



pennsylvania
DEPARTMENT OF ENVIRONMENTAL
PROTECTION

Bureau of Abandoned Mine Reclamation

Acid Mine Drainage Set-Aside Program Implementation Guidelines
[45 Pa.B. 917]
[Saturday, September 17, 2016]

Comment and Response Document

Introduction

The Department of Environmental Protection's (DEP) or (the Department) Acid Mine Drainage Set-Aside Program Implementation Guidelines (Guidelines) were published in the *Pennsylvania Bulletin* for a 30-day public comment period on February 21, 2015. See 45 Pa.B. 917. Comments were received from four commentators. Several of the comments included similar themes. These similar themes were condensed and reflected in responses numbered 1 -- 9 of this document. After that, specific comments received from commentators were addressed individually if they were not already addressed in the first 9 responses. They are numbered 10 -- 21.

1. Comment: Risk Matrix

Several comments were received concerning the Risk Matrix (RM). These comments generally opposed the RM for a number of reasons. Commentators perceived the RM as biased against passive treatment because there are a number of "high risk" discharges being treated with passive systems that are functioning properly. Commentators further stated that the RM was outdated which would prevent funding of "high risk" discharges with passive treatment. Commentators also stated that the RM was not "science-based" and would therefore prevent the evolution of science-based improvements to passive treatment technologies. Finally, regarding the RM, commentators averred that a follow-up study completed in 2013 was not adequately considered and, as a result, modifications made to the RM were not adequate. (C1), (C2), (C4)

Response: In order to fully address the comments submitted regarding the RM, the Department is providing the context and background necessary to fully understand the intent and use of the RM within the Guidelines. Further, it is necessary to discuss the RM in concert with the Best Management Practices (BMP) section of the Guidelines. Together, these two sections form the basis for the technical review and evaluation process for projects funded by the Set Aside program. Therefore, the response to the comments on the RM will include an overview of the entire process and illuminate how the RM and the BMP sections work together to standardize an approach to project selection. First, the background information explains the rationale for including the BMPs and RM in the Guidelines. Next, the response discusses the reasoning for the BMPs section. Lastly, the response presents the information about the RM.

Background

The need for abandoned mine drainage treatment in Pennsylvania far exceeds the available funding. As a result, a project prioritization process, similar to the land reclamation program, is required to ensure limited resources are used to fund cost effective projects. The BMPs and RM are just two parts of the overall prioritization strategy.

Historically, agencies that fund mine water treatment projects have struggled with identifying technically sound projects from a pool of project proposals. Part of the reason for this is the passive treatment industry lacks a set of design standards that can be compared to a project proposal to evaluate adequacy. Another reason is that proposals are difficult to distinguish because they all make similar predictions, such as the mine water will be treated to net alkaline conditions and the treatment system will operate for many years with minimal maintenance. The vast majority of grant proposals provide a before and after comparison of the mine water and receiving stream as a basis for showing project benefit. These comparisons often show the untreated mine water to be metal laden with elevated acidity and the treated water to be void of

metals and contain excess alkalinity. Furthermore, many times the grant applications provide predictions of system longevity to help support the notion that a large upfront expenditure on a passive treatment system will be rewarded with many years of low-maintenance treatment. There have been numerous examples where the prediction never materializes after the fiscal investment, including projects that cost millions of dollars. This is due in part to failure to properly consider pollutant loading and flow variations, which contribute to the “risk” to treatment of these types of discharges. In a situation where there is greater need than resources, every dollar is important and it is reasonable that funding programs contain a set of standards to reduce the likelihood of undesirable outcomes. The Guidelines aim to establish several categories of standards, including a set of BMPs and RM, to ensure project proposals contain sound practices and investments that produce the expected outcome.

