Discussion of U.S. EPA Science Advisory Draft Reports Regarding Mountaintop Mining Panel

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Statement of Jeffrey D. Jarrett

My name is Jeffrey D. Jarrett. During the period 2001 – 2006, I served as Director of the Office of Surface Mining, United States Department of Interior (OSM). From 1995 – 2001 I worked for the Pennsylvania Department of Environmental Protection (PADEP), first as the Director of District Mining Operations from 1996 – 1999, and then as the Deputy Secretary, Mineral Resources Management from 1999 – 2001. From 1987 – 1994, I served as the Deputy Assistant Director, Eastern Field Operations, for OSM. Among my responsibilities in each of these jobs was to ensure the effective implementation of various environmental laws regulating the permitting, mining, and reclamation of coal mining operations, and the implementation of programs to reclaim abandoned mine lands.

One of the more serious adverse environmental impacts from past mining is acid mine drainage (AMD). Before Congress passed the Surface Mining Control and Reclamation Act in 1977, many coal mining operations caused AMD. The term AMD, as it is commonly used, refers to a water discharge from areas affected by coal mining and reclamation operations that has a pH of less than 6.0 and in which total acidity exceeds alkalinity. A common characteristic of such discharges is the presence of high levels of other pollutants such as iron and manganese that exceed numeric water quality limits. At times, high levels of such other pollutants can be present in discharge water that is not acidic. AMD can degrade receiving streams; it can diminish or even eliminate aquatic life. Once created, without remediation or abatement, AMD will continue, practically speaking, in perpetuity.

AMD has adversely impacted thousands of miles of streams and rivers nationwide – nearly 10,000 miles according to the U.S. Environmental Protection Agency (EPA). The prevention of AMD from current coal mining is one of the key concerns addressed first during the permitting process, and then through implementation of various mitigation measures and operational practices and procedures during mining and reclamation operations. Collectively, these measures, practices, and procedures are known as best management practices (BMP). Implementation of various BMPs is likewise critical to the successful abatement of pre-existing AMD on abandoned mine lands during present-day remining operations.

Remining occurs in areas where sufficient coal reserves remain after past mining to justify additional mining using modern mining methods and equipment. Remining presents a significant benefit to society. Most of these sites were first mined at a time when there were no comprehensive land reclamation or environmental requirements that governed mining operations. Other sites were simply abandoned by operators who failed to comply with environmental requirements, and who are no longer viable companies. In either case the sites typically have on-going and often serious environmental problems, including AMD, and no viable or responsible entity to take care of the environmental cleanup. Today, when an operator remines these areas, he does so in compliance with strict and comprehensive reclamation and environmental requirements.

Of all the states, Pennsylvania has one of the most severe problems with AMD, owing to the significant mining that took place decades ago, and to a geology that is conducive to the production of AMD. In Pennsylvania alone over 3200 miles of streams have been adversely impacted by AMD from past mining. According to a 1995 U.S. EPA Fisheries Study, over 1700 miles of these impacted streams support no fish population at all. Consequentially, the PADEP has been aggressive in recent decades in developing programs and defining and implementing BMPs to prevent AMD at new mining operations, and to abate pre-existing AMD through remining, which represents the majority of current coal mining in Pennsylvania. The tremendous success of these efforts is well known and documented.

In the late 1990s, PADEP completed a study that documented significant and numerous improvements in pre-existing AMD through implementation of various BMPs during remining operations. The study, "Effectiveness of Pennsylvania's Remining Program in Abating Abandoned Mine Drainage: Water Quality Impacts," conducted in conjunction with the OSM was published in 2002 in "Transactions of the Society for Mining, Metallurgy, and Exploration, Vol. 312, pp 166 – 170. The success of Pennsylvania's efforts is elsewhere documented, including OSM annual oversight reports. Today, numerous streams that once were biologically dead now support thriving biological communities as a result of BMPs that have been implemented at remining sites.

In 2002, the U.S. EPA, with substantial participation from PADEP and OSM, completed a report and guidance manual, "Coal Remining Guidance Manual (EPA-821-B-01-010)" which verified the progress made in Pennsylvania and other coal mining states in preventing and abating AMD through remining. In that report the EPA stated, ".... remining operations accompanied by proper implementation of appropriate BMPs is highly successful in reducing the pollution load of mine drainage discharges." EPA concluded, "After more than ten years of success with state remining permit programs, abandoned mine land reclamation, and water quality improvements in Pennsylvania and other coal mining states, it is time to re-evaluate the regulatory conditions that were originally developed, advance the process by offering new remining incentives, and remove disincentives embedded in the current remining program. The goal is to develop a more efficient remining permitting process, with design-based permit standards, that incorporates critical BMPs."

