physical characteristics and condition of a waterbody (example parameters include the variety and quality of substrate, hydrological regime, key environmental parameters and surrounding land use.)

Toxicity Test: Is a procedure to determine the toxicity of a chemical or an effluent using living organisms. A toxicity test measures the degree of response of exposed test organisms to a specific chemical or effluent.

Whole-effluent Toxicity: Is the total toxic effect of an effluent measured directly with a toxicity test.

## Background

Policy context

Monitoring data are applied toward water quality program needs such as identifying water quality problems, assessing their severity, and setting planning and management priorities for remediation. Monitoring data should also be used to help make regulatory decisions, develop appropriate controls, and evaluate the effectiveness of controls once they are implemented. This policy focuses on the use of a particular type of monitoring information that is derived from ambient biosurveys, and its proper integration with chemical-specific analyses, toxicity testing methods, and biological criteria in State water quality programs.

The distinction between biological surveys, assessments and criteria is an important one. Biological surveys, as stated in the section above, consist of the collection and analysis of the resident aquatic community data and the subsequent determination of the aquatic community's structure and function. A biological assessment is an evaluation of the biological condition of a waterbody using data gathered from biological surveys or other direct measures of the biota. Finally, biological criteria are the numerical values or narrative expressions used to describe the expected structure and function of the aquatic community.

Rationale for Conducting Biological Assessments

To more fully protect aquatic habitats and provide more comprehensive assessments of aquatic life use attainment/nonattainment, EPA expects States to fully integrate chemical-specific techniques, toxicity testing, biological surveys and biological criteria into their water quality programs. To date, EPA's activities have focused on the interim goal of the Clean Water Act (the Act), stated in Section 101(a)(2): To achieve; "...wherever attainable, an interim goal of water quality which provides for protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water...." However, the ultimate objective of the Act, stated in Section 101(a), goes further. Section 101(a) states: "The objective of this Act is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." Taken together, chemical, physical, and biological integrity define the overall ecological integrity of an aquatic ecosystem. Because biological integrity is a strong indicator of overall ecological integrity, it can serve as both a meaningful goal and a useful measure of environmental status that relates directly to the comprehensive objective of the Act.

Deviations from, and threats to, biological integrity can be estimated indirectly or directly. Traditional measures, such as chemical-specific analyses and toxicity tests, are indirect estimators of biological conditions. They assess the suitability of the waters to support a healthy community, but they do not directly assess the community itself. Biosurveys are used to directly evaluate the *overall* structural and/or functional characteristics of the aquatic community. Water quality programs should use both direct and indirect methods to assess biological conditions and to determine attainment/nonattainment of designated aquatic life uses.

Adopting an integrated approach to assessing aquatic life use attainment/nonattainment represents the next logical step in the evolution of the water quality program. Historically, water quality programs have focused on evaluating the impacts of specific chemicals discharged from discreet point sources. In 1984, the program scope was significantly broadened to include a combination of chemical-specific and whole-effluent toxicity testing methods to evaluate and predict the biological impacts of potentially toxic mixtures in wastewater and surface waters. Integration of these two indirect measures of biological impact into a unified assessment approach has been discussed in detail in national policy (49 FR 9016) and guidance (EPA-440/4-85-032). This approach has proven to be an effective means of assessing and controlling toxic pollutants and whole-effluent toxicity originating from point sources. Additionally, direct measures of biological impacts, such as biosurvey and bioassessment techniques, can be useful for regulating point sources. However, where pollutants and pollutant sources are difficult to characterize or aggregate impacts are difficult to assess (e.g., where discharges are multiple, complex, and variable; where point and nonpoint sources are both potentially important; where physical habitat is potentially limiting), direct measures of ambient biological conditions are also needed.

