



30 March 2005

via e-mail

Water Docket
EPA Docket Center
Environmental Protection Agency
Mail Code 4101T
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460

Attention Docket ID No. OW-2004-0037

RE: Comments on National Whole Effluent Toxicity (WET) Implementation Guidance

Ladies and Gentlemen of U.S. EPA:

The following comments are submitted on behalf of the Colorado Wastewater Utility Council (CWUC). The CWUC is a non-profit organization with more than 40 members comprised municipal and special district wastewater treatment agencies dedicated to promoting and attaining the goals of the Clean Water Act. The purpose of the Council is to participate in educational, scientific, and outreach activities that support the needs of its members as well as the general public. The mission of the Council is to promote professional and responsible environmental protection by supporting legislation and regulations that achieve well-defined benefits while maintaining local flexibility. Collectively, the membership of the Council, which is made up of forty-three public entities, municipalities and special districts, throughout Colorado that treat the wastewater generated by approximately 90% of Colorado's population.

This letter includes the comments on the **National Whole Effluent Toxicity (WET) Implementation Guidance** prepared by Risk Sciences and Chadwick Ecological under the direction of the Colorado Wastewater Utility Council.

All members of the CWUC have a very real, day-to-day, responsibility to meet the goals of the Clean Water Act by installing and operating state-of-the-art wastewater treatment facilities. As such, the Council has a clear understanding of the importance of protecting the environment and the challenges that must be faced to meet that responsibility.

The Colorado Wastewater Utility Council continues to endorse the use of Whole Effluent Toxicity (WET) tests as a valuable tool for protecting water quality in our state. We applaud

EPA's decision to publish Implementation Guidance to clarify how best to integrate WET testing in the current NPDES permitting program.

We appreciate the opportunity to comment on the draft Implementation Guidance. We recognize that we are now entering a new era for WET testing. Throughout the long litigation process related to Whole Effluent Toxicity (WET) test methods, the U.S. Environmental Protection Agency repeatedly indicated that many of the issues raised by petitioners were best remedied through the implementation process rather than by modifying the test methods themselves:

The interpretation and application of [toxicity] test results are part of the implementation policy and are not addressed in this rulemaking...¹

In December of 2004, the U.S. Court of Appeals-D.C. Circuit concurred with the Agency's view and drew a sharp distinction between adopting a method of measurement and relying actual measurements from that method in regulatory practice:

There is an important distinction between the validity of a test method and the validity of a particular result from the test when it is used to determine compliance with permit conditions. Even EPA's calculations [show] WET tests will be wrong some of the time. ...Nothing we have written ... forecloses consideration of the validity of a particular test in an enforcement action. That issue is not before us. The case involves only the validity of the WET test methods... we are concerned here only with test methodology, not the results of particular tests in the field. Our decision does not endorse the validity of any test result in the future, nor does it foreclose a defense that the result is wrong. Those issues are simply not presented in this judicial review of rulemaking."² (emphasis added)

In other guidance documents, EPA warns that:

The interpretation of the results of the analysis of the data from any of the toxicity tests described in this manual can become problematic because of the inherent variability and sometimes unavoidable anomalies in biological data.³

The allowable frequency for criteria excursions should refer to true excursions of the criteria, not to spurious excursions caused by analytical variability or error.⁴

¹ USEPA. Whole Effluent Toxicity: Guidelines Establishing Test Procedures for the Analysis of Pollutants - Supplementary Information Document. October 2, 1995 @ pg. 28.

² Edison Electric Institute, et al v. Environmental Protection Agency; Case No. 96-1062; Dec. 10, 2004 pgs. 8-9

³ USEPA. Short-Term Methods for Estimating the Chronic Toxicity of Effluent and Receiving Water to Freshwater Organisms, Fourth Ed. EPA-821-R-02-013. October, 2002. Section 9.4.1.1 @ pg. 39

⁴ USEPA. Technical Support Document for Water Quality-based Toxics Control; EPA-505/2-90-001; 1991. See Appendix entitled: "Technical Support Document for Water Quality Based Toxics Control - Responsiveness Summary;" May 9, 1991 @ pg. 11

The mere existence of analytical variability does not invalidate the WET method or any particular test result. However, federal courts have ruled that the possibility of measurement error...

