

## Issue #5: Tier 2 Alternative Analysis

### Overview

An important part of Tier 2 Antidegradation Review is the completion and inclusion of an alternatives analysis (note that an antidegradation alternatives analysis differs from the analysis required for an Environmental Impact Statement). This originates from the rule language that the proposed degradation to water quality is “necessary”. So far, only a few states (e.g., Pennsylvania) have developed detailed regulations or guidance in regard to alternatives analysis. This Strawman provides various options Alaska may want to consider in addressing this issue.

While the state is ultimately responsible for determining whether an alternatives analysis meets the regulatory requirements, a common condition is that the majority of the work of finding, describing, and analyzing the alternatives is completed by the applicant (i.e., the facility or developer that is requesting the permit), with public input and regulatory oversight.

Several states (and Region 8 as well, for example) emphasize the importance of the alternative analysis as a way to minimize the need for complex socioeconomic justification analyses and associated effort required by the applicant and state staff. Therefore, it may be more efficient to identify practicable alternatives that could be non-degrading or less-degrading, to simplify Tier 2 analysis.

Several states request early notification of project proposals that may have a moderate or significant impact on receiving waters to ensure an effective, efficient alternatives review process. These states note that an Alternative Analysis should be incorporated early in the antidegradation review process, when decisions are being made about the technology and design of the project/process. It is also important to consider that ample time is allocated for public notice, comment, and response on the alternatives analysis. These should all occur while the alternatives are under review, not after specific decisions have been made. Note that this level of review would require two public comment periods, which may be unduly cumbersome.

### Straw Person

Below are suggestions based on other state implementation methods that DEC might consider in terms of applicant requirements for the alternatives analysis.

### **Step 1: Consider all practicable alternatives**

For discharges likely to cause significant degradation (e.g., use of more than 10 percent or 20 percent of the remaining assimilative capacity in the receiving waterbody), the applicant should provide an analysis of non-degrading and less-degrading alternatives to the proposed activity. As noted in the federal and state policy statements, the controls selected should protect existing uses and achieve the “highest statutory and regulatory requirements.”

From the Alaska Antidegradation Workgroup Meeting #3 on May 8 -9:  
Consider all practicable alternatives, such as one or more of the following:

1. Non-discharge approaches
2. Process changes
3. Wastewater treatment & reuse
4. Relocation of discharge
5. Seasonal discharges
6. New technologies

Types of alternatives can be categorized as either non-discharge or discharge alternatives. Non-discharge alternatives could include:

- Land application / infiltration of the discharge
- Total containment of the discharge
- Water reuse
- Pollution prevention, water conservation, or water recycling measures (i.e., closed loop)
- Reducing disturbed surface area (i.e., for stormwater permitted projects)
- Process changes, raw material substitution, or alternative technology

Other alternatives that could be considered on a case-by-case basis include:

- Process changes
- Wastewater treatment and reuse
- Relocation of discharge
- Reduction in scale of proposed discharge or activity
- Improved operation and maintenance of existing facilities
- Pollution trading with other point or nonpoint sources
- Seasonal or controlled discharge options to minimize discharge during critical water quality periods
- Use of best management practices (for nonpoint sources)
- Alternative or enhanced treatment technologies that have high treatment efficiency such as:
  - Advanced oxidation technologies
  - Physical filter barriers
  - Membrane technology
  - Advanced chemical treatment
  - Wetland construction

## **Step 2: Analyze Cost-Effectiveness, Technological Feasibility, and Environmental Impacts of Alternatives**

Many states use EPA's economic guidance (Interim Economic Guidance for Water Quality Standards [\(Notebook Ref. 4.5\)](#)) or other approaches to calculate cost-effectiveness of alternatives. Economic feasibility is also identified as economic efficiency by some states (e.g., Missouri).

In addition to economic and technological considerations, Arizona's antidegradation implementation guidance considers impacts on the natural environment (i.e., land, air, and water) resulting from each alternative. The types of impacts identified by Arizona include:

- Sensitivity of stream uses
- Need for low-flow augmentation
- Sensitivity of groundwater uses in the area
- Potential to generate secondary water quality impacts (storm water, hydrology)
- System or technology reliability, potential for upsets/accidents
- Effect on endangered species
- Nature of pollutants discharged
- Dilution ratio for pollutants discharged
- Discharge timing and duration
- Siting of plant and collection facilities
- Non-water quality environmental impacts

Review of these impacts might be on a qualitative or quantitative basis, as appropriate. Non-water quality environmental impact analyses could include estimations of the potential impact of the alternative(s) on odor, noise, energy consumption, air emissions, and solid waste generation. Other factors that might be considered during the review include the technical, legal, and local considerations of the various alternatives examined.

### Step 3: Rank the Alternatives

Once alternatives are identified, they can be ranked in terms of practicability, treatment effectiveness, and cost. Several ranking schemes have been suggested by states including:

- Rank technically feasible methods from least to most degrading and work down the list to the least degrading, economically feasible alternative
  - All Known, Available, and Reasonable Treatments (AKART)
- Rank all available control technologies in descending order of control effectiveness
  - Most stringent = best available control technology (BACT); Applicant can demonstrate that BACT isn't "achievable" for technological, energy, environmental, or economic reasons and proceed to the next best option
- Rank alternatives in terms of environmental trade-offs:
  - Consider favoring alternatives that best remove pollutants limiting beneficial uses at the site (e.g., Idaho antidegradation implementation guidance).
  - Could also consider cross-pollutant and cross-media impacts such as chlorination of effluent, effects of alternative on other media (e.g., air, groundwater, solid waste)
- Rank alternatives by cost-effectiveness: cost per unit mass of pollutant removed (e.g., \$/lb removed or \$/lb/million gallons per day)

In terms of integrating information on different alternatives and how they rank using different criteria, some states suggest considering technical feasibility first and economic feasibility last. Other states first

determine which alternatives are practicable, and then determine the economic efficiency or cost efficiency of the different alternatives (e.g., Missouri). Various states have criteria they use to judge whether an alternative is economically feasible. For example:

- Missouri: Alternatives less than 120 percent of the base cost of pollution control measures are economically efficient
- Delaware and EPA Region 8: Alternatives costing < 110% of the proposed pollution control measures are deemed “reasonable”
- Oregon: “all known, available, and reasonable” alternatives includes list of “at minimum” alternatives
- Nevada: “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”

#### **Step 4: Document Alternatives Analysis**

The alternatives analysis submitted by the applicant should document all alternatives considered and the process used to identify the preferred alternative. Some states require that the applicant include at least one non-discharge alternative in their analysis (e.g., land application or total containment).

Idaho suggests a four-step winnowing of alternatives to identify the appropriate alternative, in which the following are determined:

- Amount of degradation caused
- Cost-effectiveness of pollutant removal
- Environmental cost-benefit tradeoffs
- Affordability of alternatives

#### **Other Alternatives Evaluations**

Alternatives analysis may potentially be covered by other state/federal requirements including:

- NEPA Environmental Impact Statements
- CWA §404 permit reviews pursuant to US Army Corps of Engineers approval
  - For general & individual 404 permits, the USACE process under 404 requires avoidance/minimization/mitigation