Revisions to the

Missouri Antidegradation Implementation Procedure

November 11, 2019

Introduction:

The Missouri Antidegradation Implementation Procedure (AIP) was adopted by the Missouri Clean Water Commission (Commission) and originally became effective on August 30, 2008. The document was submitted to the US Environmental Protection Agency (EPA) for approval, but due to legal challenges in other states with similar procedures, EPA withheld approval. To address these concerns the document was revised twice. The current version was adopted by the Commission on July 13, 2016, and subsequently approved by EPA on July 30, 2019.

With over ten years of experience, Missouri's Antidegradation processes are well-developed and relatively mature. It has served the State well and provided reasonable wastewater treatment technology determinations which have certainly helped maintain the quality of many waters of the State. Since the earliest days of Antidegradation implementation review engineers identified a number of areas in which the AIP is unclear, situations that were not addressed, or elements that needed additional clarification. The goal of this revision is to address as many of these elements as possible and incorporate ideas that improve and streamline the process while maintaining the fundamental goal of Antidegradation, protecting and maintaining the quality of Missouri's waters.

Improvements:

1. **Non-Degrading.** Although not clearly specified in the AIP, the Department of Natural Resources' Water Protection Program (Department) has interpreted "Non-Degrading" to mean no increase in pollutant load. The method for making this calculation/determination has been to compare the proposed future pollutant load to the existing load, typically in units of pounds per day. To calculate the existing load reviewers have directed applicants to multiply their permitted effluent limit by the permitted design flow. In some cases where an effluent limit was not in the permit, reviewers

have applied the Water Quality Based Effluent Limit (WQBEL) in place of the permitted effluent limit.

The logic behind choosing this method to calculate existing load is that other ways might reward or punish applicants based on how well they operated their facilities. For instance, some facility operators do a very good job and consistently produce better effluent quality than their permit requires. It doesn't seem fair to penalize this facility by using their actual performance data to calculate a lower existing load. The opposite is also true. If a facility is not being operated well and hasn't planned for increased flows or other impacts to the operation, it doesn't make sense to allow these factors to result in a calculation showing a higher existing load. Using permitted design flows and effluent limits to calculate existing loads needs to be explicitly detailed in the AIP.

There is an additional case worth considering as well. Consider a project involving a design flow increase from a facility that discharges to an effluent dominated stream. The AIP currently states that, "The activity shall be considered not to result in significant degradation, if the proposed net increase in the discharge of a Pollutant of Concern (POC) does not result in an increase in the ambient water quality concentration of the receiving water after mixing" (See AIP document, Section II(A), page 15 and 16). For effluent dominated streams if the applicant maintains effluent concentration, then the ambient water quality concentration will not increase. This case needs to be added to the AIP.

2. **Mixing Zones for Lakes.** 10 CSR 20-7.031(5)(A)4.B.(IV) provides the regulation regarding mixing zones for lakes. It currently says: "Mixing zone – not to exceed one-quarter (1/4) of the lake width at the discharge point or one hundred feet (100') from the discharge point, whichever is less." In practice review engineers have used the "triangular prism method" to make this calculation, which is the method used by the Operating Permit Section for lake discharges. The flow volume approximates a triangular prism by making the assumption that the bottom of the lake tapers off in a linear fashion. So the volume is one-half of the length multiplied by the width multiplied by the depth. As an example, if the width of the cove is more than one-hundred feet and the depth of the lake one hundred feet from the shoreline discharge is sixteen feet, the calculation becomes:

$$V=0.5\ (100\ \text{feet})\ (100\ \text{feet})\ (16\ \text{feet}) = 80{,}000\ \text{ft}^3 \cong 598{,}000\ \text{gallons}$$

This method has worked well and it would be helpful and prudent to directly reference it in the AIP.

3. **Stormwater.** The AIP is silent regarding how to address stormwater discharges. 10 CSR 20-6.200(2)(B) details industrial activities that require facilities to obtain permits for stormwater. Most of these are covered under general permits which are reissued every five years after looking for options that are less-degrading.

   However, there are other site-specific and Metropolitan Separate Storm Sewer System projects that to date have not been directly addressed by Antidegradation. One of the primary difficulties is that the Antidegradation calculations refer to "critical conditions" of streams which is almost never the case during storm water discharge events. Another difficulty with stormwater is the amount of pollutants discharged is highly variable based on the: amount of participation, type of industrial activity, size of the site, length of time since the last precipitation event, and the facility's condition and housekeeping actions.

