Idaho Antidegradation Implementation
Discussion Paper
Tier II Alternatives Analysis
June 28, 2010

Introduction

For high quality or Tier II waters, federal rules (40 CFR 131.12(a)(2)) require water

> "quality shall be maintained and protected unless the State finds, after full satisfaction of the intergovernmental coordination and public participation provisions of the State's continuing planning process, that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located." (emphasis added)

This is echoed in Idaho's current and proposed antidegradation policy in rule. Discharges or activities that have the potential to degrade high quality (Tier II) waters are thus subject to an antidegradation analysis that addresses both their necessity and socio-economic importance.

Alternatives analysis in antidegradation implementation stems from the word necessary in the above rule language. The question is not whether it is necessary to discharge or not, although that is a possibility that should be considered, but more a question of "is it necessary to discharge effluent of the quality proposed?" In other words, "What other less polluting alternatives are there? And if the least degrading option has not been chosen, why not?" These questions of whether there are less degrading, or perhaps non-degrading alternatives to the discharge or activity as proposed is the essence of necessity. The aim is to find the least degrading alternative that is feasible and affordable.

Usually much of the consideration of alternatives is done by those proposing the discharge early on in the design or even conceptual stage of a project. Thus a key challenge of antidegradation review is to encourage engagement with water quality regulators and consideration of pollution minimization as early as possible in the project design. If this is done then the effort will result in developing alternatives that will pass antidegradation analysis.

Although it may not be recognized as part of antidegradation implementation, many states maintain that early engagement in project design does now take place, at least for point source discharges, between agency and project engineers, for example facility planning and master planning review. Oregon in particular has stated that such early engagement alters project planning so as to minimize degradation. However, for most states this interaction appears to be informal, undocumented, or not necessarily conducted with an eye toward minimizing degradation of water quality. Inadequate documentation makes it difficult to show an antidegradation benefit from early consultations that may be taking place.

Principles of Alternatives Analysis

A core idea of antidegradation is that it is not necessary to pollute at the levels proposed if there are alternatives consistent with the purpose of the project that produce less pollution. Thus alternatives need to be evaluated. Finding the best alternative is not easy;

it will be constrained by technology based treatment standards already in existence and limited by wastewater treatment engineering practice. In addition discharger costs versus community benefit plays a big role in striking a balance between necessity for lowering water quality and accommodating socially and economically important projects. The goal of the following principles is to guide identification and selection of the least degrading alternative for project discharge that still meets social and economic needs of the community.

1st Principle: Early consideration of minimizing degradation is best. If alternatives which minimize degradation are considered at the earliest stages of project design, the project is less likely to be characterized as causing unnecessary degradation during agency and public review. This can avoid ensuing project delays for revision that a later finding of unnecessary degradation would cause. It is also the most efficient of everyone's time and resources to have only one project design and review cycle, one which integrates minimizing degradation from the start.

2nd Principle: Consider a full range of alternatives. The range of alternatives evaluated should not be limited to just wastewater treatment alternatives, but should also consider such things as process changes/efficiencies, location/relocation of discharge, and non-discharge alternatives such as wastewater reuse. In many cases this may mean 'thinking outside the box'. The only alternatives that can not be considered are those that do not comply with technology based effluent limitations, would not meet water quality criteria or would not protect existing or designated uses.

3rd Principle: Leave cost balancing to later. Initially the range of alternatives should be limited only by technological feasibility and not cost. This is because the least cost alternative is likely the most degrading alternative (e.g. no treatment or the minimum required by effluent limitation guidelines). Cost of the alternative should not be an initial filter. Just because an alternative may be cheaper for a discharger does not mean it is best for the community. Cost comes into play when selecting the best alternative, as discussed later.

4th Principle: Be aware of cross-pollutant and cross-media tradeoffs. Wastewater comes as a package of pollutant characteristics and maximizing treatment for one pollutant may not be the optimal solution to minimize overall water quality impact or broader environmental degradation. A classic example of cross-pollutant tradeoffs is the chlorination of wastewater effluent to eliminate bacterial pollution and the subsequent production of chloramines in the effluent. Example of a cross-media trade-off might be the production of a solid waste in an effort to remove a pollutant (phosphorus) from wastewater. A full accounting of costs will likely minimize adverse trade-offs, but only if such costs and trade-offs are thought of and taken into account in project planning.

