

**Conducting the Antidegradation Analysis for Tier 2 Waters,
Alternatives Analyses as a Requirement for Determining Necessity of Degradation**
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CONDUCTING THE ANTIDEGRADATION ANALYSIS FOR TIER 2 WATERS

EPA outlines the conceptual approach for conducting an antidegradation review and approving a lowering of water quality in Tier 2 waters in its 1994 *Water Quality Standards Handbook*:

In "high-quality waters," under 131.12(a)(2), before any lowering of water quality occurs, there must be an antidegradation review consisting of: a finding that it is necessary to accommodate important economical or social development in the area in which the waters are located (this phrase is intended to convey a general concept regarding what level of social and economic development could be used to justify a change in high-quality waters); full satisfaction of all intergovernmental coordination and public participation provisions (the intent here is to ensure that no activity that will cause water quality to decline in existing high-quality waters is undertaken without adequate public review and intergovernmental coordination); and assurance that the highest statutory and regulatory requirements for point sources, including new source performance standards, and best management practices for nonpoint source pollutant controls are achieved (this requirement ensures that the limited provision for lowering water quality of high quality waters down to "fishable/ swimmable" levels will not be used to undercut the Clean Water Act requirements for point source and nonpoint source pollution control; furthermore, by ensuring compliance with such statutory and regulatory controls, there is less chance that a lowering of water quality will be sought to accommodate new economic and social development).

Two key issues have emerged regarding Tier 2 antidegradation policy and implementation methods: which waters are subject to Tier 2 protection, and what is implied by the requirement that degradation of high-quality waters can only be allowed after a demonstration that "allowing lower water quality *is necessary* to accommodate important economic or social development..." (emphasis added). EPA has indicated in guidance and in rulemaking action regarding Kentucky's water quality standards that most waters in a state clearly fall under the Tier 2 category. After disapproving Kentucky's antidegradation provisions for high-quality waters in 1997 because the "the criteria for designating such waters were not sufficiently inclusive," EPA proposed its own set of water quality standards for high-quality waters. A review of the rationale for this decision is instructive:

The Commonwealth's provisions only apply to a limited subset of high quality waters rather than to all waters whose quality is better than the levels necessary to support propagation of fish, shellfish and wildlife and recreation in and on the water. Kentucky's approach limits the use of the special protections for high quality waters to the Commonwealth's exceptional waters category which comprise just 1.35 percent of all its waters. However, Kentucky's 1998 305(b) Report shows that approximately 67 percent of the Commonwealth's unassessed waters are candidates for the high quality water protections. This pattern is confirmed by recent intensive watershed sampling in the Kentucky, Salt and Licking River basins, as well as data from random statewide aquatic life biological sample in Wadeable streams conducted by the Kentucky Division of Water over the last two years. This recent sampling shows that approximately 60 percent of the sites fully support their designated uses. The above information and analysis show that the eligibility criteria adopted by the Commonwealth for the exceptional waters category results in only a relatively small percentage of surface waters receiving the protection of the high quality water provisions at 401 KAR 5:029 section 1.(2). Therefore, EPA determined that Kentucky's exceptional waters category does not include other waters whose quality exceed levels necessary to support propagation of fish, shellfish and wildlife and recreation in and on the water, as required in 40 CFR 131.12(a)(2). In addition, Kentucky's implementation procedures for the use protected category (401 KAR 5:030 section 1.(4)) do not require that the Commonwealth evaluate the necessity of lowering water quality, even though this category does include high quality waters.

Other EPA guidance on how to judge the *necessity of lowering water quality* has been issued, some of which alludes directly or indirectly to the need for some type of alternatives analysis to determine whether or not there are options that might not result in lowered water quality. The *Water Quality*

Standards Handbook (1994) notes that “EPA’s regulation also requires maintenance of high-quality waters except where the [s]tate finds that degradation is “necessary to accommodate important economic and social development in the area in which the waters are located.” (Emphasis added in handbook.) The chapter goes on to note that EPA “believe(s) this phrase should be interpreted to prohibit point source degradation as unnecessary to accommodate important economic and social development if it could be partially or completely prevented through implementation of existing State-required BMPs.”