   Operating permits for facilities with stormwater outfalls often include a requirement that the entity develop a Stormwater Pollution Prevention Plans (SWPPP). The SWPPP requires the applicant to identify Best Management Practices that will minimize or eliminate possible water quality impacts from stormwater runoff. Metropolitan Separate Storm Sewer System permits that each have site-specific SWPPPs with different best management practices to reflect the individual stormwater characteristics and site conditions. Permitting language similar to the general permit language requiring a review of the best management practices for the site in the SWPPP and then the installation of the best management should serve as the analysis of treatment alternatives.

   In practice, these SWPPPs serve as an analysis of treatment alternatives, and a paragraph should be added to the AIP to explain this.

4. **Public Notice.** The AIP currently requires all Water Quality Antidegradation Reviews (WQARs) to be public noticed. It allows this notice to be to be "provided through the appropriate legal advertisement in a qualified newspaper with the largest circulation for the county where the discharge will occur," unless the public notice is incorporated into a

permitting process. In practice, almost all WQARs are public noticed as an attachment to the operating permit public notice.

The newspaper advertisement process is dated and does not reflect the most common way in which the Department seeks public comment, through posts on the Department's public notice webpage. Webpage notices will allow more potential for public input, and have a side benefit of de-linking the WQAR from the operating permit.

The AIP document should be revised to reflect this improved method of informing the public and gathering input. Additional revisions should address how the general Antidegradation reviews and the Antidegradation portion of general permits are public noticed.

5. **Eliminate Minimally Degrading Path.** While this exemption from an alternative analysis may seem useful, there are a number of reasons to consider eliminating it. First, it is only useful in situations in which there is existing water quality data, typically the big rivers. Since the data is not available in most places, this path is seldom used. Second, this path is difficult to explain and adds considerable complication to the document itself. Additionally, the exemption can lead to very strange outcomes. For instance, the minimal degradation calculation is based on the entire critical flow of the river, but regulatory mixing to develop WQBELs is limited to ten times the design flow. It is often the case that because of the mixing considerations, meeting the WQBEL can be shown to be Minimally-Degrading. Therefore, this is not really in keeping with the goals of Antidegradation. Another reason to consider elimination is that the ten percent might be considered arbitrary.

   When the AIP was originally developed it was believed that an alternatives analysis would be quite expensive and time consuming. In practice, most applicants find that assembling the alternatives analysis is not particularly difficult because much of the information is similar to facility plans and engineering reports, and as such the exemption rarely helps the applicant. Lastly, a review of the federal Antidegradation rules do not provide for *de minimis* exemptions (although the rules do not specifically prohibit them). For all of these reasons, it would be prudent to eliminate the Minimally-Degrading path.

6. **Chemical Additives.** The use of chemical process treatment additives at wastewater treatment plants is very common and they serve a variety of purposes. These range from acids or bases to adjust pH; chlorine for disinfection; sulfites to dechlorinate; coagulants and flocculants to improve settling; enzymes, nutrient solutions, and/or surfactants to stimulate bacterial action; agents to control foam; alkalinity or carbon to promote specific types of bacterial growth; and alum or ferric chloride to remove phosphorus. In all of these cases, the additive is being used to improve some specific aspect of the wastewater treatment operation or efficiency. The mechanisms to assure that many of these additives are not negatively impacting the receiving water is the establishment of a total residual chlorine limit, the applicant's review of the toxicity associated with the additive, or a permit requirement to perform Whole Effluent Toxicity (WET) testing. Generally, operating permits do not prohibit the addition of these additives provided they are not expected to negatively impact effluent quality.

   Therefore, Antidegradation reviews should be limited to those additives that might negatively affect effluent quality, and a paragraph should be added to the AIP explaining this.

7. **Nutrients.** Missouri recently adopted, and EPA approved, numeric nutrient criteria for lakes. See 10 CSR 20-7.031(5)(N). In support of these water quality standards the Department prepared a "Nutrient Criteria Implementation Plan," dated July 27, 2018, which provides a framework for how the Department intends to implement these new rules. This document differentiates between new or expanded sources that are located in watersheds where lakes are impaired for nutrients from those where nutrient criteria apply, but the lakes are not impaired.

   Tier 3 Waters. For discharges to Tier 3 waters, no further degradation is allowed, and this will apply to nutrient pollution as well.