Best Management Practices

There are examples of funded projects with continuous issues because the projects lack key design features instrumental to successful operation and maintenance. The goal of the section on Best Management Practices (BMPs, see Appendix C: Design and Sizing Criteria) in the Guidelines is to establish a series of expected design standards that will be incorporated in project proposals to avoid issues in future projects. The BMPs provide clarity to groups developing proposals on expectations and provide a means for project reviewers to evaluate and select projects. Examples of BMPs include standards on collecting water quality and quantity data, managing surface water, and providing emergency overflow capability for treatment systems.

While some of the BMPs are straightforward, other BMPs are subject of debate. An example of this includes the design methods used to size passive treatment systems. Many project proposals fail to include the sizing methods used to design treatment systems. Sizing methodologies should have the ability to use water quality and quantity data to size a treatment system for a desired water quality outcome.

The ability to size a treatment system for a desired outcome is important when trying to identify how best to restore a hydrologic unit. Sizing passive treatment systems is an evolving science and part of the continuing effort to progress this science involves requiring information on how the systems are sized so the post construction outcome can be compared to the prediction. Requiring this type of detailed information will serve to better refine sizing methodologies as predictions are compared to outcomes.

There are numerous published papers on sizing methodologies, but the passive treatment industry lacks a list of currently accepted sizing practices. Public participation was requested in identifying the acceptable sizing methodologies for the BMPs. In 2012, over thirty-five passive treatment professionals, from consultants to academia, were emailed a questionnaire with a host of BMP-related questions, including sizing methodology. DEP received five responses. As a follow-up, Bureau of Conservation and Restoration (BCR) staff contacted the five responders and requested the professionals to participate in a workgroup to discuss the BMPs. The workgroup met on December 16, 2013. This was an attempt to establish BMPs within the Guidelines to aid in project selection, create design standards to improve system performance, and establish the documentation needed to both refine sizing methodologies and conduct a thorough review should the system not function properly after construction.

The BMPs are needed to help standardize our approach to passive treatment and avoid funding inappropriately sized systems or systems lacking basic features like emergency spillways. These standards will act as a starting point and will be refined or replaced as systems are constructed and predicted outcomes are or are not achieved. It is important to note that BMPs, including sizing methodologies, are dynamic in nature and will change as technology evolves and design methods improve. When developing the BMPs, the Bureau of Abandoned Mine Reclamation (BAMR) will solicit public participation to help guide and shape revisions to the BMPs.

Risk Matrix

It is widely recognized that accumulation of metal precipitates within the limestone matrix of a passive treatment system can decrease treatment performance. The accumulation of precipitate can both affect the dissolution of limestone and cause plugging that affects retention time. Several approaches are used to address the issue of metal precipitation and plugging. One approach is to incorporate flushing systems within treatment systems. Another approach is to size the system large enough so sludge accumulation can be accommodated within the limestone matrix for many years without hydraulic failure. In any event, metal precipitation within the alkalinity generating components of passive treatment systems is undesirable and will eventually lead to maintenance and rehabilitation. Therefore, placing passive treatment on lower metal loading discharges is expected to result in systems with decreased maintenance and more predictable effluent quality.

The RM was developed on the principle that recognizes a relationship between metal precipitation and maintenance needs. The RM only applies to the passive treatment of a category of net acidic discharges. The use of the word “Risk” in naming the evaluation matrix inherently recognizes there are examples of successful and unsuccessful systems treating high-metal loading discharges and conversely examples of successful and unsuccessful systems treating low-metal loading discharges. The RM does not prevent constructing a system on a high risk discharge, but it does assign a numerical value in the technological area of scoring that scores low risk discharges more favorably than high risk discharges.

The RM therefore does incentivize the use of passive treatment on low-metal loading discharges. If two projects proposals contained very similar benefits and costs but one proposed to treat a low metal-loading discharge and the other a high metal-loading discharge, the RM would score the proposal containing the low loading discharge more favorably because it is likely to have less issues with plugging maintenance. The approach of using a RM to help evaluate passive treatment proposals seems reasonable until a final set of BMPs and sizing criteria are agreed upon that results in repeatable outcomes for treating high-metal loading discharges.

