BEFORE THE ALABAMA SURFACE MINING COMMISSION

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A Petition To Designate Lands Adjacent	**)**
To The Mulberry Fork	**)**
Of the Black Warrior River	**)**
As Unsuitable For Coal Mining	**)**
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BLACK WARRIOR RIVERKEEPER'S PUBLIC COMMENTS IN SUPPORT OF PETITION TO DESIGNATE LANDS UNSUITABLE FOR MINING

Petitioner Black Warrior Riverkeeper (Riverkeeper), in accordance with Ala. Admin. Code r. 880-X-7A-.05, files these public comments in support of the Petition to Designate Lands adjacent to the Mulberry Fork of the Black Warrior River as unsuitable for coal mining (the Petition).

Procedural History

On September 10, 2012 Riverkeeper filed the Petition with the Alabama Surface Mining Commission (ASMC) to designate the area of the Mulberry Fork classified "Public Water Supply," including those portions of the proposed Shepherd Bend and Reed Minerals No. 5 mines that have not yet been issued an ASMC permit, as lands unsuitable for mining under Ala. Admin. Code r. 880-X-7A-.05. The proposed designation consists of lands that drain to the source for the Birmingham Water Works Board's (BWWB) Mulberry Fork drinking water intake, which provides drinking water for approximately 200,000 BWWB customers. On October 9, 2012, the ASMC found that the Petition "meets the requirements of Ala. Admin. Rule

880-X-7D-05 (1) and (2)" and deemed the Petition facially complete, with certain limitations.[1] The ASMC compiled a map of the proposed petition area and established a 120-day public comment period which closes January 31, 2013. The ASMC plans to schedule a public hearing approximately 60 days thereafter, although the Commission actually has until July 10, 2013 to hold the hearing. *See* Ala. Admin. Code r. 880-X-7D-.07.

ASMC Authority and Standard of Review for Petition

In the past, the ASMC has taken a very limited view of the authority it has and the role it must play with respect to water quality. As far as examining cumulative effects of coal mining on the watershed and possible impacts on drinking water, ASMC Director Randall Johnson has stated that kind of big picture question is beyond the purview of the Surface Mining Commission. *The Birmingham News* August 15, 2010. Instead, according to Dr. Johnson, the ASMC must depend on ADEM to determine water quality standards: "The Department of Environmental Management is the sole authority for setting what those limits should be. That is what their job is. All we can do is take the limits they have set and make sure the company has designed its permit to comply with those levels." *See id.* In a recent mining permit appeal, *Birmingham Water Works Board v. Shepherd Bend Mine LLC (P-3945)*, the ASMC appears to similarly disclaim responsibility for water quality preservation or protection, suggesting by testimony and argument that as long as the source water is somehow treatable, no matter the technology or cost, that the ASMC has no further obligation to protect the source.

[1] The ASMC rejected Riverkeeper's request to also include in the Petition area the first increments of Shepherd Bend Mine (286 acres) and Reed No. 5 Mine (178 acres) because those increments are subject to valid ASMC permits (P-3945 and P-3957, respectively). The ASMC also excepted "[a]ll lands previously mined under a surface coal mining permit within the proposed petition area," which was later clarified as lands encompassing the previously mined Red Star Mine (P-3858); Horse Creek Mine (P-3945); and Quinton Mine (P-3860). *See October 23, 2012 ASMC Letter to Riverkeeper*.

This restrictive view is at odds with law, regulation and policy. First, the Surface Mining Reclamation and Control Act of 1977, (SMCRA) (30 U.S.C. §§ 1201 through 1328) was specifically intended to "establish a nationwide program to protect society and the environment from the adverse effects of surface coal mining operations." 30 U.S.C. § 1202(a). It is undisputed that one of the chief adverse effects of surface mining is water quality impairment. The Congressional findings made incident to the passage of SMCRA observe that many surface mining operations burden and adversely affect the public welfare by polluting the water; degrading the quality of life in local communities; and counteracting governmental programs and efforts to conserve water and other natural resources, like the source drinking water of the Mulberry Fork. 30 U.S.C. § 1201(c). SMCRA was specifically designed "to assure that surface coal mining operations are so conducted as to protect the environment." 30 U.S.C. § 1202(d). In its legislative report, the Senate observed that

> [surface] coal mining activities have imposed large social costs on the public in many areas of the country in the form of unreclaimed lands, water pollution, erosion, floods, slope failures, loss of fish and wildlife resources, and a decline in natural beauty.

S.Rep. No. 95-128, p. 50 (1977).

