



Recommendation No. 123

May 23, 2000

Whole Effluent Toxicity (WET) Testing Impacts on SRS Wastewater Outfalls

Background

The federal Clean Water Act (CWA) sets up the basic requirements for regulating toxic substances discharged to waters of the United States. The CWA states that the discharge of such substances in toxic amounts is prohibited. To protect water quality, EPA recommends an integrated approach for controlling toxic pollutants that uses whole effluent toxicity (WET) testing to complement chemical-specific analyses as a means to protect both aquatic life and human health. The South Carolina Department of Health and Environmental Control (SCDHEC) has incorporated this approach in its administration of the wastewater permitting process called the National Pollutant Discharge Elimination System (NPDES).

As part of the NPDES program, wastewater dischargers, like SRS, are required to perform WET tests. In WET tests, aquatic organisms are exposed to various dilutions of effluent for a specific time period, in order to predict at what levels the effluent may cause harm to the organisms. The organisms used in the SRS WET test is commonly referred to as a "water flea". Its scientific name is *Ceriodaphnia dubia*, which belongs to a group of freshwater invertebrates that are a major component of freshwater zooplankton. A test pass or fail depends on the comparison (e.g., at what level death, reproductive impairment, or growth inhibition occurs) between field samples and a control sample.

For several years, the WET test has come under scrutiny because of its variability. The textile industry has found that hardness, salinity, alkalinity, and specific causes of alkalinity can influence the survival and reproduction of the *Ceriodaphnia dubia*. Other studies have found that the test can generate up to 40% false positives on clean water samples. In 1999, seven of the ten NPDES exceedances at SRS were toxicity testing failures. Because of these failures, SRS is required to conduct a Toxicity Identification Evaluation (TIE) to determine the specific agent(s) causing the toxicity. TIEs are complicated and expensive and often do not provide a definitive answer to the toxicity source.

SRS has concerns with the WET test method since some scientific evidence indicates that the test may be unreliable and inaccurate. Furthermore, they have experienced that the test organism has a difficult time surviving and reproducing in the "soft waters" at SRS. They would prefer to use a test organism that is native to the local environment. Presently, SRS is in the process of developing an Alternate Species Investigation Plan and is proposing to use the organism *Daphnia ambigua*. Both EPA and SCDHEC are aware of this alternative species investigation.

Comment

The SRS CAB is very interested in the outcome of this alternative species investigation and the Toxicity Identification Evaluation (TIE) project. The CAB's concerns cover both the technical aspects and the cost of each initiative.

Recommendation

To address these concerns, the SRS CAB recommends the following:

1. By July 25, 2000, DOE provide to the SRS CAB a cost estimate for conducting the Alternate Species Investigation Plan and the Toxicity Identification Evaluations. If the Alternate Species Investigation Plan is successful, the SRS CAB assumes that the Toxicity Identification Evaluations will not be required to comply with the WET testing. The SRS CAB would like to evaluate the cost between these two efforts.
2. By September 26, 2000, EPA is requested to provide the SRS CAB with an update of the referenced technical information regarding the validity of the WET test for variations in wastewater pH, TDS (total dissolved solids or salts), and other variables that could affect the

test outcome. The SRS CAB would like to evaluate the overall usefulness of the WET test if false positives are a chronic problem.

3. By November 14, 2000 or sooner if additional information becomes available, DOE provide an update to the SRS CAB on the status of the Alternate Species Investigation Plan and the Toxicity Identification Evaluation project. Included in the Alternate Species Investigation Plan update, should be a discussion on: (a) how successful the new organism is in predicting whole effluent toxicity (WET) testing that is protective of both aquatic life and human health; (b) the commercial availability of the new organism; (c) the cost provided in recommendation number one above and (d) the regulatory standardization (EPA approval) of the new organism.

References

1. Society of Environmental Toxicology and Chemistry (SETAC) Webpage, www.setac.org
2. EPA Office of Wastewater Management Whole Effluent Toxicity (WET) Program Webpage, www.epa.gov/OST/WET/
3. Consortium on Competitiveness for the Apparel, Carpet, and Textile Industries (CCTI) Baseline Toxicity Studies on Textile Effluent 1997 project report, www.fcs.uga.edu/tmi/news/ccacti/projects.html
4. Toxicity Testing Challenges at SRS Wastewater Outfalls, presentation to the CAB ER Committee by Don Gordon, April 25, 2000

Agency Responses

[Department of Energy-SR](#)