The Guidelines acknowledge the need for the science to evolve and provide an avenue for innovative ideas. However, the BCR must first and foremost manage the state’s limited resources in a fiducially responsible manner. The Guidelines promote first trying emerging technologies on a small scale to limit financial exposure to technologies without a proven and repeatable track record.

The relationship between the risk designations (Low, Medium, High) and metal loading was developed by reviewing the results of 50 treatment systems treating net acidic discharges. One promoted advantage of passive treatment is a large initial upfront investment will result in low treatment costs amortized over a long time frame. Therefore, the review committee only selected

treatment systems that were operating for a minimum of five years. Systems were evaluated by using sampling data to determine whether systems produce net acidic or net alkaline water. The RM was refined several times in response to public comments and from workgroup discussions as a result of a 2013 follow-up study. Since the follow-up study showed that several small flow systems were successfully treating “high risk” discharges, a means of lowering discharges of less than 50 gpm per treatment cell from high risk to medium risk was provided.

The Guidelines fully recognize the relationship between risk designations and metal loadings is not absolute and will evolve over time as technology improves. As systems are constructed using BMPs and predictions are compared to outcomes, the matrix will require refinement to evolve with the program. Nevertheless, the RM does act as a starting point to acknowledge performance issues caused by high-metal loading discharges and help to provide the guidance needed to prioritize projects when the need for treatment in Pennsylvania far outweighs the financial resources.

Lastly, the Department emphasizes that the Guidelines promote the use of passive treatment for low metal acidic, net alkaline and circum-neutral pH net-acidic discharges.

2. **Comment: Formation of a Set-Aside advisory committee or workgroup with representatives from stakeholder groups**

A common theme in the four sets of comments received was a request for establishment of an advisory committee that includes public stakeholders, although the comments varied on the role of the committee. Comments on the role of the committee include bringing transparency into decisions, evaluating decision process of Guidelines, promote and expand the cooperative spirit and provide transparency, change current decision-making strategy, and guide procedures and policy. (C1), (C2), (C3), (C4)

Response: The Department is considering the establishment of a subcommittee that would serve as a liaison between public stakeholder groups and the Department. The purpose of the subcommittee would be to improve communication between the public and Department staff, provide input to the Department on the evolution and success of passive treatment technologies, and to bring transparency into the Department’s decision-making process with regard to Set-Aside fund expenditures.

The Mining and Reclamation Advisory Board (MRAB) is already in existence and may be an appropriate vehicle for establishment of this subcommittee. The MRAB believes that its most significant accomplishment/impact is its acting as liaison between the Department, the mining industry, and the environmental community (10-23-14 MRAB meeting minutes). In addition, representatives of the Eastern and Western Coalitions for Abandoned Mine Reclamation are members of the MRAB (Robert Hughes, EPCAMR is a member and Andy McAllister, WPCAMR is an alternate, representing county conservation districts).

3. **Comment: Re-define or remove the requirement that QHUs be addressed in a comprehensive manner (lack of transparency in establishing the definition)**

Several comments received suggest that the Set-Aside guidelines fail to address restoration in a comprehensive manner. The comments address three aspects of the use of the term comprehensive and are addressed separately below. (C1), (C2), (C3)

Comment: The first comment expresses that the restoration model used in the guidelines allows for some acid mine drainage (AMD) discharges to be left untreated in achieving a restoration goal.