The Petition addresses an issue of the ultimate social cost: the pollution of source drinking water for 200,000 people. Both Birmingham's health and economic prosperity depend upon an adequate and reliable source of drinking water. So while ADEM may possess exclusive NPDES permitting authority for coal mining operations, this fact does not relieve the ASMC from ensuring that the environment and the State's resources, including surface and ground water, are protected. *See April 13, 2009 ADEM – ASMC Memorandum of Understanding* at p. 1 ("The ASMC was created pursuant to [ASMCRA] to provide such regulation and control of surface coal mining as will reduce injurious effects to the resources and environment of the

State" as well as to "exercise the full reach of State constitutional powers to provide protection of the public interest through effective control of surface coal mining operations.") Moreover, State law and policy absolutely require that "[e]xisting instream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected." *See* Ala. Admin. Code r. 335-6-10-.04(2). This law is not just a mandate to ADEM: it is a benchmark intended to apply to all who use or have responsibility for water resources in Alabama.

One important means that SMCRA has to protect the environment, including renewable resources like source drinking water, is the lands unsuitable for mining designation process. *See* 30 U.S.C § 1272. Although the ASMC has exclusive jurisdiction over the regulation of surface coal mining in Alabama, see Ala. Code §§ 9-16-70 through 9-16-107, that jurisdiction is almost entirely defined by SMCRA. Alabama cannot operate a qualifying state program <u>unless</u> it incorporates the required federal statutory scheme, including the petition process to designate lands unsuitable for mining. 30 USC § 1253(f). In enumerating the requirements for state programs, Congress plainly recognizes the lands unsuitable for mining process as a key component for qualification, without which the stated objective of protecting society and the environment from the adverse effects of surface mining cannot be realized.

The lands unsuitable designation process represents a departure from the typical legal proceeding, with attendant presumptions and burdens of proof. Instead, the designation process is designed to facilitate "objective decisions" that are "based on competent, scientifically sound data and other relevant information." "Additionally, "[n]o person will bear the burden of proof or persuasion." 48 Fed. Reg. 41312 (September 14, 1983); Ala. Admin. Code r. 880-X-7D-05(c). Ultimately, the process must be "legislative and fact-finding." 30 C.F.R. 769.17(a); Ala. Admin Code. r. 880-X-7D-.07.

Given these explicit requirements, the ASMC's focus must shift from its more traditional role of how to facilitate surface mining to a new duty: how to protect source drinking water as the Petition demands. Instead of being reactive, the lands unsuitable process requires the ASMC to be proactive in protecting renewable resource lands where mining operations "*could* result in a substantial loss or reduction of long-range productivity of the water supply." *See* Ala. Admin. Code r. 880-X-7C-.04(2)(c) (Emphasis added.) In other words, under applicable law, the Petitioners are not required to prove that surface mining in the Mulberry Fork drainage *will* adversely affect the long-range productivity of the water supply; only that the evidence adduced shows that possibility exists and that mining *could* produce a substantial loss or reduction of the long-range productivity of the water supply.[2]

Thus, the ASMC can no longer pass the buck to ADEM on water quality issues. While the ASMC may believe it must defer to ADEM in addressing surface water quality issues as a part of the mine permitting process, there is no such deference or limitation when evaluating a petition to designate lands unsuitable for mining. Instead, the Commission must conduct its own direct, independent and objective inquiry about whether surface coal mining has the potential to degrade source water quality in the Mulberry Fork. Ultimately, the health and safety of 200,000 drinking water customers may depend on how the ASMC conducts this inquiry and answers this question. Just as important, whether the BWWB has to install expensive new treatment technologies not mandated by State law also depends upon the ASMC's decision. The BWWB's recent objection to and appeal of two surface mining permits in the Mulberry Fork watershed

[2] *See* discussion *Technical Study by the Pennsylvania Dep't of Environmental Protection Bureau of Mining and Reclamation Technical Study for a Petition to Declare Lands Unsuitable for Mining: Muddy Run Watershed* at pp. 54-55. There, the total estimated value of the minable reserves to the economy was estimated to be $62.3 million; even though the probability of contamination was deemed "low," the fact that the possibility, "although unlikely" existed, the lands at issue were designated unsuitable for mining.

points the logical way: based upon an objective review of available science and facts, surface mining could result in the substantial loss or reduction of long-range productivity of the water supply and the ASMC has a duty under ASMCRA to designate the Mulberry Fork drainage as unsuitable for mining.[3]

We believe that ample, competent, objective and scientifically sound evidence exists in the administrative record compiled for the Petition to presently support this designation. However, in the event that the ASMC does not agree with this assessment, at a minimum the record justifies a moratorium on mining in the Mulberry Fork drainage until the ASMC can commission and complete a robust, impartial technical study that provides the proper and objective scientific basis for such a decision. That technical study must include overburden (and underburden, such as fire clay) analysis for the entire subwatershed and statistically significant water sampling over a variety of seasons and flows, combined with macroinvertebrate studies.[4]