Appendix G of the handbook, *Questions and Answers on Antidegradation* (August, 1985), states that allowances for lowering the quality of high-quality waters is “intended to provide relief only in a few extraordinary circumstances where the economic and social need for the activity clearly outweighs the benefit of maintaining water quality above that required for the “fishable/swimmable” water, and the two cannot both be achieved. The burden of demonstration on the individual proposing such activity will be very high.”

However, the federal antidegradation rule does not mandate implementation of *any* feasible alternative, regardless of cost. The *Water Quality Guidance for the Great Lakes System: Supplementary Information Document* (USEPA 1995) indicates that generally, if a wastewater treatment plant expansion is needed, up to a 10 percent construction cost increase should be considered an appropriate cutoff to determine if degradation is *necessary*. Little guidance is available on what might constitute “important... social development” in terms of approving a lowering of water quality.

Georgia Court Mandates Higher Treatment Levels to Protect Water Quality

Late in 2004, the Georgia Supreme Court overturned the issuance of an NPDES permit to a Gwinnett County wastewater treatment plant based on the state Environmental Protection Division’s (EPD) failure to use the antidegradation review to require higher levels of treatment (*Hughey et al v. Gwinnett County et al*, Case S04G0873, November 23, 2004). The original permit authorized the F. Wayne Hill Water Resources Center in Gwinnett County to discharge up to 40 million gallons per day of treated wastewater into Lake Lanier. A consortium of environmental groups challenged EPD’s issuance of the permit in several venues, eventually reaching the state Supreme Court. One aspect of the case involved the question of who had the burden of proof in demonstrating that a permit complied with antidegradation rules, the permittee, the state permit-issuing authority, or challengers to the permit. The court held that the permit applicant bore the burden of proof with EPD during the permit application process, but, after the permit’s issuance, the challengers were required to demonstrate that EPD’s conclusion was incorrect.

In ruling on whether the state permitting agency (EPD) conducted a proper antidegradation review, the court held that the permitted discharge would degrade water quality in Lake Lanier but that EPD had demonstrated that the degradation was justified to provide several economic and social benefits. The court held that the permit was supported by the need for additional wastewater capacity due to the projected population growth, that sufficient land was not available for the land application of the wastewater, and that the cycling of treated wastewater from the Chattahoochee River system would aid negotiations concerning an interstate compact regarding the waters. Finally, the Supreme Court ruled that the antidegradation regulations prohibited Gwinnett County from discharging water that is more polluted than it reasonably needs to be by virtue of the plant’s existing technology. The court held that Gwinnett County presented no evidence that it would be impracticable or infeasible for it to use the full technology available at its plant to treat the water before discharging it to Lake Lanier. The court held that the antidegradation regulation did not contain any exceptions that allowed the *convenience of the parties* or *fear of regulatory violations* as justifications for greater water degradation. The court held that the permit must require Gwinnett County to meet the highest and best level of treatment practicable. Because the permit did not contain such standards, the court held that the permit violated the state antidegradation regulations.

The Region 8 *Antidegradation Implementation* guidance contains a very detailed approach that is consistent with the above principles, for the most part, but provides a significant level of information regarding the process for reviewing antidegradation submittals and calculating both the water quality impacts and economic and social benefits. The *data requirements* section on Tier 2 reviews provides some insight into how the Region views the process and the distribution of work involved:

EPA Region VIII believes that implementation of antidegradation tier 2 requirements need not pose an undue burden on the state and tribal agencies charged with administering surface water quality programs. The model antidegradation procedure included in this guidance has been developed to allow states and tribes to focus resources on significant problems and issues and, where necessary, place the information-gathering burden on the project applicant. With respect to antidegradation tier 2, the Region believes and advocates that, rather than getting unduly “bogged down” with assessing and projecting water quality conditions, state/tribal programs should focus on evaluation of non-degrading and less-degrading alternatives in order to minimize the pollutant loadings that will result from the proposed activity. By focusing on the projected pollutant loadings and costs associated with each available alternative, such alternatives analyses can occur independent of the analysis of receiving water quality conditions. The Region believes that evaluation of alternatives is the proper focus on tier 2 reviews, and has developed the model procedure to achieve this focus. To this end, the model procedure:

- 1) includes an initial presumption that all surface waters are high quality and subject to tier 2 review requirements;
- 2) allows for basing high quality determinations on ancillary data such as land use information, presence of sources, biological health, etc.
- 3) establishes a low threshold or definition of “significant degradation;”
- 4) allows for determinations of significance based on simple analyses and factors which do not require modeling (such as percent change in source loadings);
- 5) provides for by-passing the significance test entirely where reasonable alternatives to lowering existing water quality are clearly available; and
- 6) allows for the data-gathering burden to be placed on the project applicant with respect to any data that may be needed to make the high quality and significance findings.

ALTERNATIVES ANALYSES AS A REQUIREMENT FOR DETERMINING NECESSITY OF DEGRADATION

The Minnesota nondegradation policy for significant discharge lists three factors that must be considered in making a determination whether additional control measures can reasonably be taken to minimize the impact of the discharge:

1. The importance of economic and social development impacts of the project
2. The impact of the discharge on the quality of the receiving water
3. Cumulative impacts of all new or expanded discharges on the receiving water

This section addresses the implementation procedures for number 1 above, finding that the lowering of water quality is necessary to accommodate important development. EPA has endorsed alternatives analyses as an integral part of antidegradation reviews for many years. At the outset of this discussion, it is important to note that none of the states surveyed required alternatives analyses as a part of antidegradation review for stormwater permits. This is because of the fact that alternatives analysis is part of a Tier 2 review, and no states have conducted such a review for stormwater permits.

As its proposed rule for *Water Quality Standards for Kentucky*, issued on November 14, 2002, EPA notes that

EPA considers pollution prevention and enhanced treatment alternatives analyses as an appropriate starting point and of particular importance in an antidegradation review for both industrial and municipal dischargers. Given the variety of engineering approaches to pollution control, a number of options are available that could reduce or eliminate the anticipated lowering of water quality. Some of these include substituting less-toxic or less-bioaccumulative chemicals for the toxic or bioaccumulative chemical. Another approach could involve water conservation to reduce the overall volume of waste water and possibly reduce pollutant mass loadings. Other approaches could include more careful control of the materials in the process stream, the recycle or reuse of waste byproducts, and operational changes to reduce the quantities of waste. (The state) would need to make a determination that an alternative or combination of alternatives is cost-effective. If cost-effective pollution prevention alternatives are available, there would be no need for the lowering of water quality.

States have developed a two-step process to generate findings of necessity regarding activities that propose to lower water quality. One process addresses necessity through an alternatives analysis, while the other addresses the importance of the social and economic development that the proposed activity supports. Although the Minnesota antidegradation policy does not explicitly require an alternatives analysis, such a requirement is implied in the finding of *necessity*. The following sections provide an overview of the differing approaches to alternatives analysis; give examples from several states; and discuss the topics that should be included in regulations and implementation guidance to allow the Minnesota Pollution Control Agency (MPCA) and the applicant to sufficiently address the finding of necessity to allow degradation of a Tier 2 surface water.

Most antidegradation implementation documents reviewed by Tetra Tech include a Tier 2 alternatives analysis. The differences in states' approaches to alternatives analysis include (1) what triggers the alternatives analysis; (2) when the analysis is conducted in relation to the social and economic analysis (SEA); (3) the finding or decision made after the alternatives analysis; and (4) the level of analysis required.