Response: Guidelines for the Set-Aside Program funding were developed to meet the federal statutory intent which directs states to “ensure efficient and effective expenditure of Set-Aside funds in achieving measurable restoration of watersheds...in accordance with the requirements of the Surface Mine Control and Reclamation Act of 1977 (SMCRA)”. Section 402(g)(6)(A) of SMCRA states, “Any State with an approved abandoned mine reclamation program pursuant to section 405 may receive and retain, without regard to the 3-year limitation referred to in paragraph (1)(D), up to 30 percent of the total of the grants made annually to the State under paragraphs (1) and (5) if those amounts are deposited into an acid mine drainage abatement and treatment fund established under State law, from which amounts (together with all interest earned on the amounts) are expended by the State for the abatement of the causes and the treatment of the effects of acid mine drainage in a *comprehensive manner* within qualified hydrologic units affected by coal mining practices.”

As “comprehensive” is not a defined term in SMCRA, the restoration goals were designed in order to set obtainable and worthwhile goals in using Set-Aside funding in the abatement of AMD discharges, consistent with the plain meaning of the term.

The example provided in paragraph D of the guidelines (p. 5) considers all aspects of the watershed in setting an achievable and obtainable restoration goal. In this example, tributaries that were receiving AMD discharges but excluded from restoration efforts were not selected for restoration efforts due to the severity of the impacts “*and the poor habitat due to other activities in the watershed.*”. The example illustrates the very real situations often encountered in attempting to restore a watershed which limit restoration to something less than every foot of stream within a watershed. Due to physical constraints (i.e., space limitations), current passive treatment technologies may not be able to provide a viable treatment solution to achieve restoration of a stream degraded by AMD. Additionally, as mentioned in the example cited in the guidelines, there are often additional impacts contributing to the degradation of a stream that Set-Aside monies would not be eligible to address. Some examples of this would be unpermitted discharges of sewage effluent, poor stream habitat resulting from poor agriculture practices such as over-grazing by cattle creating severe stream bank erosion, denuding/destruction of stream banks from clear-cutting of timber, and over-development of an area allowing removal of all riparian habitat necessary for creating a cold-water fishery. These types of impacts would be required to be addressed through other agencies and would generally be outside the scope of the Set-Aside program.

Comment: The second criticism concerning the Guideline’s use of the word comprehensive centered on the limiting of the number of potential Qualified Hydrologic Units (QHUs) that could be created and thus resulting in very few projects qualifying for Set-Aside funds.

Response: Under the current SMCRA authorization, the Department is awarded a sum of money based on the annual fees collected from mining activity. This sum has been generally consistent although somewhat reduced (through sequestration and other factors). As the administrator of Pennsylvania’s Set-Aside funds, the Department has a fiduciary obligation to fund the best restoration projects achieving the most efficient and effective use of the limited

resources it manages. Therefore, the Department will carefully consider each restoration plan submitted for consideration as a Qualified Hydrologic Unit (QHU) for completeness, feasibility, positive cost-benefit ratio, and amount of stream miles restored. The Department has and will continue to partner with the various stakeholder groups (which includes local watershed associations, county conservation districts, Trout Unlimited, the Eastern Pennsylvania Coalition for Abandoned Mine Reclamation, the Western Pennsylvania Coalition for Abandoned Mine Reclamation, the Susquehanna River Basin Commission, and the Foundation for Pennsylvania Watersheds) involved in AMD remediation in order to restore AMD polluted streams to viable fisheries. The benefits of working in partnership with these stakeholder groups were acknowledged in the guidelines where it cites the “reduced costs to the Title IV program when working in Hydrologic Units where significant construction has already been funded” (p. 23, Section 3.b.). This construction is largely conducted through the use of non-Title IV monies which the stakeholder groups access in their projects to restore a stream or watershed. The very process of making a watershed a Qualified Hydrologic Unit and thus eligible for Set-Aside funding under Section 402(g)(6)(B)(ii) of SMCRA takes into consideration whether the Hydrologic Unit contains land or water that is the subject of expenditures by “...other State sources to abate or treat abandoned mine drainage” (such as state funded Growing Greener, Commonwealth Financing Agency or Section 319 projects). The very scope of the challenge to address the numerous sources of AMD within the Commonwealth requires the Department to continue to foster partnerships and input from stakeholder groups involved in treating AMD.

