

## **CSSD Whole Effluent Toxicity (WET) Test Program (Including a Modification for Low Ionic Content Effluents)**

### **Standard WET Testing Program**

#### **Background**

WET testing is used to identify effluent toxicity which may be caused by the aggregate and/or synergistic toxic effects of a mixture of pollutants and other water quality parameters. WET testing is required by CSSD Standard 1 in order to evaluate the potential for CWT effluent toxicity. WET testing is also required as a part of ongoing effluent quality monitoring for facilities operating under the standard unless CSSD determines ongoing WET testing is not necessary in a particular case. WET testing will be conducted every six months, beginning six months after results are finalized for the initial WET test, unless CSSD determines another timeline is appropriate.

#### **Specifications**

Acute and chronic toxicity tests will be completed using the water flea (*Ceriodaphnia dubia*) and fathead minnow (*Pimephales promelas*). An additional chronic test will be completed using the alga *Raphidocelis subcapitata* (formerly known as *Selenastrum capricornutum* and *Pseudokirchneriella subcapitata*). All testing will be conducted in accordance with the following EPA methods [EPA 2002a,b]:

- 2002.0 *Ceriodaphnia dubia*, acute
- 2000.0 Fathead Minnow, *Pimephales promelas*, acute
- 1002.0 *Daphnia*, *Ceriodaphnia dubia*, survival and reproduction
- 1000.0 Fathead minnow, *Pimephales promelas*, larval survival and growth.
- 1003.0 Green alga, *Selenastrum capricornutum* (renamed to *Raphidocelis subcapitata* and also may be referred to as *Pseudokirchneriella subcapitata*), growth.

Tests will be conducted at five effluent concentrations using a dilution factor of 0.5 (see, for example, EPA 2002b, p. 204). Testing will be conducted under laboratory specific quality control standard operating procedures (SOPs) which are in conformance with NELAC and US EPA guidelines, where applicable.

### **Modification for Low Ionic Content Effluents**

#### **Background**

Some wastewater treatment processes, such as distillation and reverse osmosis, may create effluents that are toxic due to the absence of salts or ions required to support aquatic life (ionic imbalance toxicity [SETAC 2004]). Low ionic content effluents that are expected to fail the **Standard WET Testing Program** may be evaluated for toxicity using this modification. The ionic imbalance toxicity is addressed by adding simple salts to effluent samples prior to testing for whole effluent toxicity. This modification is intended to capture any additional toxicity that might be present due to effluent pollutants.

#### **Modifying Effluents for Ionic Imbalance Toxicity**

Prior to preparing test solutions, effluent samples will be modified by the addition of physiologically required ions as specified in the EPA moderately hard synthetic freshwater recipe [EPA 2002a, p. 32]. Otherwise, all other requirements outlined in this Standard WET Testing Program remain the same.

## **Reporting Requirements**

The laboratory should provide the Operator with proof of proper accreditation. The laboratory will provide a final report specifying sampling and testing methods, test conditions, amended effluent and test solution properties, materials, results, statistical determination of organism survival and reproduction rates at the established effluent concentrations, any unforeseen laboratory protocol deviations, any results that indicate a potential effluent toxicity, and conclusions and recommendations based on results. . In the event results or laboratory conclusions indicate a potential effluent toxicity, the appropriate EPA guidance documents will be followed, unless CSSD establishes otherwise, and CSSD will assist as needed with detailing the proper procedures for ongoing analysis.

## **References**

EPA 2002a, "Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms," Method Manual EPA-821-R-02-012, Fifth edition, U.S. Environmental Protection Agency, Office of Water, Washington, DC , available at:  
[http://water.epa.gov/scitech/methods/cwa/wet/upload/2007\\_07\\_10\\_methods\\_wet\\_disk2\\_atx.pdf](http://water.epa.gov/scitech/methods/cwa/wet/upload/2007_07_10_methods_wet_disk2_atx.pdf).

EPA 2002b, "Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Water to Freshwater Organisms," Method Manual EPA-821-R-02-013, U.S. Environmental Protection Agency, Office of Water, Washington, DC, Fourth edition, available at:  
[http://water.epa.gov/scitech/methods/cwa/wet/upload/2007\\_07\\_10\\_methods\\_wet\\_disk3\\_ctf.pdf](http://water.epa.gov/scitech/methods/cwa/wet/upload/2007_07_10_methods_wet_disk3_ctf.pdf).

SETAC 2004, "Whole Effluent Toxicity Testing: Ion Imbalance," Technical Information Sheet, Society of Environmental Toxicology and Chemistry, Pensacola, FL, available at:  
[https://www.setac.org/resource/resmgr/publications\\_and\\_resources/tip-ion.pdf](https://www.setac.org/resource/resmgr/publications_and_resources/tip-ion.pdf).