

WAC 173-205-020 Definitions. "Acute critical effluent concentration" means the maximum concentration of effluent during critical conditions at the boundary of the zone of acute criteria exceedance assigned in accordance with WAC 173-201A-100. The boundary may be based on distance or a percentage of flow. Where no zone of acute criteria exceedance is allowed, the acute critical effluent concentration shall be one hundred percent effluent.

"Acute statistical power standard" means that the maximum acceptable difference in survival that is not statistically significant between the control and the acute critical effluent concentration is twenty-nine percent. In order to determine if a whole effluent toxicity test with results that are not statistically significant meets the acute statistical power standard:

1. Subtract the mean survival across the replicates in the acute critical effluent concentration from the mean survival across the replicates in the control.

2. Divide this difference between the mean survivals by the mean survival across the control replicates.

3. Multiply the result by one hundred and express the product as a percent difference in survival.

4. If the percent difference in survival is equal to or less than twenty-nine percent, then the whole effluent toxicity test has met the power standard.

"Acute toxicity test" means a toxicity test with the death of test organisms as the measured response.

"Chronic critical effluent concentration" means the maximum concentration of effluent during critical conditions at the boundary of the mixing zone assigned in accordance with WAC 173-201A-100. The boundary may be based on distance or a percentage of flow. Where no mixing zone is allowed, the chronic critical effluent concentration shall be one hundred percent effluent.

"Chronic statistical power standard" means that the maximum acceptable difference in response that is not statistically significant between the control and the acute or chronic critical effluent concentration is thirty-nine percent. The chronic statistical power standard does not apply to Fisher's Exact Test. In order to determine if a whole effluent toxicity test with results that are not statistically significant meets the chronic statistical power standard:

1. Subtract the mean of the responses across the replicates in the acute or chronic critical effluent concentration from the mean of the responses across the replicates in the control.

2. Divide this difference between the mean responses by the mean response across the control replicates.

3. Multiply the result by one hundred and express the product as a percent difference in response.

4. If the percent difference in response is equal to or less than thirty-nine percent, then the whole effluent toxicity test has met the power standard.

"Chronic toxicity test" means a toxicity test which measures a sublethal effect such as failed fertilization, development, growth, or reproduction. Organism survival is also a measured endpoint in some chronic toxicity tests.

"Critical conditions" means those circumstances when the physical, chemical, and biological characteristics of the receiving water environment interact with the effluent to produce the greatest potential adverse impact on aquatic biota and existing and characteristic water uses.

"Department" means the department of ecology of the state of Washington.

"EC₅₀" (effective concentration, fifty percent) means the effluent concentration estimated to cause an adverse effect in fifty percent of the test organisms in a toxicity test involving a series of dilutions of effluent.

"Effluent characterization" means, for whole effluent toxicity, establishing the baseline toxicity level by toxicity testing using multiple species on effluent samples taken over the seasons of one year. The effluent characterization toxicity test results shall also be used to determine the need for water quality-based whole effluent toxicity limits.

"Effluent screening tests" are full duration whole effluent toxicity tests that are conducted as a screen for toxicity in one hundred percent effluent or some other high concentration of effluent. No other effluent concentrations (except the control) are tested until toxicity has been detected in the effluent screening test.

"Hypothesis testing" means the mathematical technique for comparing the average response of the replicates of an effluent concentration to the average response of the control replicates at the end of a toxicity test in order to determine if there is a statistically significant difference in response within a level of certainty such as ninety-five percent or ninety-nine percent. For purposes of this chapter, Fisher's Exact Test is used as a hypothesis test for analyzing survival in the cladoceran survival and reproduction test.

"IC₅₀" (inhibition concentration, fifty percent) means the effluent concentration estimated to cause a fifty percent reduction in a biological function in a toxicity test involving a series of dilutions of effluent.

"LC₅₀" (lethal concentration, fifty percent) means the effluent concentration estimated to cause death in fifty percent of the test organisms in a toxicity test involving a series of dilutions.

"Multiple species" toxicity testing means conducting separate toxicity tests using different species on the same effluent sample in order to assess its effect on a broad range of organisms such as fish, invertebrates, or plants.

"NOEC" means the "no observed effect concentration" which is the highest concentration of effluent in a toxicity test shown to have no statistically significant adverse effects when compared to an appropriate control.

"Point estimates" are estimates of the concentration of effluent resulting in a specified level of effect and are determined either graphically or statistically from the concentration-response relationship determined from a toxicity test having a series of dilutions.

"Rapid screening test" means a screening toxicity test on one hundred percent effluent or some other high concentration of effluent in order to detect unanticipated increases in toxicity. Examples of rapid screening tests include twenty-four hour EPA acute tests, acute toxicity tests using rotifers produced from cysts, bacterial bioluminescence tests, and two-day life cycle tests with rotifers.

"Reasonable potential" under this chapter means that the department has determined, in accordance with 40 C.F.R. 122.44 (d)(v) and based on a whole effluent toxicity performance standard, that the effluent could cause in-stream toxicity in violation of WAC 173-201A-040(1).

"Species rotation" means the switching to a different toxicity test from the list in a discharge permit for each effluent monitoring sample according to a rotation schedule set by the department.

"Statistically significant" under this chapter means establishing that a difference in response between a control and an effluent concentration is likely due to toxicity and not variability. The statistical technique for making this determination shall be Fisher's Exact Test or a one-tailed hypothesis test specified or approved by the department. These hypothesis tests shall be conducted at the ninety-five percent confidence level although the department may approve tests at the ninety-nine percent confidence level if the statistical power of the test will not be adversely affected.

"Technology-based controls" means methods for the treatment, prevention, or control of pollutants such as best management practices, biological treatment, physical-chemical treatment, use of nontoxic process chemicals, secondary containment for spills, control of site run-on/runoff, equipment maintenance, equipment operation, implementing site-specific pollution prevention plans, and any other technique with the same goals.

"Toxicity identification/reduction evaluation" means the process for determining the effective control of effluent toxicity by identifying the toxicant and/or its source, and developing a method to reduce toxicity by source control or treatment.

"Toxicity test" means a direct measurement of the adverse effect of a substance in a controlled test using living organisms. In the context of this rule, "toxicity test" and "whole effluent toxicity test" are synonymous.

"Whole effluent toxicity" means the total toxic effect of an effluent measured directly with a toxicity test so that the interactions of all toxicants present in the effluent are assessed.

"Whole effluent toxicity performance standard" means a level of effluent toxicity that is consistently so much lower than is necessary to meet state water quality standards (chapter 173-201A WAC) that no reasonable potential exists to violate the water quality standards. For acute toxicity, the performance standard is the median survival in one hundred percent effluent being equal to or greater than eighty percent and no individual test result showing less than sixty-five percent survival in one hundred percent effluent. For chronic toxicity, the performance standard is no chronic toxicity test demonstrating a statistically significant difference in response between the control and a test concentration equal to the acute critical effluent concentration. For permittees that are ineligible for an approved mixing zone, the performance standard will equal or be close to equal (in the case of acute toxicity) the water quality-based effluent toxicity limit.

"Whole effluent toxicity test" means a toxicity test on an effluent.

[Statutory Authority: Chapter 90.48 RCW and 40 C.F.R. 122.44. WSR 93-20-110 (Order 91-54), § 173-205-020, filed 10/6/93, effective 11/6/93.]