   Waters Without Nutrient Water Quality Standards. If the proposed discharge is located in a waterbody that is not a lake or a tributary to a lake that has been assigned nutrient water quality standards, then Total Phosphorus (TP) and Total Nitrogen (TN) are <u>not</u> to be considered POCs.

Non-Degrading Approach for Nutrients (Tier 2 & Tier 1). To calculate the existing load, current practice for other pollutants is to multiply the permitted design flow by the permitted effluent limit. Very few existing permits currently limit nutrients. Until a permit limit exists, for nutrients only, the calculation may be based on actual average effluent concentrations as reported in discharge monitoring reports. The minimum amount of data to use this method should be one year (quarterly reporting); however, all of the available data that is representative of current operations should be utilized. Again, once a limit is placed into a permit, it is that value by which the calculation will be made.

Tier 2 Water With Nutrient Water Quality Standards. Because of the complex nature of the fate and transport of nutrient pollution in the environment, it is not possible to determine precisely what effluent concentrations are protective of the standards. For this reason, the Department proposes that applicants assume conventional secondary treatment is the "base case" for TN and TP. For TP, these values typically range from 1 to 4 mg/L. Existing facilities would use existing effluent concentrations to establish the baseline. The AIP requires applicants of proposed discharges to Tier 2 waterbodies to evaluate a range of less degrading treatment alternatives with the intent of identifying reliable, demonstrated processes or practices that can be reasonably expected to achieve greater pollution reduction than the base case. Applicants for domestic wastewater will be asked to evaluate at least three less degrading options, specifically chemical addition and settling, biological nutrient removal (BNR), and Enhanced Nutrient Removal (ENR). The chemical addition of metal salts, typically ferric chloride or alum to precipitate phosphorus followed by settling is a common process that has been used for a number of years in Southwest Missouri for the lakes that are subject to the 0.5 mg/L effluent limits required in 10 CSR 7.015. BNR is commonly associated with sequenced combinations of aerobic, anoxic, and anaerobic processes which facilitate biological denitrification via conversion of nitrate to nitrogen gas and "luxury" uptake of phosphorus by biomass with subsequent removal through wasting of sludge. ENR typically employs BNR with the addition of chemical precipitations and additional filtration to achieve lower effluent concentrations than can be achieved through BNR alone.

Table 1 below provides the generally expected concentration ranges for domestic wastewater sources associated with these technology levels.

Table 1: General Effluent Concentration Ranges for Less Degrading Options

	Chemical Addition and Settling (mg/L) monthly average	Biological Nutrient Removal (mg/L) monthly average	Enhanced Nutrient Removal (mg/L) monthly average
Total Phosphorus	0.5	0.5 – 3.0	0.2-0.5
Total Nitrogen	20	6-10	4-6

For industrial sources, these "cut points" are not defined, and it will be the obligation of the applicant to identify a "base case" and less degrading options to consider.

Applicants should develop annualized costs comparisons for the "base case" option and the three less degrading options as noted above. The costs should be presented on a present worth basis and include both capital and operating expenses. They are typically calculated for a twenty-year plant life. As a non-binding rule-of-thumb, alternatives less than 120 percent of the annualized cost of the base case are considered economically efficient, and the applicant will be required to install this level of technology, unless they find it unaffordable under the process already outlined in the AIP.

Missouri has a history of requiring 0.5 mg/L TP limits in the Table Rock Lake and Lake Taneycomo watersheds. Because of this, applicants will be expected to use this concentration as a default and the Department should be comfortable in assigning limits at this value. This does not mean that other limits would not be appropriate when applicants support them for their specific circumstances.

Lastly, it is important to note that the alternatives analysis must also be conducted for the other POCs (Biological Oxygen Demand, Total Suspended Solids, Ammonia, etc.) as has always been done. It is expected that for domestic wastewater, ammonia and nutrients will be the pollutants that "drive" the design.

Tier 1 Review for Nutrients. The Department expects that environmental data collected at a number of lakes will eventually

show that they are impaired based on the new criteria. It is only after the Department goes through the formal 303(d) listing process that the subject waterbodies will be considered Tier 1. In most cases, the primary driver for impairment is expected to be TP, but if the information gathered through the listing process shows that TN is a driver of the impairment in a particular waterbody, then TN will also be considered a Tier 1 POC. Otherwise, TN will be treated as a Tier 2 POC.