Comment: An additional comment under this category is that the terms Comprehensive Restoration and Qualified Hydrologic Unit should be redefined through a collaborative effort with partners.

Response: The Department acknowledges this comment. It should be noted that these terms were defined in the original document and discussed in a stakeholders meeting held in 2008. There were no concerns expressed by the stakeholders concerning these definitions at that time. The definitions have not changed in the more recent iterations of the Guidelines.

4. **Comment: Create additional Qualified Hydrologic Units in order to allow Set-Aside funds to be used for operation and maintenance**

The Department’s narrow definition of comprehensive and the conditions for creating QHUs results in the lack of money available for the operation and maintenance of the over 250 passive treatment systems created through the use of Commonwealth grants currently outside of existing QHUs. The criticism maintains that many of these passive treatment systems could be designated as QHUs because they are the result of comprehensive watershed restoration planning. (C1), (C2)

Response: The Department acknowledges the comment. Commentators have correctly identified a concern within Pennsylvania related to the need for funds across the Commonwealth for the ongoing operation, maintenance and rehabilitation of AMD passive treatment systems. The Department does not agree that the indiscriminate use of set-aside funds in all watersheds is necessarily the proper way to address the concern. By diverting set-aside funds from the statutory intent would create a significant financial burden on the budget for Set-Aside monies. This budget considers the obligations of operating and maintaining the active and passive treatment systems that were designed and constructed for watersheds that are part of a qualified hydrologic unit created to comprehensively improve or restore an AMD impacted watershed.

Further, it also goes against the premise of the Guidelines – that due to grossly inadequate funding to address all AMD problems in Pennsylvania, there is a need to prioritize certain watersheds, and then commit to their restoration. To do otherwise would result in a dilution of funding and effort to the point that very little is accomplished.

5. **Comment: Technical capabilities of staff that developed, reviewed, and scored the Guidelines are inadequate**

A few comments received suggested a lack of technical expertise among DEP staff involved in development of the Guidelines and in reviewing and scoring projects. (C1), (C3)

Response: The BCR (re-organized back into BAMR in 2015) has staff members with decades of AMD experience. All BAMR AMD personnel are competent and capable professionals with a strong desire to learn about new and emerging technologies as well as innovations in implementing existing proven technologies.

A fundamental principle of DEP is to implement its programs as “one-agency”, which means that when a specific expertise is required to complete a project or program, that expertise is brought to bear regardless of where it may be located within or outside DEP.

Due to the recent hiring of staff into the program from other program areas, a strong emphasis has been placed on providing AMD technical training to all BAMR technical staff. This has included extensive training for all technical staff by OSMRE’s national experts at program-wide staff meetings, and individually and in small groups in the Cambria and OSMRE offices and in the field. This included training on AMD chemistry, stream modeling and data collection. One-on-one passive treatment training for passive treatment design engineers was provided by an experienced consultant designer now employed by OSMRE. Staff has attended the following training provided by OSMRE over the past 2 years: AMD Treat, Passive Treatment Technologies, Acid Forming Materials and Forensic Hydrology.

Finally, technical staff has been encouraged and approved to attend technical conferences. These include the 2013 and 2014 NAAMLTP conferences, the statewide AMR conferences, the West Virginia AMD Task Force symposiums and West Branch Susquehanna River symposiums.

The BCR fully supports the need for continued AMD training and would welcome training opportunities from experts in the field of AMD that are relevant to the mission of the Bureau.