Biosurveys and biological criteria add this needed dimension to assessment programs because they focus on the resident community. The effects of multiple stresses and pollution sources on the numerous biological components of resident communities are integrated over a relatively long period of time. The community thus provides a useful indicator of both aggregate ecological impact and overall temporal trends in the condition of an aquatic ecosystem. Furthermore, biosurveys can detect aquatic life impacts that other available assessment methods may miss. Biosurveys detect impacts caused by: (1) pollutants that are difficult to identify chemically or characterize toxicologically (e.g., rare or unusual toxics [although biosurveys cannot themselves identify specific toxicants causing toxic impact], "clean" sediment, or nutrients); (2) complex or unanticipated exposures (e.g., combined point and non-point source loadings, storm events, spills); and perhaps most importantly, (3) habitat degradation (e.g., channelization, sedimentation, historical contamination), which disrupt the interactive balance among community components.

Biosurveys and biological criteria provide important information for a wide variety of water quality program needs. This data could be used to:

- Refine use classifications among different types of aquatic ecosystems (e.g., rivers, streams, wetlands, lakes, estuaries, coastal and marine waters) and within a given type of use category such as warmwater fisheries;
- Define and protect existing aquatic life uses and classify Outstanding National Resource Waters under State antidegradation policies as required by the Water Quality Standards Regulation (40 CFR 131.12);
- Identify where site-specific criteria modifications may be needed to effectively protect a waterbody;
- Improve use-attainability studies;
- Fulfill requirements under Clean Water Act Sections 303(c), 303(d), 304(l), 305(b), 314, and 319;
- Assess impacts of certain nonpoint sources and, together with chemical-specific and toxicity methods, evaluate the effectiveness of nonpoint source controls;
- Develop management plans and conduct monitoring in estuaries of national significance under Section 320;
- Monitor the overall ecological effects of regulatory actions under Sections 401, 402, and 301(h);
- Identify acceptable sites for disposal of dredge and fill material under Section 404 and determine the effects of that disposal;
- Conduct assessments mandated by other statutes (e.g., CERCLA/RCRA) that pertain to the integrity of surface waters; and
- Evaluate the effectiveness and document the instream biological benefits of pollution controls.

## Conduct of Biological Surveys

As is the case with all types of water quality monitoring programs, biosurveys should have clear data quality objectives, use standardized, validated

laboratory and field methods, and include appropriate quality assurance and quality control practices. Biosurveys should be tailored to the particular type of waterbody being assessed (e.g., wetland, lake, stream, river, estuary, coastal or marine water) and should focus on community components and attributes that are both representative of the larger community and are practical to measure. Biosurveys should be routinely coupled with basic physicochemical measurements and an objective assessment of habitat quality. Due to the importance of the monitoring design and the intricate relationship between the biosurvey and the habitat assessment, well-trained and experienced biologists are essential to conducting an effective biosurvey program.

## Integration of Assessment Methods and Regulatory Application

### Site-specific Considerations

Although biosurveys provide direct information for assessing biological integrity, they may not always provide the most accurate or practical measure of water quality standards attainment/nonattainment. For example, biosurveys and measures of biological integrity do not directly assess nonaquatic life uses, such as agricultural, industrial, or drinking water uses, and may not predict potential impacts from pollutants that accumulate in sediments or tissues. These pollutants may pose a significant long-term threat to aquatic organisms or to humans and wildlife that consume these organisms, but may only minimally alter the structure and function of the ambient community. Furthermore, biosurveys can only indicate the presence of an impact; they cannot directly identify the stress agents causing that impact. Because chemical-specific and toxicity methods are designed to detect specific stressors, they are particularly useful for diagnosing the causes of impact and for developing source controls. Where a specific chemical or toxicity is likely to impact standards attainment/nonattainment, assessment methods that measure these stresses directly are often needed.

### Independent Application

Because biosurvey, chemical-specific, and toxicity testing methods have unique as well as overlapping attributes, sensitivities, and program applications, no single approach for detecting impact should be considered uniformly superior to any other approach. EPA recognizes that each method can provide valid and independently sufficient evidence of aquatic life use impairment, irrespective of any evidence, or lack of it, derived from the other two approaches. The failure of one method to confirm an impact identified by another method would not negate the results of the initial assessment. This policy, therefore, states that appropriate action should be taken when any one of the three types of assessment determines that the standard is not attained. States are encouraged to implement and integrate all three approaches into their water quality programs and apply them in combination or independently as site-specific conditions and

assessment objectives dictate.