States require alternatives analysis based on a determination of degradation as defined by the individual state's definition of degradation; this definition—or trigger—varies. Some states use a case-by-case evaluation of increased loading, increased concentration, decreased assimilative capacity, and so on. Others use a de minimis test or rule of thumb such as a 5 percent or 10 percent decrease in the assimilative capacity as measured from baseline water quality. After a finding that the proposed activity would cause or would likely cause degradation to a Tier 2 surface water, an alternatives analysis is triggered. Some states require an alternatives analysis before the SEA; some incorporate the alternatives analysis into the SEA, and one state requires it after the SEA is completed.

Another key difference in states' approaches to alternatives analysis is the finding or decision regarding necessity. In some states, if the applicant identifies a cost-effective, reasonable alternative or alternatives, the least degrading of these alternatives must be used or the permit application is denied. In other words, the state determines at this point that the degradation of the Tier 2 water is not necessary and does not allow the applicant to conduct SEA to justify the project. Other states do allow SEA even if reasonable alternatives are identified. This approach considers the findings from the alternatives analysis along with the findings from the SEA before making a final determination of the necessity of the proposed degradation.

Finally, states differ in the level of detailed and rigorousness required for the alternatives analysis. Most states simply list the categories of alternatives that must be considered and criteria that will be used by the state in its evaluation of the submittal. Some states provide much more detail in their expectations of what the alternatives analysis should include, such as what should be included in the cost of the alternatives and cost methods to use in the analysis. Another approach employed by one state is to be

very general and to place an emphasis on not burdening the applicant with detailed analysis. Below are summaries of the approaches taken in selected states.

Delaware

Delaware requires an alternatives analysis after a determination that the activity will likely cause significant degradation. This determination is based on a review of nine significance factors. Significance can be demonstrated with respect to any one (or combination) of the factors. It is also based on a general guideline that the proposed activity would lower by more 5 percent available assimilative capacity or increase pollutant loadings to the segment by more than 5 percent.

The *Antidegradation Implementation Guidance* document lists nine types of alternatives that the applicant must consider: pollution prevention; reduction in the scale of the project; water recycling or reuse; process changes; innovative treatment technology; advanced treatment technology; seasonal or controlled discharges to avoid critical water quality periods; improved operation and maintenance of existing treatment systems; and alternative discharge locations.

If the state makes a preliminary determination that one or more reasonable alternatives to allowing the degradation exist, the state works with the project applicant to revise the project design. As a nonbinding rule of thumb, nondegrading or less-degrading pollution control alternatives with costs that are less than 110 percent of the costs of the pollution control measures associated with the proposed activity are considered reasonable. If a mutually acceptable resolution cannot be reached on the alternatives, the state documents the alternatives analysis findings and a public notice a preliminary decision to deny the activity. If no reasonable alternatives exist, the antidegradation review continues with a determination of social and economic importance.

West Virginia is very similar to Delaware in its approach. However, it uses a different definition of degradation: significant degradation is use of 10 percent of the available assimilative capacity as measured from baseline water quality or 20 percent of the remaining assimilative capacity when considering cumulative impacts.

Pennsylvania

Pennsylvania requires special pre-permit analysis for proposed discharges into high-quality, Tier 2 waters. Alternatives to new, additional, or increased point source discharges to surface waters must be employed where they are cost-effective and environmentally sound. This requirement is called the nondischarge alternatives analysis. If a nondischarge alternative is not cost-effective and environmentally sound, the proposed discharger must use the best available combination of cost-effective treatment, land disposal, pollution prevention, and wastewater reuse technologies. This process is known as the anti-degradation best available combination of technologies (ABACT) and establishes a minimum level of performance for the discharger.

The state then requires an analysis to determine if nondegrading discharge alternatives exist. If the ABACT produces a nondegrading discharge, the discharge can be approved for the Tier 2 water. If it would produce a degrading discharge, a Social or Economic Justification (SEJ) Analysis is required before it could be used. The SEJ Analysis determines the approvable level of treatment technologies and the final determination of *cost-effectiveness* is not made until the SEJ analysis is complete. If the SEJ analysis has not demonstrated economic or social importance of the activity, the only approvable discharge would be one that is nondegrading.

