SETAC New Orleans Session: Whole Effluent Toxicity Testing, 20 years and going strong.

Applications of Toxicity Testing as a Tool: Things We've Learned

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Whole effluent toxicity (WET) testing methodologies have been widely used to assess potential adverse effects of wastewater discharges on aquatic life in the United States since the 1970's. The tests have been incorporated into the U.S. Environmental Protection Agency's Water Quality Based Approach to control discharges of toxic materials in toxic amounts to aquatic systems. Test organism responses integrate chemical, biological, and physical aspects of effluents, ambient waters, storm waters, produced waters, and other aqueous mixtures while chemical analyses simply focus on select parameters. Toxicity testing provides information on a host of compounds, breakdown compounds, or combinations of compounds that may not be expected or tested for in a discharge. In addition, toxicity testing can provide information on toxic compounds for which test methods may not even exist. All of the acute and sublethal test freshwater and marine methods have specific test acceptability criteria but results of tests have shown that laboratories do not always follow the methods as prescribed that in turn may affect the determination of acute and sublethal toxicity. For example, the chronic Ceriodaphnia dubia test is a three brood test and the broods can be identified as the young are counted, which means that the test may be a 6-d, 7-d, or 8-d test. Typically three broods may produce from 20-35 per female, but data reports have shown 7-d tests with young counts as high as 45-55 per female which indicates that four broods have been counted. In this paper, we discuss the progress that has been made in the conduct and application of the tests and discuss a variety of ways laboratories may not always meet the required TAC as required which can invalidate tests. We will also discuss the data reviews needed and the application of the performance requirements to each test result to ensure accurate interpretation of effluent toxicity. As the tests are more routinely used, we will discuss some of our observations and misapplications that occur in the areas of effluent sampling and renewal, reference toxicant testing, counting of three broods for test termination, and more. Finally, we will discuss the progress that has been made in effluent testing from our perspective and discuss the some challenges.

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