6. **Comment: Active treatment cost-benefit example, Hollywood AMD treatment plant, does not reflect actual costs**

Commenters pointed out that actual cost for construction of the Hollywood treatment plant were higher than the estimate that was available when the cost-benefit analysis was completed. Related to this, benefits and costs can be too easily manipulated and should not be used as an initial determining factor in project selection. (C1), (C2), (C3), (C4)

Response: A cost-benefit analysis is performed to evaluate estimated plan benefits vs. estimated plan costs to determine if the restoration plan is justified and should be further scored. After an individual project is constructed and complete, this analysis is not adjusted or revised from the actual costs, the decision has already been made, the project is complete and treatment has

begun. From that point on, the focus on that project is to operate and maintain the system while evaluating and adjusting operational controls to provide the most cost effective and efficient treatment.

The Hollywood project has provided more benefits than were calculated in the cost-benefit example in the guidelines. Thirty-three miles of the Bennett Branch have been restored to a Trout Stocked Fishery (TSF), not just the ten miles in the example. If you recalculate the cost-benefit of Hollywood with the actual costs of construction, engineering, permitting, land acquisition and average Operation and Maintenance (O&M) cost for the three years of operation with the additional miles of stream restored and the revised Valuation dollar amount in the Recreational Use Loss Estimates for Pennsylvania Streams Degraded by AMD, the cost-benefit ratio is 2.43. What this means is \$2.43 in benefits are provided for every Set-Aside dollar spent in the watershed.

Set-Aside staff finds the initial cost-benefit analysis to be a very useful tool in guiding the decision-making process with regard to watershed selection and project selection. As discussed in other sections, the cost of restoring all mine drainage impacted streams in Pennsylvania is far greater than the money available. The cost-benefit analysis helps direct those limited dollars to the watersheds and projects where they can provide the most value.

7. Comment: Cost-benefit analysis should be modified to include other costs.

Commentators suggest that other costs, such as land acquisition, permitting and design costs, be included in the cost-benefit analysis. (C2), (C4)

Response: The Department agrees with this comment to the extent that these costs are expended from the Set-Aside fund. If these costs are paid for by another source, they can be considered a match. Guidelines will be modified to include these costs.

8. Comment: Additional benefits associated with fishery restoration

Commentators suggested additional benefits should be included, such as increase in property values, improved water supplies for industrial, commercial or residential use and benefits to the local economy. (C2), (C3)

Response: The Department agrees with this comment. This is currently addressed in the Guidelines, page 9, paragraph 5, as follows:

Other tangible benefits with known values can also be included, as applicable. Examples may include: expected, calculated savings to municipal or industrial water supplies; the value of providing low-flow consumptive use water to the Susquehanna River Basin Commission; providing increased water tourism on public lands; generating resources that could be used in other industries (resource recovery); generation of energy; increased property values; or the cost savings realized by the application of new or innovative technology. Land restoration projects can also have benefits that improve water quality in streams, provide permanent benefits for wildlife, or provide opportunities for outdoor recreation if on publicly accessible land.

9. Comment: Data used to evaluate success of passive systems has not been made public

DEP conducted an analysis of the success of passive treatment systems in 2009. This analysis was repeated in 2012. Commentators want this data made available for public review. (C1), (C4)

Response: The analyses in 2009 and 2012 include all passive systems that were in operation for at least 5 years and that also included an alkalinity-generating cell such as a vertical flow limestone pond. Systems treating alkaline discharges were not included.

The original analysis completed in 2009 and the data compiled at that time has not been located due to the time that has elapsed and the changes in staffing that have occurred since then. A new analysis was completed in 2012. The final compilation of the 2012 analysis is as follows. Systems rated as low risk (33 systems) had a 71% success rate (23 producing net alkaline effluent and 10 producing net acid), systems rated medium risk (55 systems) had a 66% success rate (36 net alkaline and 19 net acidic) and systems rated high risk (43 systems) had a 34% success rate (15 net alkaline and 28 net acidic).

A copy of the final compilation of the 2012 analysis can be obtained by contacting the Bureau of Abandoned Mine Reclamation, Acid Mine Drainage section at (814) 472-1800. Data is in excel.xls format and will be sent as a doc.pdf.