*...deprives the agency of the power to find a violation of the standards, in enforcement proceedings, where the measured departure from them is within the boundaries of the probable measurement error.*⁵

We recognize that EPA has published several other guidance documents intended to explain how to minimize and account for test variability. Nevertheless, in our day-to-day experience, we still find that test variability is the single greatest barrier to more effective use of WET test results. No problem is more vexing than that which occurs when two separate bioassay laboratories analyze identical split samples and report contradictory conclusions as to whether the effluent is toxic or not. This occurs despite the fact that both laboratories are required to adhere rigorously to EPA's WET variability guidance documents.

Therefore, if the WET test methods are to remain useful as regulatory tools, the Implementation Guidance must inform state and federal permitting authorities on how to account for residual measurement error in a manner that complies with previous court rulings. Specifically:

- 1) When a large number of toxicity test results are used to evaluate reasonable potential the permitting authorities must account for the number of Type-I errors that are expected to occur. EPA guidance recommends using a 95% confidence level when conducting statistical analyses of WET test data. Consequently, on average, 5% of all toxicity tests performed will falsely indicate the presence of toxicity in a non-toxic sample.⁶

While the risk of error is relatively low for any single test, it is very high when are large number of statistical analyses are performed. For example, if a discharger conducts chronic toxicity tests on two species (fish & invertebrate) once per quarter, a total of 80 statistical analyses will be performed over the 5 year life of a typical NPDES permit. The probability of passing all 80 tests is less than 2% even if the discharge is chemically identical to the non-toxic control water used by the laboratory. Table 1 illustrates the cumulative risk of error for this sampling scenario.

The formula for calculating the data shown in Table 1 can be found in any standard college textbook on statistics. The formula can also be verified by performing simple Monte Carlo simulations. The probability of observing an exact number of errors (X) in a large number of analyses (N) when the risk of error for any single test (P) is only 5% is:

$$[X! / [(N-X)! * X!]] * P^X * (1 - P)^{N-X}$$

⁵ *Amoco Oil Co. v. EPA*, 501 F.2d 722 (D.C. Cir. 1974)

⁶ This statistical phenomena is discussed in relation to reference toxicant tests in USEPA. Short-Term Methods for Estimating the Chronic Toxicity of Effluent and Receiving Water to Freshwater Organisms, Fourth Ed. EPA-821-R-02-013. October, 2002. Section 4.16.5 @ pg. 16 but is true for any random sample of non-toxic waters also.

The cumulative risk of error rises dramatically as the number of statistical analyses increases. Table 2 illustrates the cumulative risk of error when monthly chronic toxicity tests are performed on three species (fish, invertebrate & plant) during a normal 5-year permit term. Such a monitoring program requires 300 statistical analyses to be performed.

Table 1: Cumulative Probability of Type-I Errors in Quarterly Chronic Test Regime

# of Type-1 Errors Observed in 80 Statistical Analyses	Probability of Observing EXACTLY as many Type-1 Errors	Probability of Observing AT LEAST as many Type-1 Errors
0 in 80	1.7%	
1 in 80	8.6%	98.3%
2 in 80	14.4%	91.4%
3 in 80	19.8%	76.9%
4 in 80	20.0%	57.2%
5 in 80	16.0%	37.1%
6 in 80	10.6%	21.1%
7 in 80	5.9%	10.5%
8 in 80	2.8%	4.7%
9 in 80	1.2%	1.8%

Note: In a quarterly test regime, 20 samples will be analyzed over a 5-year permit term. 80 statistical analyses are required because two different biological endpoints (survival and sublethal growth or reproduction) are evaluated for both the fish and invertebrate test species. 5 years x 4 quarters x 2 species x 2 endpoints = 80 statistical analyses total.

A plain English explanation of Table 1:

If 1,000 permittees were to initiate quarterly chronic toxicity tests using two species on a non-toxic effluent, only 17 would pass all 80 statistical analyses. The other 983 non-toxic effluents would fail at least one toxicity test regardless of the actual water quality. In addition, 572 of the permittees would report AT LEAST four false toxicity test failures during the 5 year monitoring period. And, 12 of the 1,000 dischargers would observe 9 false failures - nearly 2 per year.

The CWUC understands that some level of test imprecision is inevitable when biological organisms are used to evaluate water quality (see memorandum for Chadwick Ecological Consultants, Inc. attached as Appendix-A to this Comment Letter). However, there remains considerable variability in test results even after dischargers and laboratories enact all of EPA's previous recommendations to minimize such problems.