In cases where an assessment result is suspected to be inaccurate, the assessment may be repeated using more intensive and/or accurate methods. Examples of more intensive assessment methods are dynamic modelling instead of steady state modelling, site specific criteria, dissolved metals analysis, and a more complete biosurvey protocol.

## Biological Criteria

To better protect the integrity of aquatic communities, it is EPA's policy that States should develop and implement biological criteria in their water quality standards.

Biological criteria are numerical measures or narrative descriptions of biological integrity. Designated aquatic life use classifications can also function as narrative biological criteria. When formally adopted into State standards, biological criteria and aquatic life use designations serve as direct, legal endpoints for determining aquatic life use attainment/nonattainment. Per Section 131.11(b)(2) of the Water Quality Standards Regulation (40 CFR Part 131), biological criteria can supplement existing chemical-specific criteria and provide an alternative to chemical-specific criteria where such criteria cannot be established.

Biological criteria can be quantitatively developed by identifying unimpaired or least-impacted reference waters that operationally represent best attainable conditions. EPA recommends States use the ecoregion concept when establishing a list of reference waters. Once candidate references are identified, integrated assessments are conducted to substantiate the unimpaired nature of the reference and to characterize the resident community. Biosurveys cannot fully characterize the entire aquatic community and all its attributes. Therefore, State standards should contain biological criteria that consider various components (e.g., algae, *invertebrates, fish) and attributes (measures of structure and/or function)* of the larger aquatic community. In order to provide maximum protection of surface water quality, States should continue to develop water quality standards integrating all three assessment methods.

## Statutory Basis

Section 303(c)

The primary statutory basis for this policy derives from Section 303 of Clean Water Act. Section 303 requires that States adopt standards for their waters and review and revise these standards as appropriate, or at least once every three years. The Water Quality Standards Regulation (40 CFR 131)

requires that such standards consist of the designated uses of the waters involved, criteria based upon such uses, and an antidegradation policy.

Each State develops its own use classification system based on the generic uses cited in the Act (e.g., protection and propagation of fish, shellfish, and wildlife). States may also subcategorize types of uses within the Act's general use categories. For example, aquatic life uses may be subcategorized on the basis of attainable habitat (e.g., cold- versus warm-water habitat), innate differences in community structure and function (e.g., high versus low species richness or productivity), or fundamental differences in important community components (e.g., warm-water fish communities naturally dominated by bass versus catfish). Special uses may also be designated to protect particularly unique, sensitive or valuable aquatic species, communities, or habitats.

Each State is required to "specify appropriate water uses to be achieved and protected" (40 CFR 131.10). If an aquatic life use is formally adopted for a waterbody, that designation becomes a formal component of the water quality standards. Furthermore, nonattainment of the use, as determined with either biomonitoring or chemical-specific assessment methods, legally constitutes nonattainment of the standard. Therefore, the more refined the use designation, the more precise the biological criteria (i.e., the more detailed the description of desired biological attributes), and the more complete the chemical-specific criteria for aquatic life, the more objective the assessment of standards attainment/nonattainment.

Section 304(a)

Section 304(a) requires EPA to develop and publish criteria and other scientific information regarding a number of water-quality-related matters, including:

- Effects of pollutants on aquatic community components ("Plankton, fish, shellfish, wildlife, plant life...") and community attributes ("diversity, productivity, and stability...");
- Factors necessary "to restore and maintain the chemical, physical, biological integrity of all navigable waters...", and "for protection and propagation of shellfish, fish, and wildlife for classes and categories of receiving waters...";
- Appropriate "methods for establishing and measuring water quality criteria for toxic pollutants on other bases than pollutant-by-pollutant criteria, including biological monitoring and assessment methods."

This section of the Act has been historically cited as the basis for

publishing national guidance on chemical-specific criteria for aquatic life, but is equally applicable to the development and use of biological monitoring and assessment methods and biological criteria.