Individual Comments not addressed in the sections above have been provided below, along with responses to the specific comments.

10. Comment: There is a great deal of leeway in the number of points assigned for various characteristics. In view of the relative lack of technology expertise evident for many DEP personnel, this leaves the result very susceptible to personal bias and emotion. (C3)

Response: The Department agrees with the comment that scoring revisions were needed. Department staff reviewed the restoration plan scoring and found questions asked in the scoring were not clearly defined or addressed in various sections of the Guidelines' narrative portion. The Guidelines now references sections of the narrative throughout the scoring pages and provides additional explanations in the narrative in correlation to the questions. The scoring of the individual projects seemed to be the most complicated portion of the scoring. Staff revised the individual project scoring, resulting in less personal interpretations and a weighted overall score for all the watershed projects based on individual project loadings, and expanded various questions to better define what was being scored.

11. Comment: The title of the document is incorrect. The program is not specific to "Acid Mine Drainage". Mine water in Pennsylvania is both alkaline and acid. People experienced in mine water treatment no longer use the term "acid mine drainage" to generically refer to all contaminated mine water. Redefining the term at the bottom of the page does not justify this error. (C4)

Response: The Department acknowledges the comment. The term "Acid Mine Drainage" is the term used in the federal Surface Mine Control and Reclamation Act in establishing the Set-Aside Program. An explanation is provided in two different places in the document that the use of the

term includes both acid and alkaline mine drainage in this document. For sake of consistency with the statutory language, the Department retains “Acid Mine Drainage” in the title of this guidance.

12. **Comment:** Examples of streams that achieved Upper Tier restoration and are delisted due to AMD remediation should be provided as examples of this extraordinary achievement. The document could present a table of delisted streams, the entity or entities that implemented the plan, and the type of technology utilized. (C4)

Response: A specific example of Upper Tier restoration, Sterling Run, was provided in the document, just as a specific example was provided for lower tier restoration. The suggestion for a table of delisted streams does not seem applicable to the purposes of this specific document. Delisted streams can be found in the DEP’s Integrated Water Quality Monitoring and Assessment Reports.

13. **Comment:** The benefits of Upper Tier restoration are larger than Lower Tier restoration. The Lower Tier goal is to establish a fishery. Valuing this achievement through the Pennsylvania Fish and Boat Commission (PFBC) table is logical. The reestablishment of an unimpaired functional aquatic ecosystem is a more ambitious goal. Only this level of restoration can achieve delisting, which is more valuable to the Environmental Protection Agency and DEP rather than a simple fishery reestablishment. The benefit scoring should recognize this by providing a benefit premium for Upper Tier projects. The DEP could provide a unit per-mile value cost for delisting streams. As this may take a while to decide upon, the starting point for Upper Tier restoration should be a multiplier of the PFBC fishery value. A 50% premium above the PFBC value is suggested as a starting point. (C4)

Response: The Department recognizes the value of an Upper Tier goal and has determined that the scoring in Table B.2 “Benefits – Other” currently provides additional points for projects “reasonably expected to attain” upper tier restoration goals.

14. **Comment:** Annual cost of 4% is a long-term average that includes many years with much less than 4% and occasional major maintenance that is greater than 4%. Clarify this in the text. (C4)

Response: The 4% average was discussed in a segment of the text that provides an explanation and example for determining costs of passive and active treatment systems. The 4% average resulted from the work of an Operation, Maintenance and Repair workgroup convened by DEP several years ago. In the context that it is provided in the Guidance, as an amount used to calculate project costs, the comment above does not change the calculated results. Therefore, it is not necessary to provide this explanation as a component of the sample calculation in the Guidelines.

