Issue #7: Should DEC Define Significant and *de Minimis* Degradation?

As a way to efficiently focus their resources, many states have defined "significance thresholds" (e.g., *de minimis* discharges or "measurable" degradation) in their Antidegradation policies. New or expanded discharges below these levels would NOT be required to undergo Tier II analysis. EPA recognizes this as an adequate "approach that allows states to focus limited resources where they may result in the greatest environmental protection." (Federal Register Vol. 63, No. 1, pg. 36783; Ephraim King *Tier 2 Antidegradation Reviews and Significance Thresholds* Memo, 08/10/2005). EPA recommends that use of a *de minimis* approach for limiting antidegradation reviews be accompanied by a cumulative cap, to ensure that small, incremental discharges do not lead to significant degradation.

While there is a precedent for using *de minimis* in determining whether a Tier II analysis is required, and there is support for significance thresholds in both case law and EPA guidance, DEC must decide whether or not to include a definition of significant or *de minimis* degradation in their antidegradation policy and implementation guidance. There are potential problems associated with establishing such thresholds, including:

- Documentation and tracking of multiple *de minimis* discharges that may incrementally lower water quality significantly over time – even to the point of impairment
- Potential need to establish baseline water quality conditions, and the scale at which those baseline conditions would apply (e.g., assessment unit, stream reach, watershed, etc.)
- Resolving disputes over what is considered insignificant or *de minimis*
- Use of a de minimis threshold doesn't guarantee that uses will not be impacted

One way to avoid these problems would be for DEC to require a Tier II analysis for every new or expanded discharge, thereby eliminating the question of *de minimis*. However, that could mean a burdensome workload and inefficient use of already scarce staff resources. This document summarizes different approaches that can and have been used to define significance thresholds, as well as their potential pros and cons.

Measurable Changes in Concentration

This approach sets the "significance threshold" equal to an estimated change (predetermined to be "measurable") in pollutant concentrations at a compliance point downstream. This implies that relevant water quality parameters are being measured and that the data can be statistically compared. The difficulty with this definition is that predicted changes based on modeling may not occur as projected under actual field conditions – impacts might be greater or lesser than anticipated.

Washington and Oregon have incorporated some form of this definition into their Antidegradation guidance. Washington defines measurable degradation numerically for temperature, DO, bacteria, and pH, and measurable change for temperature and DO.

Proportional Changes to Assimilative Capacity

This approach sets the "significance threshold" equal to an *a priori* proportion of the assimilative capacity (i.e., the difference between baseline water quality and the most stringent applicable criterion

for a particular pollutant). If the change in water quality downstream of a new or increased discharge is greater than the significance threshold, then a Tier II analysis would be required. If the downstream change is lower than the threshold, then no Tier II analysis would be needed.

Proportional change approaches – often defined as the use of some percentage of the available assimilative capacity for a particular parameter – is fairly common. Many states use this approach (or combine it with another approach) and specify a proportion of assimilative capacity that may be considered "insignificant":

- Delaware (5%)
- West Virginia (10%)
- New Hampshire (10%)
- Kentucky (10%)
- Arizona (20%)
- Wyoming (20%)

Proportional Changes to Baseline Water Quality

This approach sets the "significance threshold" equal to a proportion of the baseline water quality. Similar to the previously mentioned changes to assimilative capacity, if the change in downstream water quality is greater than the threshold, then a Tier II analysis would be required; if the change was lower than the threshold, no analysis would be needed. This would also require that baseline water quality be measured.

Colorado (10% of existing load for bioaccumulatives and 15% of existing concentration for other pollutants) and Ohio (5% change for superior high quality waters of existing ambient water quality) are examples of states that incorporate this rule into their guidance.

Proportional Changes to the Criterion

This approach sets the significance threshold equal to a proportion of the applicable standard. The allowable amount of change will remain constant, *regardless of the baseline water quality.* If the water quality downstream of a new or expanded discharge is calculated to be greater than the significance threshold, then a Tier II analysis would be required; if the downstream water quality is lower than the threshold, the Tier II analysis would not be needed.

Montana uses this guideline in their Antidegradation rules. Insignificant changes for particular pollutants are those less than 10% of the applicable standard (when the surface water quality is less than 40% of the standard).

Combination Approaches

Some states have implemented a combination of any or all of the approaches listed above. Many have also implemented a "cumulative cap" that functions as a backstop on the amount of allowable assimilative capacity used before requiring a Tier II analysis. As noted previously, this has been suggested and approved by EPA.

The following table lists the pros and cons of the above approaches:

	Pro	Con
Measurable Change	• Objective, rather than subjective like the other approaches • Established a priori, if using analytical method detection and sensitivity/precision • Ambient water quality data may not be necessary	• Changing analytical methodologies • Some changes that are biologically meaningful might not be measurable (for a particular pollutant) • Some measurable changes aren't biologically meaningful • What is considered measurable could depend on the concentrations being compared (smaller changes are measurable at greater concentrations)
Proportion of Assimilative Capacity	• Tied directly to the existing water quality coupled with the water quality criteria • Fairly straight-forward • EPA and Court precedent for this approach being acceptable (depending on the selected proportion)	• Best quality waters can be degraded the most • Must have baseline water quality data1 • Document and track baseline data • Not conducive to pollutants without numeric criteria (e.g. nutrients) • Will change as criteria change (e.g. ammonia criteria)
Proportion of Baseline Water Quality	• Supportive of pollutants without numeric criteria • Fairly straight-forward • Tied directly to existing water quality and not affected by changing criteria • The baseline water quality is fixed	• Lowest quality waters can be degraded the most (up to a certain point) • Must have baseline water quality data1 • Documentation and tracking of baseline data
Proportion of the Water Quality Standard	• Tied with protection of the beneficial use (because criteria are designed to be protective of the beneficial use) • Every discharger would be treated equally (equal proportion of the criterion) until the baseline water quality approaches the cumulative cap	• Doesn't tie as cleanly to maintaining existing water quality conditions • May require baseline water quality data[1] • Will change as criteria change (e.g. ammonia criteria)
Combination	• Could be designed to be most protective of best and lowest quality waters by allowing the most change in "mediocre" quality waters	• Depending upon its structure, this could be more complicated and confusing • Requires baseline water quality data • Documentation and tracking of baseline data

Other Issues

Additional issues to consider when evaluating whether or not an activity has the potential to degrade a waterbody might include: whether/how to include biological data, what the cumulative cap should be regarding the significance threshold, determining the appropriate compliance point (edge of mixing zone or after mixing is complete), whether pollutant trading or offsets can/should be considered, and how to address pollutants without numeric criteria.