This EPA report served as the technical underpinning of EPA's final regulation, "Effluent Limitations Guidelines and New Source Performance Standards, 40 CFR Part 434: Coal Mining Point Source Category," 67 Fed. Reg. 3,369 – 3,410 (January 23, 2002), promulgated under the authority of (Rahall Amendment) to the Clean Water Act. The "Coal Remining Subcategory" was established to encourage operators to remine abandoned mine lands that still have viable coal reserves, and at the same time improve the quality of pre-existing AMD through implementation of appropriate BMPs.

The EPA Coal Remining Guidance Manual provides a comprehensive discussion of the appropriate application and implementation of the various BMPs available for the prevention and remediation of AMD through remining. Typically, several different and appropriate BMPs are implemented at a given mine site, as dictated by site conditions. A central feature of the suite of BMPs typically implemented to remediate AMD is the intentional addition and/or incorporation of calcium carbonate and other alkaline materials, through various practices, that react with and neutralize acidity. Simply put, alkalinity is the desirable and necessary constituent to neutralize the acidity in AMD. Appropriate BMPs must necessarily set up the conditions to allow calcareous materials, typically limestone in some form, to dissolve in the water. The greater the acidity load in the AMD, the more alkalinity is needed to neutralize it. The neutralization reaction produces bicarbonate which is dissolved in the water. In other words, it is a constituent of total dissolved solids. So, the more alkalinity needed to neutralize acidity, the higher will be the level of TDS and the greater will be the measure of conductivity. While the removal of other pollutants such as iron and manganese, also constituents of TDS, will somewhat offset the increase in TDS and conductivity, the presence of those pollutants before remediation dictate high levels of TDS and high conductivity measurements. The end result will almost always be conductivity levels that exceed the EPA criteria of 500µS/cm.

To illustrate the benefits of remining and the consequences of imposing a conductivity limit of 500µS/cm, I cite one of several examples of remining success stories reported by PADEP: The Fisher Mining Co., Thomas Mine in Lycoming County, Pennsylvania was a remining operation with pre-existing acidic water discharges. During mining, BMPs were implemented, including alkaline materials addition. The mine site now produces alkaline water (34mg/l), but also has a specific conductance ranging from 2100µS/cm to 2800µS/cm. Another adjacent Fisher Mining Co. operation used a similar approach and turned a very large abandoned deep mine discharge from acidic, with a pH of about 4.0, to net alkaline. However, specific conductance increased from a range of 500µS/cm - 1000µS/cm, to a range of 1800µS/cm -1900µS/cm. The net effect of these two projects is that the receiving stream, Otter Run, which once supported no biological life, is now a trout fishery. If the mine operator had been required to achieve a conductivity standard of 500µS/cm, remining would not have occurred and Otter Run would remain biologically dead.

The above examples serve as a stark reminder of the limitations of the EPA study and its use to establish conductivity thresholds even on a regional basis. In essence, the EPA study concludes that streams with certain ionic signatures, dominated by bicarbonate and sulfide emanating from mining fills in the upstream catchment, which result in conductivity greater than 500µS/cm, will cause impairment of otherwise "pristine" streams with certain unique characteristics of the streams included in the study. Indeed, data from other streams with different ionic signatures and other characteristics were intentionally excluded from the study. As the draft EPA Science Advisory Board report recognizes, some of the decisions to exclude data from certain streams limit generality and broad applicability of the conductivity benchmark.

EPA, OSM and states such as Pennsylvania have worked diligently in recent decades to develop programs, policies and BMPs that are now proven to be tremendously successful in preventing and abating AMD. The EPA's recently established criteria for conductivity represents an abrupt reversal of that progress. The implementation of EPA's conductivity standards will likely preclude implementation of the very BMPs that have been so successful in preventing the formation of AMD during current mining, and abating pre-existing AMD as an intended consequence of remining. Implementation of EPA's standards regarding TDS/conductivity is counterproductive to these efforts, detrimental to environmental restoration efforts, and will likely make EPA's own remining regulations substantially meaningless.

Jeffrey D. Jarrett