15. **Comment:** In the calculation of costs and benefits for watersheds with existing systems, it is stated that only the O&M costs of existing systems are included in a cost-benefit analysis of the Hydrologic Unit Plan. It is not stated how the benefits should be calculated. For example, if past restoration activities have restored the stream to an Upper Tier condition, what would be benefit used to balance the cost of long-term O&M? The logical choice is the value of the restored stream, because if the treatment systems are not maintained this benefit could be lost. This needs clarification. There are likely to be many streams proposed for HUP designation that have already achieved significant restoration benefits, so this calculation will be important. (C4)

Response: The Department agrees with the comment. Restored stream miles should be used to determine the benefit values in a watershed that has already been partially or largely restored but the watershed is being considered as a QHU for the purposes of completion of remaining work and providing funds for the operation and maintenance of existing systems. This clarification has been provided in Section I, Initial cost-benefit analysis.

16. **Comment:** It is remarkable that passive treatment is defined by “what it is not.”

Passive treatment is a remediation approach that makes fullest use of gravity, natural materials, and natural biological, geochemical, and physical processes. Passive treatment systems can provide year-round effective treatment, have low operational costs, and often generate ecological benefits beyond clean water. (C4)

Response: The Department agrees with the comment and has modified the guidance to provide such an explanation of passive treatment.

17. **Comment:** The overall technology score for a HUP is reported to be an average of all project scores. All the scoring procedures presented later in the document calculate total scores on a loading basis. (C4)

Response: The Department acknowledges the comment. Technology scores are based on individual projects. The individual project scores are compiled on Table A.4.a and are then weighted by the percentage of pollution loading. The weighted individual scores are then summed for the total technological analysis score.

18. **Comment:** ALD design criteria: “minimum retention is 1 hour at design flow.” I hope that this is a misprint because is wrong by a factor of 10. (C4)

Response: The Department acknowledges the comment and has revised the provision to reflect: “12 to 15 hours at design flow.”

19. **Comment:** Page 21 says that no alternative analysis is required for projects < \$400,000. Page 53 says the cutoff is \$250,000 (C4)

Response: The Department has revised the score sheet (formerly on page 53) to reflect a cutoff of \$400,000.

20. **Comment:** In the chemical limits for the Tier 1 and Tier 2 status, the guidelines continue to use the criterion alkalinity>acidity. This criterion is chemically erroneous and misleading. It is entirely possible to have an effluent with alkalinity>acidity but which is net acid and creates serious downstream degradation. The criterion should be a Hot Peroxide Acidity less than zero. Hot Peroxide Acidity by USEPA or APHS methods is actually a net acidity, because an alkalinity titration is part of the method and the alkalinity results are subtracted from the acidity, so that the DEP version actually involves the alkalinity twice. This alkalinity>acidity criterion is in various existing regulations, but there is no reason to perpetuate it here. (C3)

Response: The Department agrees with these comments. In the statements of chemical limits for attainment for both Tier 1 and Tier 2 goals, the Department has revised “alkalinity > acidity” to include “hot peroxide acidity less than zero according to USEPA methods.”

21. **Comment (2 similar comments):** The terms “Exceptional Worth” or “High Worth” are used interchangeably to describe projects and watersheds. The terms are explained with regard to projects but do not seem clear as to their relevance to the watersheds themselves. Please clarify. (C2)

Is the “High or Exceptional Worth” status a characteristic of an individual stream section, or of a watershed, or of a proposed reclamation area? The term seems to be used in various ways in the text. (C4)

Response: The Department agrees with this comment and revised the guidance by removing the term worth and replaced it with benefit. The guidance has been clarified to reflect the “benefit” of a restoration plan.

Commentators:

- C1. Amy Wolfe, Director, Eastern Abandoned Mine Program & PA Eastern Brook Trout Habitat Initiative, Trout Unlimited
- C2. Andrew McAllister, Regional Coordinator, Western Pennsylvania Coalition for Abandoned Mine Reclamation
- C3. Arthur W. Rose, PG, Department of Geosciences, Penn State University
- C4. Robert Hedin, Hedin Environmental and Iron Oxide Recovery