If an applicant for a new or expanded discharge would like to discharge into the watershed of one of these impaired lakes, the "Nutrient Criteria Implementation Plan" requires the installation of Best Available Technology (BAT) for TP and they must show that their proposed discharge will not cause or contribute to the impairment. This must be done prior to formal submittal of their Antidegradation application. Again, in most cases TN is not expected to be the primary driver of lake nutrient impairment. However, if modeling or data shows that TN plays a significant role in a particular case, then BAT for TN must also be implemented.

In addition, once a formal Wasteload Allocation (WLA) for nutrients has been developed through a Total Maximum Daily Load (TMDL) process, the new source will be subject to the WLA of the TMDL for that setting.

The Clean Water Act defines BAT as the best technology that is economically achievable. Typically BAT applies to nonconventional pollutants at existing direct dischargers. This technology-based approach will be borrowed for the interim purpose of determining the appropriate level of control for nutrient dischargers in impaired settings prior to the development of a TMDL. There are a number of factors that can be accounted for in determining BAT including the age of existing equipment and facilities, the treatment process selected, the engineering design aspects, the need for process changes, as well as other non-water quality environmental impacts and other factors. Of course, these considerations must all be weighed against cost.

For Tier 1 purposes in the interim, applicants for <u>domestic</u> wastewater treatment plants may assume that an effluent concentration of 0.5

mg/L for TP represents BAT. If it is understood that nitrogen plays a driving roll in the impairment, then for discharges of 500,000 gallons per day, or greater, domestic applicants may assume an effluent concentration of 5 mg/L for TN represents BAT. For smaller discharges, applicants may assume that 10 mg/L for TN represents BAT. These assumptions are based on the fact that these effluent concentrations have been routinely achievable in the Table Rock Lake and Taneycomo watersheds since the effluent regulation established these requirements over 10 years ago. Note: these values may evolve as technology improves, cost considerations change, or additional information is gathered.

If applicants for domestic wastewater systems wish to assert that BAT for their individual situation differs from the assumptions above, they may provide an engineering study that evaluates alternatives, demonstrates that the costs of achieving the above effluent concentrations are not economically efficient, and provide a recommended alternative. All applicants for industrial discharges must take this alternative analysis approach and provide an engineering study that establishes the BAT for their proposed project. The information submitted will be reviewed by staff, and in conjunction with the applicant, the appropriate BAT for the proposed project will be determined and documented in the WQAR.

Once BAT has been proposed, the applicant can then determine the associated pollutant load of the proposed project by multiplying the effluent concentration by the design flow for both TN and TP (typically expressed in pounds per day). This information will be forwarded from the Wastewater Engineering Unit to the Watershed Protection Section, who will conduct appropriate watershed modeling to determine the expected impact of the project on the waterbody. If the modeling demonstrates that the proposed load does not cause or contribute to the impairment of the beneficial use, the applicant may proceed with formal submittal of the Antidegradation review request. If the modeling shows that the proposed loading will cause or contribute to the impairment, the applicant may work with the Watershed Protection Section to amend their proposal to see if an amended pollutant load can be allowed. Alternatively, the applicant may select some other non-discharging option or abandon the project

because State and federal regulations prohibit discharges that cause or contribute to an impairment.

Finally, once a TMDL has been written for a particular impaired waterbody, the WLA must be translated into appropriate permit limits in a way that is consistent with the assumptions and requirements of the TMDL. If a WLA exists, it must be maintained in the WQAR.

8. **Cumulative Degradation.** The AIP envisioned a system by which existing water quality would be established for individual receiving waterbody segments as of August 30, 2008. This system exempted applicants from an analysis of treatment alternatives if the sum of all of the projects discharging to a specific segment is less than 10 percent. The Department has not done a rigorous job of tracking these exempted projects, and the review process only looks at this question when an issue is suspected. There are several problems with this cumulative degradation approach.

   First, this situation is relatively rare. The natural process of development tends to space discharges out, and we do not often see new discharges into segments that already have a discharge. Another problem is that there will be situations in which a water quality standard changes. As we anticipate future ammonia standards, changes in how we establish ammonia limits (monthly), or potential changes to bacteria standards, what is existing water quality for these new or different standards? And lastly, prior to application, how does an applicant know that there were previous discharges into a particular segment?

   For these reasons, the AIP should be amended to eliminate any references to "cumulative degradation." Each project will then either be Non-Degrading or will have to have an analysis of treatment alternatives. In addition, there will be no need to refer to "Segment Assimilative Capacity" and the document will rely on "Facility Assimilative Capacity," which is the assimilative capacity applicable to an individual facility in that particular receiving water segment.

