

# WATER QUALITY PERMITS

Policy #: WQP-19

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## Policies & Procedures

### Policy for Characterizing Ambient Water Quality for Use in Determining Water Quality Standards Based Effluent Limits

**Purpose:** This policy is intended to provide specific guidance for the characterization of upstream ambient water quality for use in determining water quality standards based effluent limits. This policy is set forth to assure that exceedances of water quality standards are authorized only in circumstances where specifically allowed in accordance with the Basic Standards and Methodologies for Surface Waters (Regulation 31) (Basic Standards).

#### Background/

**Rationale:** Section 25-8-503(4) of the Colorado Water Quality Control Act, provides that:

(4) No permit shall be issued which allows a discharge that by itself or in combination with other pollution will result in pollution of the receiving waters in excess of the pollution permitted by an applicable water quality standard ...

The Basic Standards in section 31.9 expands on that very stringent statutory requirement by providing a low flow exception, as follows:

Water quality standards shall apply at all times; provided, that in developing effluent limitations or other requirements for discharge permits, the Division shall normally define critical flow conditions using the following low-flow values: the empirically based 30-day average low flow with an average 1-in-3-year recurrence interval (30E3) for chronic (30-day) standards or the empirically based 1-day low flow with an average 1-in-3-year recurrence interval (1E3) for acute (1-day) standards, or the equivalent statistically-based flow.

Therefore, the intent of the Basic Standards is to assure that the standards are attained at all times except when flows are below the critical flow condition. The low-flow exception, described above, has been used to eliminate very low flow events in determining water quality standards based effluent limits.

In 1987 the Water Quality Control Commission had a full discussion of approaches to characterize ambient water quality and selected a method which uses the 15<sup>th</sup>, 50<sup>th</sup> and 85<sup>th</sup> percentile values depending on the specific parameter type. One result of those discussions was the decision to explicitly include this approach in section 31.8(2)(b)(i)(B) of the Basic Standards, which provides that:

"Existing quality" shall be the 85<sup>th</sup> percentile for unionized ammonia, nitrate, and the dissolved metals, the 50<sup>th</sup> percentile for total recoverable metals, the 15<sup>th</sup> percentile of such data for dissolved oxygen, the geometric mean of such data for fecal coliform and E. coli, and the range between the 15<sup>th</sup> and 85<sup>th</sup> percentiles for pH...

The Division has utilized this approach to characterize ambient water quality when identifying impaired segments pursuant to section 303(d) of the federal Clean Water Act, and when reporting on the status of water quality pursuant to section 305(b) of the Act. Additionally, the Division uses the 85<sup>th</sup> percentile to establish ambient quality-based standards in accordance with section 31.7(1)(b)(ii) of the Basic Standards. The Division has done this for all surface waters without regard for their designation under the Antidegradation Rule (Basic Standards, 31.8).

However, the Colorado Total Maximum Daily Load and Wasteload Allocation Guidance, that was prepared by the Water Quality Control Division in November, 1991, provides that the 50<sup>th</sup> percentile of representative upstream data should be used to characterize ambient water quality for constituents that are naturally occurring, such as metals. The Division has used the 50<sup>th</sup> percentile in determining some water quality standards based effluent limits but, more commonly, has used the mean of such data to characterize ambient water quality for purposes of calculating these effluent limits.

Use of the median of the ambient data to characterize upstream water quality implies that the value used is exceeded half of the time, while the use of the 85<sup>th</sup> percentile results in the value being exceeded only 15 percent of the time

The permitting practice of using the mean of ambient data to characterize upstream quality has, in the past, led to cases where assimilative capacity has been allocated to a discharge where the receiving stream was identified as impaired. In this situation, there was no assimilative capacity available and left uncorrected this would have been a violation of state and federal regulations. There also have been instances where the use of the mean for calculating permit limits has resulted in discharges causing exceedances of water quality standards at stream flows greater than the critical low flow.

The use of methods described in section 31.8(2)(b)(i)(B) of the Basic Standards to characterize upstream ambient water quality in combination with the use of the low flow exception provides a reasonable but, by no means, overly conservative estimate of the assimilative capacity of a water body. The goal of this policy is to assure that the assimilative capacity of a water body is properly determined.

**Policy/  
Procedure:**

The following descriptive statistics will be used to characterize upstream ambient water quality for use in determining water quality standards based effluent limits.

- 1) The 85th percentile of the available data for metals with standards that are expressed as the dissolved fraction, and all parameters not otherwise specified below.
- 2) The 50th percentile of available data for metals with standards that are expressed as the total or total recoverable fraction.
- 3) The geometric mean of available data for fecal coliform and E. coli
- 4) The 15th percentile of available data for Dissolved Oxygen.
- 5) The range between the 15th and 85<sup>th</sup> percentile for pH.

The percentiles are applicable to that form of chemical as defined and are not to be considered as translators between forms, e.g. the 50th percentile concentration for a total metal is not considered equivalent to the 85th percentile concentration of the dissolved form of that metal.