Alternatives Analysis

Feasible alternatives should be ranked from least to most degrading of water quality. If the project manager opts for the least degrading option then the first test for allowing degradation is met, presuming an appropriate range of technologically feasible

alternatives were considered. If the least degrading option is not preferred then the next least-degrading alternative may still be justified on the basis of extenuating circumstances such as minimizing cross-pollutant / cross-media impacts or cost-effectiveness of improved pollutant reduction. After ranking by degree of degradation, a step-wise process can then begin that may justify elimination of less degrading alternatives by working down from the top of the list (least degrading) and stopping at the first alternative that can not legitimately be eliminated. It is in this process that economics enters the picture.

Treatment costs are not usually linear or infinitely adjustable, but rather often go in steps with different treatment processes. Treatment cost-effectiveness looks at the marginal cost of improved pollutant reduction and may allow the justification of the next least-degrading alternative if the incremental cost of improved treatment far outweighs the incremental gain in pollutant reduction. For example if the best alternative removes 99 lbs of a pollutant for $5,000 per MGD and the second best removes 90 lbs of the pollutant for $1,000 per MGD, then the cost of removing 99 lbs of pollutant is $50.50/lb compared to just $11.11/lb for the first 90 lbs. If this were the case it would likely be easy for the discharger to make the case that the marginal cost of treatment did not justify the improvement in water quality that would result and thus the next best alternative is acceptable.

Cost-effectiveness should not rule alone; it needs to be tempered by consideration of affordability and emerging practice in the industry. Consider the previous example further. If the third best alternative achieved 45 lbs of pollutant reduction at a cost of $450 per MGD the cost per lb of treatment would be marginally better at $10/lb, but the overall annual cost of $1,000 per million gallons for removing 90 lbs versus $450 per million gallons for 45 lbs may be quite affordable to the discharger. The added cost in better treatment should be weighed against the value of maintaining high water quality. In general, affordable reductions in pollution should not be forgone. If the $1000 per MGD alternative is practiced by a similar modern discharge then the argument for the cheaper option becomes even weaker.

Gauging importance of economic and social development, should a project pass the necessity test, is addressed in a companion paper.

Other States

The adjacent states of MT, OR, WA & WY all address alternatives analysis in rule, but with varying level of detail. A fifth, Nevada, addresses it in statute. Three of the five use the word feasible or feasibility in connection with identification of alternatives. Oregon uses the phrase “all known, available, and reasonable” which may be equivalent. Nevada law calls for:

> “the highest and best degree of waste treatment available under the existing technology, consistent with the best practice in the particular field under the conditions applicable.”

Oregon provides a list of “at minimum” alternatives to be considered, including “improved operation & maintenance, recycling and reuse, and land application”, while

Washington provides examples of alternatives which is quite similar to Oregon's minimum alternatives.

Only Montana's rules mention economics as part of the analysis, calling for:

> "evaluating the cost effects of the proposed alternatives on the economic viability of the project and on the applicant by using standard and accepted financial analyses."

Only Nevada addresses the timing of the alternatives analysis, by stating in law that antidegradation is looked at "as part of the initial design of the project or development", though it is unclear how the Nevada Department of Environmental Protection is involved in ascertaining this is done. More detail is provided in Nevada's Continuing Planning Process.

Openness is addressed through public comment, though it appears this is typically done only as a matter of review once the agency has made an initial determination to go ahead and allow degradation, and as a part of normal permit review. Thus there is no model in adjacent states for involvement of the public in description and selection of alternatives. There is however a model in the NEPA environmental impact statement process where agencies such as the US Forest Service conduct public scoping meetings with the aim of developing a range of alternatives to be further analyzed. This is likely too cumbersome for antidegradation review, but perhaps the intent of it - to get at a full range of alternatives – can be somehow captured in Idaho rule or guidance.