## State/EPA Roles in Policy Implementation

State Implementation

Because there are important qualitative differences among aquatic ecosystems (streams, rivers, lakes, wetlands, estuaries, coastal and marine waters), and there is significant geographical variation even among systems of a given type, no single set of assessment methods or numeric biological criteria is fully applicable nationwide. Therefore, States must take the primary responsibility for adopting their own standard biosurvey methods, integrating them with other techniques at the program level, and applying them in appropriate combinations on a case-by-case basis. Similarly, States should develop their own biological criteria and implement them appropriately in their water quality standards.

EPA Guidance and Technical Support

EPA will provide the States with national guidance on performing technically sound biosurveys, and developing and integrating biological criteria into a comprehensive water quality program. EPA will also supply guidance to the States on how to apply ecoregional concepts to reference site selection. In addition, EPA Regional Administrators will ensure that each Region has the capability to conduct fully integrated assessments and to provide technical assistance to the States.

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Attachment B

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Attachment C

## Relevant Guidance

**Existing documents**

- Chemical-specific evaluations

  Guidance for Deriving National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses (45 FR 79342, November 28, 1990, as amended at 50 FR 30784, July 29, 1985)

  Quality Criteria for Water 1986 (EPA 440/5-86-001, May 1, 1987)

- Toxicity testing

  Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, Second Edition (EPA/600-4-89-001), March 1989)

  Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms (EPA/600-4-87/028, May 1988)

  Methods for Measuring Acute Toxicity of Effluents to Freshwater and Marine Organisms (EPA/600-4-85-013, March 1985)

- Biosurveys and integrated assessments

  Technical Support Manual: Waterbody Surveys and Assessments for Conducting Use Attainability Analyses: Volumes I-III (Office of Water Regulations and Standards, November 1983-1984)

  Technical Support Document for Water Quality-based Toxics Control (EPA/505/2-90/001, March 1991)

  Rapid Bioassessment Protocols for Streams and Rivers: Benthic Macro-invertebrates and Fish (EPA/444-4-89-001, May 1989)

  Hughes, Robert M. and David P. Larsen. 1988. Ecoregions: An Approach to Surface Water Protection. Journal of the Water Pollution Control Federation 60, No. 4: 486-93.

  Omerik, J.M. 1987. Ecoregions of the Coterminous United States. Annals of the Association of American Geographers 77, No. 1: 118-25.

Regionalization as a Tool for Managing Environmental Resources (EPA/600-3-89-060, July 1989)

EPA Biological Criteria - National Program Guidance for Surface Waters (EPA/440-5-90-004, April 1990)

Documents being developed

Technical Guidance on the Development of Biological Criteria

State Development of Biological Criteria (case studies of State implementation)

Monitoring Program Guidance

Sediment Classification Methods Compendium

Macroinvertebrate Field and Laboratory Manual for Evaluating the Biological Integrity of Surface Waters

Fish Field and Laboratory Manual for Determining the Biological Integrity of Surface Waters

San Jacinto River Authority, NPDES Permit No. TX0054186

# Response to Comments Attachment 4

## Page 18 – EPA's National Policy Regarding Whole Effluent Toxicity Enforcement

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

AUG 14 1995

OFFICE OF
ENFORCEMENT AND
COMPLIANCE ASSURANCE

MEMORANDUM

SUBJECT: National Policy Regarding Whole Effluent Toxicity Enforcement

FROM: Robert Van Heuvelen, Director
Office of Regulatory Enforcement
for Michael Cook, Director
Office of Wastewater Management

TO: Water Management Division Directors, Regions I-X
Regional Counsels, Regions I-X
State NPDES Directors

The purpose of this joint memorandum is to clarify National policy with regard to the two most common issues raised by the regulated community involving the enforcement of whole effluent toxicity (WET) requirements in NPDES permits: 1) single exceedances of WET limits, and 2) inconclusive toxicity reduction evaluations (TREs).