9. **Existing Uses.** As with "Cumulative Degradation" the AIP includes the concept of "existing uses." These refer to the uses that were in effect as of August 30, 2008. However, uses and standards can change over the years. Again, the AIP should be amended to eliminate this reference to a specific

moment in time, and instead look at beneficial uses that apply on of the day of application.

10. Effluent Limits. The federal Antidegradation requirement under Section 131.12(a)(2)(ii) is to lessen or limit the degradation associated with projects subject to Antidegradation. "The analysis of alternatives shall evaluate a range of practicable alternatives that would prevent or lessen the degradation associated with the proposed activity. When the analysis of alternatives identifies one or more practicable alternatives, the State shall only find that a lowering is necessary if one such alternative is selected for implementation." Since the Antidegradation program was initiated in Missouri in 2008 the method to "prevent or lessen degradation" has been to include an effluent limits in each Antidegradation review.

To undergo an analysis of treatment alternatives and choose a less degrading option but not establish effluent limits is incongruous with the goals of the Antidegradation. It would be very difficult to explain to the public or to decision-makers that a review of alternatives resulted in a requirement that the applicant install a more expensive and better performing system but then apply limits that could be met without spending the extra money or operating the system properly. Preferred Alternative Effluent Limits (PELs) have the added benefit of providing a specific design parameter as well as an operational goal. For example, a particular system may be well designed to treat ammonia, but operated in a manner such that those effluent concentrations are not routinely met.

For projects that are demonstrated to be Non-Degrading, it also makes sense to establish limits based on those calculations.

Depending on the pollutant, there are several types of effluent limits developed during an Antidegradation Review. These include: PELs (based on an analysis of less degrading treatment alternatives), Non-Degrading Effluent Limits (NDELs, based on mass balance calculations), Federal or State Regulation limits (FSRs, limits from 10 CSR 20-7.015 such as pH or phosphorus, among others), Technology-Based Effluent Limits (TBELs, from the federal effluent limit guidelines or case-by-case review), and WQBELs.

The AIP should be amended to specifically reflect that effluent limits are to be applied.

11. **Pollutants That Do Not Have Water Quality Criteria:** If there is no water quality criteria for a specific pollutant, there is no direct way to establish a "base case," treatment technology that is protective of beneficial uses. From an operating permit standpoint, these pollutants are often best addressed through a requirement to conduct WET tests. A paragraph should be added to the AIP to reflect this practice.

12. **Affordability.** Although this provision has never been utilized, the AIP allows applicants to demonstrate that a less degrading technology that is "economically efficient" may not be affordable for a particular situation. The document currently references an EPA publication, "Interim Economic Guidance for Water Quality Standards," EPA-832-895-002 (1995). RSMo 644.145 now requires the Department to adopt procedures to determine whether a permit or decision affecting a Publicly-Owned Treatment Works is immediately affordable, and the "Cost Analysis for Compliance" (CAFCom) was developed to meet this requirement. The AIP should be amended to refer to the Department developed tools and procedures to make CAFCom affordability determinations made for Antidegradation purposes clearer and more directly aligned with how these determinations are made for permitting and enforcement situations related to public systems.

13. **Dissolved Oxygen Modeling.** A policy was developed to waive an analysis of dissolved oxygen sag if the applicant chooses to accept effluent limits of 10/15 mg/L Biological Oxygen Demand (monthly average/weekly or daily maximum). This was done because an analysis of screening models showed that sources with these limits will not cause dissolved oxygen concentrations to drop below the water quality standard (5 mg/L dissolve oxygen). The AIP should be amended to include a paragraph explaining when modeling is and is not required, and what methods and processes to use.

14. **Bacteria.** The Department has historically applied WQBELs limits for bacteria. Sources discharging to streams with Whole Body Contact A (WBC-A) uses received end of pipe limits based on WBC-A criteria, and sources discharging to Whole Body Contact B (WBC-B) streams received

end of pipe limits based on WBC-B criteria. However, disinfection systems are all designed for total kill or total inactivation. Therefore, the AIP should be amended to establish WBC-A limits for any discharge to waters that require disinfection. This would best represent the less degrading alternative.

