Whole Effluent Toxicity Testing: Revisions to Consider Standards Implementation Procedures

TCEQ Staff Draft: May 5, 2008

Changing applicability to include the following statement:

Drinking-water facilities using reverse osmosis/desalination don't require WET testing.

Changing statistical interpretation to include increased confidence for determining a sublethal failure:

If significant toxicity is demonstrated (that is, if there is a statistically significant difference in a measured response at the critical dilution when compared to the control), but the conditions of test acceptability are met and the measured endpoint equals or exceeds the acceptability criteria at the critical dilution and all dilutions below that, then the permittee may report an endpoint of not less than the critical dilution as the response.

In addition, for sublethal responses, the nominal error rate (alpha) used for hypothesis testing in WET data analysis will be 0.01 (99% confidence interval). For lethal responses, alpha remains 0.05 (95% confidence interval). The alpha level for sublethal statistical analysis was modified to meet with EPA guidelines (EPA 821-R-B-00-004).

Adding the following interpretation on how to assess reasonable potential determination for permit applications:

Option 1. For those permittees that meet the applicability criteria for WET testing, the EPA now requires a predictive approach to determining reasonable potential (RP) for violating narrative criteria regarding toxicity. For new permittees and/or permittees that have never previously performed WET testing, such a determination isn't possible. Therefore, quarterly testing will be required in order to make the assessment.

Permittees with WET testing requirements and demonstrating persistent significant lethality will already be performing toxicity reduction evaluations (TREs) and will likely receive a toxicity control measure at the end of the TRE.

Permittees demonstrating persistent sublethality were not previously required to initiate TREs. Therefore, during the permit renewal or amendment process, the TCEQ will now make an RP determination. The permittee will be required to initiate a sublethal TRE if, over the past five years, the permittee has:

- Demonstrated significant sublethality in greater than 50% of the tests performed for either test species, counting only those results where the NOECs (no observed effects concentrations) were less than 50%,
- Demonstrated significant sublethality in at least two tests over the past two years, and
- Demonstrated significant sublethality in at least one test in the past year.

Option 2 (based on EPA WET guidance document). During the permit renewal or amendment process, the TCEQ will (for both lethal and sub-lethal effects):

- Determine the maximum effluent concentration for toxicity for the last five years of data,
- Apply an uncertainty multiplier to account for variability, and
- Use the derived values to assess for in-stream toxicity.

RP would exist if the in-stream toxicity concentration determined is higher then the proposed critical dilution.

In these cases, a WET limit will be included in the re-issued permit, with a compliance period of up to three years.

Toxicity Reduction Evaluations (TREs):

Sublethal TRE (TRE_s). If a permittee fails a WET test, that is, statistically significant sublethality occurs at the critical dilution, the permittee will conduct three retests with that test species. The retests are to be conducted monthly during the next three consecutive months. If significant sublethality is demonstrated by failure of two or more of the three retests, the permittee will perform a TRE_S. However, for a TRE_S to have a chance to be successful, the toxicity must be of sufficient magnitude. Therefore, NOECs of 50% or greater will not be considered "failures" when making a TRE_S determination.

Sublethal WET Limit. A TRE_S will be evaluated and implemented similarly to TREs for lethal toxicity, and a sublethal WET limit can eventually be established if a specific chemical toxicant cannot be identified. A TRE will always precede a sublethal WET limit. This option is similar to that for lethal WET limits, but the period allowed for completing the TRE may be extended when a toxicant cannot be identified. In addition, the definition of compliance with a sublethal WET limit is different than for a lethal WET limit.

Toxicity Reduction Evaluations (TREs) - 24 hour acute testing:

Failing a 24-hour acute WET test necessitates two retests over consecutive weeks (unless retesting concurrently with chronic test failure; in such a case, the permittee may defer to the chronic monthly retest schedule).

Toxicity attributable to Diazinon:

The Standards previously contained a special provision for those domestic wastewater facilities entering TREs due to Diazinon toxicity.

However, since Diazinon can no longer be sold to the public, the previous conditions granting the TRE exemption (primary cause of toxicity and ubiquitous within the wastewater collection system) can no longer be met, so the special provision is no longer included in the Standards. Diazinon will now be treated as any other toxicant, subject to effluent limits.