Single Exceedances

Section 309 of the Clean Water Act (CWA) states that any violation of a permit condition or limitation is subject to enforcement. Through EPA's "Enforcement Management System" (EMS) guidance, the EPA Regional or State enforcement authority is encouraged to initiate an appropriate enforcement response to all permit violations. EPA's overall approach to enforcement applies to all parameters--once a facility has been identified as having an apparent permit violation(s), the permitting authority reviews all available data on the seriousness of the violation, the compliance history of the facility, and other relevant facts to determine whether to initiate an enforcement action and the type of action that is appropriate. The EMS recommends an escalating response to continuing violations of any parameter.

**EPA does not recommend that the initial response to a single exceedance of a WET limit, causing no known harm, be a formal enforcement action with a civil penalty. The "Whole Effluent Toxicity Basic Permitting Principles and Enforcement Strategy"**

issued by the Office of Water on January 25, 1989 states that any violation of a WET limit is of concern and should receive an immediate, professional review. It does not necessarily require that a formal enforcement action be taken--the enforcement authority has discretion on selecting an appropriate response.

Guidance on enforcement responses to WET violations was added to the EMS in 1989. For example, EPA's recommended response to an isolated or infrequent violation of a WET limit, causing no known harm, is issuance of a letter of violation or an Administrative Order (AO), which does not include a penalty. As with violations of any parameter, the EMS recommends an escalating enforcement response to continuing violations of a WET limit.

The regulated community has expressed concern about the potential for third party lawsuits for single exceedances of WET limits. **Citizens cannot sue a permittee on the basis of a single violation of a permit limit.** Under § 505(a) of the CWA, citizens are allowed to take a civil action against anyone who is alleged "to be in violation" of any standard or limit under the CWA. In Gwaltney of Smithfield, Ltd. v. Chesapeake Bay Foundation, Inc., 484 U.S. 49, 108 S.Ct. 376, 98 L.Ed.2d 306 (1987), the Supreme Court held that the most natural reading of "to be in violation" is "a requirement that citizen-plaintiffs allege a state of either continuous or intermittent violation--that is, a reasonable likelihood that a past polluter will continue to pollute in the future."

Inconclusive TREs

The 1989 "Whole Effluent Toxicity Basic Permitting Principles and Enforcement Strategy" states on page 9:

> "In a few highly unusual cases where the permittee has implemented an exhaustive TRE plan, applied appropriate influent and effluent controls, maintained compliance with all other effluent limits, compliance schedules, monitoring, and other permit requirements, but is still unable to attain or maintain compliance with the toxicity-based limits, special technical evaluation may be warranted and civil penalty relief granted. Solutions in these cases could be pursued jointly with expertise from EPA and/or the States as well as the permittee."

EPA is committed to providing technical support in the "highly unusual cases" described above and is in the process of determining the number of facilities nationwide that fit in this category. As the WET program has grown and evolved, sources for this type of technical support have shifted to EPA Regions, States, and Tribes. In a conference call with Regional permits and enforcement staff in April and feedback from the annual

Biological Advisory Committee in May, the Regions requested support from Headquarters in helping to establish national WET technical expertise to address issues such as inconclusive TREs. There has been a national mechanism for this type of support in the past, as a complement to Regional and State/Tribal efforts (e.g., the National Effluent Toxicity Assessment Center). A national vehicle for this type of effort is currently being evaluated with a view toward providing additional support for the national WET program.

EPA believes that the science behind the WET program and test procedures is sound and continually improving, and fully supports the mid-course evaluations that are being planned and executed through an upcoming WET workshop, as well as other planned or ongoing studies. The September 1995 workshop is being organized by the Society for Environmental Toxicology and Chemistry (SETAC) as part of their Pellston workshop series, through partial funding from EPA and other groups. The purpose of the workshop is to assess where we are in the WET program--i.e., identify technical issues that have been resolved and need no further work as well as explore associated technical issues that do need further research, clarification, or resolution. Because participation in the workshop is by invitation only, an open forum will be held soon after the workshop to discuss the results with all interested parties.

Please call us or have your staff call Kathy Smith (ORE) at 202-564-3252 or Donna Reed (OWM) at 202-260-9532 if you have any questions regarding this matter.

cc: Tudor Davies (OST)
NPDES Branch Chiefs, Regions I-X