Far from being anomalous or outside its statutory purview, the ASMC's responsibility to address water quality issues comes directly from SMCRA. Recent proposed changes to the federal Office of Surface Mining's (OSM) Stream Protection Rule specifically examine surface mining's negative impacts on streams and water resources; OSM is developing regulations under SMCRA to better address the documented harm that surface mining causes to streams. Among the advertised options are revisions in the rule designed to define the term "prevent material damage to the hydrologic balance outside the permit area," which includes surface waters

[3] *Birmingham Water Works Board v. Shepherd Bend Mine LLC (P-3945); Birmingham Water Works Board v. Reed Minerals LLC (P-3957).*

[4] The *Technical Study* cited earlier is an excellent illustration of the kind of robust scientific study that the ASMC must conduct if finds that the administrative record needs to be supplemented. The Technical Study identified overburden studies, extensive water testing information (from 22 private wells, several municipal wells, 26 springs and 52 different mines in the petition area) and bioassessment surveys as the best methodology to correctly and comprehensively evaluate water quality for the lands unsuitable process.

downstream of mining operations; limiting or prohibiting mining activities in or near streams, including mining through streams; adding more extensive and specific monitoring requirements for surface water, groundwater, and aquatic biota during mining and reclamation; and refining backfilling and grading rules, excess spoil rules, and restoration requirements to reduce discharges of total dissolved solids to streams. 75 Fed. Reg. 34667-34668 (Friday, June 18, 2010). In other words, OSM recognizes the damaging impacts that surface mining has on water resources – and is prepared to do something about it under the authority of SMCRA. We ask the ASMC to do the same thing by designating the Mulberry Fork public water supply drainage as lands unsuitable for mining based upon available, objective evidence that supports but one conclusion: surface mining may cause the substantial loss or reduction of the Mulberry Fork's long range productivity as a water supply.

1. ***Peer reviewed scientific studies document the high concentration of toxic elements in Warrior coal as well as the general adverse effects these pollutants have on source water quality and the public health.***

As stated in the Petition, despite the number of coal mines currently and historically on or near the Mulberry Fork, there are no peer reviewed or technical studies available which assess or address the cumulative impacts of these mines on source drinking water quality or public health, either in the Mulberry Fork drainage or the Black Warrior basin generally.[5] However, we do know that both current and pre-SMCRA mine sites in the Warrior coal field have the ability to contribute many contaminants of concern to source drinking water. *See, e.g.,* Goldhaber, et al.,

[5] Both ADEM (impacts of surface coal mining near wadeable streams in the coal-mining regions of Alabama) and EPA (surface mining impacts on drinking water in the Black Warrior basin) are engaged in studies that may represent a start to the process of assessing the impacts of surface mining on source water quality. But these studies represent only a beginning, and should not be viewed as a conclusive determination of the issue, given the dearth of information for Alabama streams and the wide body of available, peer reviewed science that documents the adverse water quality impacts of surface mining. As stated in FN 4, much more data is required.

Dispersion of Arsenic from Arsenic-enriched Coal and Gold Ore in the Southern Appalachians; Goldhaber, *Distribution of a Suite of Elements Including Arsenic and Mercury in Alabama Coal*.

Data from the U.S. Geological Survey (USGS) coal quality database shows that potentially toxic elements, including mercury, arsenic, molybdenum, selenium, copper, and thallium are enriched in a subset of coal samples in the Warrior Coal Field, including those of the Mulberry Fork. *See* Diehl, Goldhaber, and Hatch, *Modes of Occurrence of Mercury and Other Trace Elements in the Black Warrior Basin* at p. 1. Nearly 1000 analyses from the USGS coal quality (COALQUAL) database show that the highest arsenic concentrations for all U.S. coals, up to 2500 mg/kg on a whole coal basis, are found in Pennsylvanian bituminous coals of the Warrior, Cahaba and Coosa coal fields, in northern Alabama. Goldhaber, et al., *Dispersion of Arsenic from Arsenic-enriched Coal and Gold Ore in the Southern Appalachians* at p. 1 (citations omitted). Mercury and other potentially hazardous elements (e.g., antimony, molybdenum and thallium) are also locally elevated in coals of the Warrior field of Alabama. *Id*. (*citing* Oman et al., 1995; Goldhaber et al., 1997, 2000; Kolker et al., 1999; Hatch et al., 2001). For nearly 960 samples, the average (mean) content of arsenic in Alabama coal (72 ppm) is three times higher than the average for all US coal (24 ppm). Of the U.S. coal analyses for arsenic that are at least three standard deviations above the mean, approximately 90% are from the coal fields of Alabama. *Id*. (*citing* Bragg et al. (1997)). Selenium, molybdenum, antimony and copper are also enriched in Warrior field coals compared to national averages. *Id. (citing* Goldhaber et al., 2000)). The median content of mercury in coal from the Warrior field (0.19 ppm) significantly exceed those of the Illinois Basin (0.10 ppm) and the Powder River Basin (0.07 ppm). *Id.* (*citing* Bragg et al. (1997)). As observed by Goldhaber, “the large 'tail' of very high values (> 200 ppm) for arsenic in the Warrior coal contrasts with [these] other two regions that have very few analyses greater than 200 ppm." Goldhaber, et al., *Distribution of a Suite of Elements Including Arsenic and Mercury in Alabama Coal.*