To the extent some errors are irreducible, and beyond the discharger's control, it is essential that state authorities recognize that fundamental truth and not assume all test failures are prima facie evidence of a permit violation. We believe this is what the court intended in the Amoco case.

Table 2: Cumulative Probability of Type-I Errors in Monthly Test Regime

# of Type-1 Errors Observed in 80 Statistical Analyses	Probability of Observing EXACTLY as many Type-1 Errors	Probability of Observing AT LEAST as many Type-1 Errors
0 in 300	.00002%	---
1 in 300	.0003%	99.99998%
2 in 300	.003%	99.9997%
3 in 300	.01%	99.997%
4 in 300	0.1%	99.98%
5 in 300	0.2%	99.93%
6 in 300	0.4%	99.77%
7 in 300	0.9%	99.34%
8 in 300	1.8%	98.4%
9 in 300	3.1%	96.6%
10 in 300	4.7%	93.5%
11 in 300	6.6%	88.8%
12 in 300	8.3%	82.2%
13 in 300	9.7%	73.9%
14 in 300	10.5%	64.2%
15 in 300	10.5%	53.7%
16 in 300	9.9%	43.2%
17 in 300	8.7%	33.3%
18 in 300	7.1%	24.7%
19 in 300	5.6%	17.5%
20 in 300	4.1%	11.9%
21+ in 300	---	7.8%

Note: monthly testing will evaluate a total of 60 effluent samples over the course of 5 years. Each month five separate statistical analysis are performed: fish survival, fish growth, invertebrate survival, invertebrate reproduction and plant growth. Therefore a total of 300 separate statistical analysis will be conducted. And, each biological endpoint is statistically independent from all the others when a sample is stipulated to be non-toxic.

The plain English explanation for Table 2:

If 1,000 dischargers perform monthly chronic toxicity tests on three species, the probability of passing all 300 statistical analyses is 0.00002% (1 in 5 million) even if the effluent is chemically identical to the non-toxic control water used by the laboratory. Nearly 75% of the permittees will record 13 or more false failures during the 5-year monitoring period

Most end-users of WET test results, including many state and federal regulators mistakenly expect non-toxic effluents to fail few if any WET tests because the risk of Type-1 error is very low for any individual test. The Implementation Guidance must correct this misunderstanding and describe how the absolute number of false positives varies as a function of the number of tests performed even though the average remains just 5% of the total. Some regulatory authorities have misinterpreted previous EPA guidance to mean that there can be no instance where the number of Type-1 errors ever exceeds 5% at any given location. Therefore, EPA must inform those who rely on WET test results that 5% expected error rate is an average over a large number of tests. If 100 dischargers each perform 100 WET tests, it is very unlikely that all 100 will have exactly 5 Type-1 errors. Some will have more, some will have less - but the overall average will be about 5%. Table 1 illustrates just how variable individual discharger results can be over time.

Absent appropriate guidance on the proper interpretation of Type-1 errors, state and federal regulatory authorities will continue to misunderstand the meaning and import of a few WET test failures among a large number of tests performed. This, in turn, can (and has) led to mistakes in making reasonable potential determinations, compliance determinations and water quality assessments (305b and 303d reports).

Because analytical variability cannot be considered during an enforcement proceeding, it is essential to instruct state and federal authorities to account for the possibility of such errors during the permitting process. In addition, although EPA guidance now recommends that the nominal error rate be set to 5%, the new Implementation Guidance should inform end-users that states retain discretion to adopt a 1% threshold where appropriate.

- 2) The Implementation Guidance should describe, in detail, how to use the Coefficients-of-Variation EPA published for each WET test method. This is particularly important because EPA was unable to develop a Method Detection Level (MDL) for WET. Consequently, although WET test methods exhibit variability that is comparable to chemical testing, there is presently no mechanism by which to evaluate the range of uncertainty associated with any given WET test result. The Coefficient-of-Variation should be used to remedy the problem.

EPA recently published the Coefficient-of-Variation (CV) for each WET test method based on results from a large-scale interlaboratory study. However, the Agency failed to tell state and federal regulatory authorities how to use this new information.

