# CHAPTER 2.5 - Relationship Between WET and Chemical-Specific Limits

## The purpose of this chapter is to describe the differences between WET and chemical-specific applications and to discuss why these may be used separately or in lieu of one another.

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The WDNR uses an integrated approach for controlling toxic pollutants that includes whole effluent toxicity (WET) testing and chemical-specific analyses to protect aquatic life. The use of WET testing in addition to chemical-specific testing is necessary due to several factors, including: 1) the limitations of chemical analysis methods, 2) inadequate toxicity data for some chemicals, and 3) the inability to predict the toxicity of chemicals when combined. Water quality criteria for individual pollutants provide protection against these compounds individually, but do not account for the effects they may have when combined in an effluent.

### WET Failures From Compounds Without WQC

The WDNR has been using WET since 1988, in addition to chemical-specific testing, to measure, predict, and control the discharge of materials that may be harmful to aquatic life. Since then, there have been occasions where a positive WET test result was attributed to a compound that did not have promulgated water quality criteria (WQC). According to ch. NR 106, Wis. Adm. Code, permittees are responsible for effluent toxicity, whatever the cause.

The WET program has several major advantages over its counterpart chemical-specific approach with regards to water quality protection. Among the most important of those advantages is the ability of the WET test to evaluate the impact of all chemical constituents of an effluent. The entire chemical matrix has an effect on whether or not the organisms exposed to the effluent react in an adverse fashion. Using WET test procedures, factors such as additivity (1+1=2), synergism (1+1=3), and antagonism (2+2=3) can be addressed without the need for expensive chemical analysis for a myriad of known and unknown chemical compounds.

Establishment of water quality criteria for chemical compounds requires controlled laboratory conditions, including the use of "clean" water to eliminate the risk of introducing bias. Because of that limitation, WET tests offer another major advantage in that they can evaluate the potential for impact to a fish and aquatic life community by exposing the test organisms to a mix of effluent and natural receiving water. These mixtures often contain ligands with binding sites for many compounds that help render them unavailable to sensitive aquatic life, thus changing the measured toxicity. Further, compounds with toxicity related to water quality may be released or sequestered by naturally occurring conditions of the effluent/receiving water mix, as appropriate.

## Chemical-specific Limits in Lieu of WET Limits

There may be some instances where a chemical-specific limit can be established in lieu of a WET limit. For instance, if the permittee can, through the use of toxicity reduction evaluation (TRE) procedures, identify and confirm the chemical(s) responsible for an effluent's toxicity, then a limit for the identified toxicant may be appropriate in lieu of a WET limit. The chemical in question would have to have an established WQC or secondary value, according to ch. NR 106, Wis. Adm. Code.

An example of this may be the Department's policy for addressing chloride toxicity in wastewaters. The ultimate goal of the policy is for dischargers to comply with water quality-based effluent limits (WQBEL) for chloride, however, in recognition of the impracticality of end-of-pipe treatment options for chloride, the rules allow permittees to implement a source reduction plan that works towards the WQBEL. When a permittee gets a source reduction based permit, s. NR 106.89, Wis. Adm. Code, allows permittees to demonstrate chloride is the source of WET. If chloride is the sole cause of WET, the Department must include chloride limits in the WPDES permit in lieu of WET testing requirements until source reduction actions are completed. (See Chapter 2.10 for more details.)