Oregon

The state prohibits a lowering of water quality in Tier 2 waters unless all the following apply:

- All water quality standards will be met and beneficial uses protected
- No other reasonable alternatives exist
- The lowering of the water quality is necessary for social and economic benefits that outweigh the environmental costs

If the proposed activity would likely result in any measurable change in water quality away from conditions unimpacted by anthropogenic sources, then the proposed activity is considered to likely result in the lowering of water quality. The *measurable change* is based on any of the following (a) percent change in ambient concentrations at appropriate critical periods, (b) the difference between current ambient conditions and conditions that would result if the activity is allowed, (c) percentage change in loadings, (d) percent reduction in assimilative capacity; (e) nature, persistence, and potential impacts on aquatic biota, and (f) degree of confidence in modeling used.

In the alternatives analysis, the applicant must provide a discussion of the technical and economic feasibility of the alternatives. If at least one of the alternatives to lowering the water quality is technically and economically feasible, the applicant “should pursue that alternative rather than the activity that results in a lowering of water quality. If a technically, economically alternative does not exist, the antidegradation review continues to the analysis socioeconomic benefits vs. environmental costs.

Finally, Pennsylvania and West Virginia provide a very useful level of detail in their implementation guidance for alternatives analysis. Below is a description of topics covered in their guidance:

- A discussion of when alternatives analysis is required.
- A listing and description of nondegrading and less-degrading pollution control measures to consider (Pennsylvania also includes environmental consideration for each method).
- Identification of cost components and assessment of costs. This provides a consistent approach for the cost analysis by listing cost categories that may and may not be included in the analysis and the cost formulae to use.
- Evaluation of environmental impacts associated with the alternatives. This discusses the types of impacts that the applicant must address, at minimum.
- Cost and reasonableness criteria for alternatives evaluation.
- The procedure for comparing costs of various alternatives.
- A summary of the alternatives analysis process. This includes a description of how the findings of the analysis will be used in the overall antidegradation review and permitting process.

District Court Rules on West Virginia Antidegradation Procedures

The U.S. District Court in Huntington, West Virginia, issued a ruling in 2003 that addressed a range of issues related to the West Virginia antidegradation implementation program (*Ohio Valley Environmental Coalition, et. al. v. Marianne Lamont Horinko, Acting Administrator, United States Environmental Protection Agency*; Civil Action No. 3:02-0058). Among the key decisions rendered in the ruling are the following:

- The designations of certain waterbody segments for Tier 1 antidegradation protection only is not permissible, especially when monitoring data does not indicate that water quality fails to exceed levels necessary to support wildlife and recreation.
- Allowing exceptions to antidegradation reviews for publicly owned wastewater treatment plants as long as there is net decrease in the overall pollutant loading was deemed to be arbitrary and capricious.
- Requiring Tier 2 antidegradation reviews for discharges under CWA section 402 and 404 general permits only at the time of general permit issuance was deemed to be arbitrary and capricious.
- Rules that state that nonpoint sources will be deemed to be in compliance with antidegradation regulations if best management practices are installed and maintained are reasonable.
- EPA's approval of the section in the antidegradation regulations that provides that "[w]ater segments that support the minimum fishable/swimmable uses and have assimilative capacity remaining for some parameters" shall only "generally" be provided Tier 2 protection was arbitrary and capricious.
- EPA's approval of a provision that allows for a 10 percent reduction in the available assimilative capacity of individual pollutant parameters from an individual discharge before Tier 2 review is required was supported by evidence in the record and therefore was reasonable.
- EPA's approval of a provision allows for a twenty percent cumulative reduction from all discharges before Tier 2 review is required was not supported by any evidence in the record and therefore was arbitrary and capricious.
- Approval of trading provisions which can reasonably be read to require that the trade must result in an improvement to water quality in the water segment where the new or expanded discharge is located was reasonable.