The Coefficient-of-Variation is a measure of test precision which can be used to estimate the range of uncertainty associated with any given WET test result. For example, according to EPA's calculations, the Ceriodaphnia dubia chronic reproduction test has a CV of 0.35. If a specific WET test finds that the IC-25 is 76%, then a more accurate way to report the result is as "IC25 = 76% \pm 53%" or, alternatively, " IC25 = 76% (95% confidence range = 23% - >100%). "

Table 3 shows how range of precision varies in relation to the reported IC₂₅ value and the related Coefficient-of-Variation EPA identified for two popular chronic freshwater methods.

Table 3: 95% Confidence Range of Test Precision for IC₂₅ Values

Reported IC₂₅	Fathead minnow Growth (CV=21%)	C. dubia Reproduction (CV=35%)
5%	3% - 7%	2% - 9%
10%	6% - 14%	3% - 17%
15%	9% - 21%	5% - 26%
20%	12% - 28%	6% - 34%
25%	15% - 36%	8% - 43%
30%	17% - 43%	9% - 51%
35%	20% - 50%	11% - 60%
40%	23% - 57%	12% - 68%
45%	26% - 64%	14% - 77%
50%	29% - 71%	15% - 85%
55%	32% - 78%	17% - 94%
60%	35% - 85%	18% - >100%
65%	38% - 92%	20% - >100%
70%	41% - 99%	21% - >100%
75%	44% - >100%	23% - >100%
80%	46% - >100%	24% - >100%
85%	49% - >100%	26% - >100%
90%	52% - >100%	27% - >100%
95%	55% - >100%	29% - >100%
100%	58% - >100%	30% - >100%

Once again, in plain English, Table 3 shows that when a lab reports that the IC₂₅ is estimated at 25% for a given effluent sample, 95% of the time another lab analyzing an identical split sample using the same method will report an IC₂₅ value somewhere between 8% and 43% effluent for Ceriodaphnia dubia reproduction and between 15% and 36% for Fathead minnow growth. This is precisely the pattern of results EPA routinely observes in the annual DMR-QA studies when more than 100 labs perform chronic WET tests. It is also important to note that the range of precision is much narrower for the chronic survival because the level of natural background variability is much lower for those endpoints.

Similar results are also evident within labs as well as between labs. All laboratories that perform WET testing maintain control charts to track the health of their culture organisms. Reviewing these charts reveals that laboratories routinely observe a very wide variation in results from monthly tests conducted using reference toxicants (see, for example, Figure 3 in Appendix -A attached to this Comment Letter).

In practice, EPA deems all results that fall within the 95% confidence range as functionally-equivalent and "acceptable." However, all answers are not equally "acceptable" from the discharger's point of view. For example, if the maximum allowed instream waste concentration was 30%, then the reported value of 25% would cause the test to be considered a "failure." This occurs despite the fact that an identical split sample may have estimated the IC25 at 32%; a non-toxic result. Both estimates, 25% and 32%, are well within the expected range of precision for the other. But, one results in a permit violation and the other does not. This is an improper and unfair use of WET test results. And, it is the most important issue that the Implementation Guidance must address.

In the interlaboratory WET variability study, EPA used several sophisticated tools, such as ASTM's h & h statistics, to identify and censor "outliers" from the dataset. Unfortunately, such tools require dischargers to perform a large number of WET tests on identical split samples. That is simply cost prohibitive. Moreover, it is unnecessary. The precision range can easily be calculated from the CV data EPA published without having to run parallel tests at different labs.

Calculating the range of certainty based on the CV is simply a short-cut to estimating how the results might vary if a very large number of identical split samples were analyzed simultaneously. The 95% "error band" is equivalent to saying that 95% of the identical split samples would report an IC25 somewhere between 23% and 100% effluent.

The question of whether to report the 95% confidence range, the 99% confidence range, or some other confidence range is one that each state must answer for themselves. However, reporting WET test results without acknowledging the intrinsic level of precision published by EPA routinely leads to misuse and misapplication of the data by state and federal regulatory authorities.

As noted earlier, the federal courts have ruled that it is essential to know the error band for any given test result before that data can be used to make a compliance determination. Therefore, EPA must describe how to use the CV's for each method to calculate and report such error bands.

- 3) When WET test results are reported as the No-Observed-Effect-Concentration (NOEC), EPA's recommended acceptance range should be applied before using the data to make regulatory decisions. While performing a large-scale interlaboratory study to validate WET test methods, EPA reported that normal measures of variability (such as the Coefficient-of-Variation) cannot be to NOEC-LOEC data. However, EPA established an "Acceptance Range" of the median value plus or minus one concentration interval in the dilution series.