15. **Metal Salts for Phosphorus Removal.** As we address nutrient pollution for the protection of Missouri's lakes and streams, many facilities will turn to chemical addition and settling for the removal of phosphorus. Ferric Chloride and Alum are the predominant choices, and iron and aluminum are both POCs. The AIP needs to address how to deal with these pollutants. Specifically, it does not make sense to evaluate less degrading alternatives for chemical addition. A paragraph explaining how this will be handled should be added to the AIP.

16. **Organization.** One way to improve the AIP would be to include a section that addresses all of the common pollutants and how they are best addressed. As an example, pH is a range, and therefore it does not make sense to conduct an analysis of treatment alternatives for this pollutant. Another odd pollutant is temperature. In the case of temperature, the AIP should direct applicants to conform to Section 316 of the Clean Water Act. The AIP should be amended to explain the idiosyncrasies of the various pollutants and how to address them.

    In addition, the AIP needs to have a section that explains applicability; when an Antidegradation review is necessary. And it also needs a section explaining how an application is completed and reviewed. For example, applicants should first examine if a non-discharging or a regionalization option is feasible. It should explain that for new sources a Geohydrologic evaluation and natural heritage review are required. If modeling or metals translators studies will be part of the project, these must be conducted prior to official submittal of the Antidegradation application. If the proposed process is a new technology, the applicant needs to know that there will be additional monitoring as part of the permit so that performance can be demonstrated. In addition, Antidegradation review needs to occur prior to apply for State Revolving Fund loans or grants.

The Antidegradation stage is the time to plan. The AIP should be amended to explain all of this.

17. **Outfall Relocations and Construction Completion.** Applicants sometimes have chosen to relocate outfalls to larger receiving streams to garner more mixing. In some cases, the effluent concentration is such that the receiving water will meet all water quality standards. Since there is very little cost associated with this change, all less degrading alternatives are much more expensive than the 120% rule-of-thumb. For these cases, the engineering work associated with developing costs for less degrading alternatives is not necessary because the conclusion is already understood. The AIP should be amended to allow applicants to make this case by providing a reasonable case, rather than requiring full costing of the alternatives.

    A foregone conclusion is also apparent in some other situations. For example, there have been applicants that are rehabbing an older system or bringing online a system that has been built but never permitted. Completing construction is clearly the lowest cost or base case option, and other options will all cost well over 120% of this base case. If it is clear that a particular option has a very low or null cost, then all that is necessary is a discussion of alternatives not a full analysis. Amending the AIP to allow applicants to demonstrate this with reasonable information, rather than requiring a full costing of treatment alternatives would benefit the applicant and streamline the review.

18. **Impaired Waters.** Page 15 of the AIP states, "The department must also assure that activities within the watershed are implementing cost-effective, reasonable best management practices to control nonpoint source pollution." The Department has no statutory authority to require this, therefore it needs to be removed or amended in the AIP.

    When EPA publishes the 303(d) list, entire rivers are shown as impaired, when only particular segments are actually on Missouri's list. References to the 303(d) list should be changed to only those segments shown on the map viewer maintained by the Department.

19. **General Antidegradation.** For facilities with design flows of less than 50,000 gallons per day, the Department has drafted a general analysis of

alternatives using dozens of small projects as a basis for the alternatives analysis. This path provides a quick review and allows owners and applicants to spend money on treatment as opposed to engineering costing studies. The AIP should be amended to include a specific provision for this. In addition, the AIP should allow the Department to identify effluent concentrations that it finds to be generally less degrading and economically efficient. This would allow applicants to forgo costly engineering evaluations and choose clearly better technologies.

20. **Miscellaneous Edits.** The following edits should be made for clarity, usage, usability, etc.
    - Better define temporary degradation as projects generally less than two years in duration.
    - Add a paragraph noting that a WQAR is typically valid for two years, but the Department may allow for longer timeframes if water quality standards have not changed and costs could be assumed to be nearly equivalent.
    - A reference to EPA's Technical Support Document should be added because it is relied on in many instances.
    - For alternatives analysis, we should refer to the engineering practice statutes, RSMo 327.181.1.
    - With the removal of "Minimal Degradation" the AIP could be amended to eliminate the term "Significantly Degrading" and replace it with the word "Degrading."
    - The document needs to clarify that the bioaccumulation of pollutants are not evaluated solely on fish tissue, but all aquatic organisms and in sediments. This will address a key issue identified by EPA during the recent standards approval process.
    - The document could use a better set of example calculations at the end to explain various situations.
    - Other wording changes to improve document organization, readability, and flow.