In practice, this means that when multiple labs identify identical split samples of a single effluent, with a true NOEC of 25% the reported NOEC will range between 12.5% and 50%. All values within that range are deemed an "acceptable" estimate of the true NOEC. EPA relied on a similar range of precision to evaluate reported NOEC values in both the WET Interlaboratory Variability Study (2000) and in all of the DMR-QA studies performed since 1992.

The Implementation Guidance should make clear to state and federal regulatory authorities that any reported NOEC value must be evaluated in light of the published acceptance range. It would be unreasonable to accept that laboratory estimates of toxicity will vary by plus or minus 100%, but fail to acknowledge or account for this "error band" when using WET test results to evaluate compliance or assess reasonable potential. Doing otherwise will lead to significant errors in regulatory decision making.

The U.S. Court of Appeals warned of this in their recent decision regarding WET test methods:

[Petitioner's] concern is that some discharge permits may specify an acceptable non-zero level of toxicity, which the effluent may not exceed, and that the WET tests have the potential to produce arbitrary permit violations. For example, if a permittee were subject to a toxicity limit of 3 TUC, and a WET test of its effluent would yield a 2 TUC result most of the time, but up to 4 TUC some of the time, the latter outcome would constitute a permit violation and potentially trigger an EPA enforcement action. This is certainly a problem for which EPA's system must account.⁷

In concurring with EPA that the level of intrinsic variability was not "excessive," the Court did not give regulators the license to ignore the acknowledged level variability altogether. Rather, is something that "must" be accounted for. Relying on WET test results that are reported without an appropriate confidence range fails to account for the inherent variability of the method as required by the court. And, just as the court noted, the variability can result in errors that either over- or under-estimate toxicity. In either case, the regulatory purpose is ill-served when such variability is not reported.

- 4) The Implementation Guidance should make clear that failure of a WET test, per se, does not necessarily constitute a violation of water quality standards. EPA has repeatedly written that it was not promulgating a water quality standard for toxicity when it adopted the WET test procedures into 40 CFR Part 136.⁸ This is consistent with the recent federal court ruling:

"States retain discretion, subject to EPA guidance and recommendations, to set their toxicity thresholds in order to compensate for local conditions at the permitting stage. In light of this discretionary, rather than mandatory, nature of state implementation of standards and thresholds...the WET program [is not] an illegal federal water quality standard...Before implementing a test method, EPA must establish that the measured

⁷ Edison Electric Institute, et al v. Environmental Protection Agency; Case No. 96-1062; Dec. 10, 2004 pg. 8

⁸ See, for example, 60 Fed. Reg. 199 @ 53529 (Oct. 16, 1995) and 67 Fed. Reg. 223 @ 69969 (Nov. 19, 2002)

characteristic bears a rational relationship to real-world conditions... 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 rule-making 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 the local authorities are regulating at a level that poses only a minimal risk to aquatic life.⁹

Before WET test results can be used in a reasonable potential determination or to assess permit compliance, state regulatory authorities must "translate" the narrative criteria using approved toxicity test methods. This is particularly important where the natural ionic chemistry of local water supplies may interfere with the conduct and interpretation of WET tests. Several examples serve to illustrate the problems encountered:

Example-A: In many cities, local water supplies are very soft. Extreme low hardness is known to adversely impact the normal rate of reproduction in *Ceriodaphnia dubia*. In this instance, it is the absence of essential elements rather than the presence of harmful pollutants that may lead to mistaken conclusions about effluent "toxicity."

Example-B: Storm water samples routinely fail chronic toxicity tests because rainfall (and most snowmelt from the Colorado Rockies), is naturally low in conductivity and pH. Generally speaking, rain water is ill-suited for optimum growth of the standard species used as indicator organisms in WET testing.

Example-C: Many states in the arid southwest rely extensively on groundwater to meet public demand for potable water supplies. The natural chemistry of groundwater is distinctly different from surface freshwater. The balance of ions in groundwater may be less than ideal to support maximum growth and reproduction in the standard test species.

In each of these real-world examples, the presence of toxic pollutants is often inferred prematurely from WET test failure. This occurs because most state regulatory authorities improperly equate the WET test method with a water quality standard. We believe this occurs because state agencies fail to go through their normal rule-making process when adopting a water quality standard for Whole Effluent Toxicity. EPA requires states to publish "Implementation Procedures" to describe how compliance with narrative toxicity criteria will be assessed. However, in most states, such procedures are considered "guidance" and are not required to be adopted into rule or meet public participation requirements.

The new Implementation Guidance must make clear that EPA views the state implementation procedures to be an essential element of the state's narrative water quality standards. If EPA would not approve the state standards in the absence of such implementation procedures, then the Agency should so state. If the EPA did so, then the states would be required to enact WET requirements in the same manner as for any other chemical pollutant ... through formal notice and rule-making.

⁹ Edison Electric Institute, et al v. Environmental Protection Agency; Case No. 96-1062; Dec. 10, 2004 pgs. 12-13

Finally, the Implementation Guidance should clarify that states are not required to use the sublethal endpoints when developing procedures to implement the narrative water quality criteria unless it is necessary to do so to meet state standards. Several of EPA's regional offices have improperly informed state regulators that the chronic sublethal endpoints are required because they are part of the method. This is occurring despite the fact that EPA published a summary review of field validation studies showing that, unlike the WET mortality endpoints, the sublethal test endpoints could not be correlated with actual instream conditions.¹⁰

As EPA previously acknowledged, promulgation of a toxicity test method does not constitute adoption of a water quality standard for WET. If EPA's Regional Offices persist in telling state authorities that sublethal endpoints "must" be used then, in fact, the method promulgation is being used to establish de facto water quality standards contrary to what EPA told the U.S. Court of Appeals.

CONCLUSION & RECOMMENDATIONS

Variability is a fact of life for all test methods- chemical and toxicological. EPA's previous guidance was an important and useful first step in minimizing analytical error in WET testing. However, there remains a level of variability that is simply intrinsic to the use of biological organisms as measurement "devices."

Long years of experience have taught permitting authorities that values below the chemical MDL are not sufficiently reliable for most regulatory purposes. The absence of an MDL for WET test methods has led to the mistaken belief that all reported estimates of toxicity are equally precise and reliable. This, in turn, leads directly to errors when assessing attainment with water quality standards, making reasonable potential determinations and when evaluating permit compliance.

The Colorado Wastewater Utility Council strongly recommends that EPA use the results of the WET Interlaboratory Variability Study (2000) and the DMR-QA data generated over the last 10 years to inform state and federal permitting authorities on how to interpret the precision WET test results correctly. This can be accomplished by coaching state regulators to work with a "precision range" just as EPA has been doing for years.

CWUC is not asking for any fundamental programmatic change; only that dischargers be given the same consideration EPA routinely gives when auditing laboratory - acknowledgement that test results vary within a predictable range and that all values within the "error band" are functionally-equivalent and acceptable. Even occasional "spikes" in the reference toxicant control chart are deemed, by EPA, to be inevitable and unavoidable Type-1 test error when a larger number of tests are performed.

EPA readily admits that the WET test isn't perfect. That the test has limitations does not limit its utility unless those limitations are ignored. Toxicity is a zero-tolerance pollutant. State authorities rightfully expect permittees to discharge non-toxic effluent. However, they also

¹⁰ USEPA. A review of Single Species Toxicity Tests: Are the Tests Reliable Predictors of Aquatic Ecosystem Community Responses? EPA/600/R-97/114 (January, 1999)

assume that the only way to demonstrate that has occurred is to pass each and every WET test that is performed. It is impossible to demonstrate treatment perfection with a test method that is imperfect.

Our recommendations can be summarized as follows:

- 1) Calculate and consider the number of Type-1 errors likely to occur when a large database of WET test results used to evaluate attainment with water quality standards (305b & 303d) or to make reasonable potential determinations.
- 2) Calculate and consider the precision associated with each test method and include the "error band" associated with all reported toxicity estimates (NOEC, LC, IC, etc).
- 3) Require states to submit their WET implementation procedures to formal rule-making so that the method itself is not mistaken for a water quality criterion and to ensure public participation requirements are met.
- 4) Recognize that mortality endpoints are inherently more reliable than sublethal endpoints because they are less variable. Inform states that federal law and regulation do not require use of sublethal endpoints as enforceable pass/fail permit limits.

Respectfully submitted,



On behalf of the Colorado Wastewater Utility Council



Timothy F. Moore
Risk Sciences
1417 Plymouth Dr.
Brentwood, TN 37027
Phone: 615-370-1655
Fax: 615-370-5188
Email: tmoore@risk-sciences.com