All of these metals may be released to the environment during coal mining, processing, or combustion. Goldhaber, et al., *Modes of Occurrence of Mercury and Other Trace Elements in the Black Warrior Basin* at p. 194 (citing Cecil et al., 1981; Minkin et al., 1984). Stream sediments from coal mining areas have been determined to be elevated in trace elements like arsenic compared to adjacent areas. *Id.* (citing Goldhaber et al., 2000). Drainage from coal mines often has elevated concentrations of these substances, including iron, managanese, zinc copper and cadmium. Higher concentrations of the other trace metals identified in Warrior coal are likely to be in this drainage as well. *Birmingham Water Works Board July 9, 2010 ASMC Comment Letter for Shepherd Bend Mine* at p. 3. Table 1 incorporated by that comment letter lists trace element concentrations found in coal sampled by the U.S. Geological Survey in the Mulberry Fork drainage near the drinking water intake; the high concentrations of aluminum, iron, arsenic, chromium, mercury, manganese, molybdenum, lead, and antimony are extremely concerning, given that their possible migration into source drinking water would make the water more expensive to treat. In a worst case scenario, the source water could be made untreatable or -- even worse – contaminants could enter the drinking water undetected, since the BWWB tests periodically, not constantly.

It is well established scientifically, then, that the concentration of toxic pollutants in Warrior coal is especially high and that the mining process, through mining, weathering and leaching, feeds these pollutants to stormwater, groundwater and streams. Many of these pollutants - mercury, arsenic, antimony, copper, molybdenum, selenium, and thallium - are listed as toxic substances by the U.S. Department of Health and Human Services' Agency for Toxic

Substances and Disease Registry. Toxic Substances and Disease Registry. These substances are all regulated by the Safe Drinking Water Act, 42 U.S.C. 300f - 300j, as are a whole host of other pollutants associated with Alabama coal and analyzed as a part of the ADEM and ASMC permitting processes. Antimony, arsenic, cadmium, chromium, lead, mercury, nickel, selenium and thallium are all regulated by primary drinking water standards prescribed by federal and state law.[6] 40 CFR Part 141; Ala. Admin. Code r. 335-7-2-.03. Aluminum, copper, chlorides, iron, manganese, silver, sulfates, total dissolved solids and zinc are all regulated by secondary drinking water standards. 40 CFR Part 143; Ala. Admin. Code r. 335-7-3-.02.

The BWWB has indicated in sworn testimony that using current treatment technology at the Western Filter Plant, they would be unable to adequately treat many of the metals and other pollutants in Mulberry Fork source drinking water should current concentrations rise as a result of anticipated surface mining impacts to the Mulberry Fork drainage. *See November 28, 2012 Testimony of BWWB Assistant General Manager Darryl Jones, Birmingham Water Works*

[6] The law gives EPA substantial discretionary authority to regulate drinking water contaminants but gives states the lead role in implementation and enforcement. Primary drinking water standards are legally enforceable mandates that protect the public health; they limit the levels of contaminants in drinking water. Secondary standards are non-enforceable guidelines regulating contaminants that may cause cosmetic effects (such as skin or tooth discoloration) or aesthetic effects (such as taste, odor, color or staining) in drinking water. EPA recommends secondary standards but they are not legally enforceable; however, states may choose to adopt them as enforceable standards.

ADEM has adopted the secondary MCLs as guidelines, *see* Ala. Admin. Code r. 335-7-3-.02. However, other parts of ADEM's administrative code appear to make these guidelines enforceable. *See, e.g.,* Ala. Code Admin. Code r. 335-6-10-.05(1), " General Conditions Applicable to All Water Quality Criteria" (" The quality of any waters receiving . . . industrial wastes or other wastes, regardless of their use, shall be such as will not cause the best usage of any other waters to be adversely affected by such . . . industrial wastes or other wastes); Ala. Admin. Code r. 335-6-10-.06(a) "Minimum Conditions Applicable to All State Waters" ("State waters shall be free from substances attributable to . . . industrial wastes or other wastes that will settle to form bottom deposits which . . . interfere directly or indirectly with any classified water use") . The BWWB has stated that additional coal mining in the Mulberry Fork drainage will interfere with their prior, designated use. *See November 28, 2012 Testimony of BWWB Assistant General Manager Darryl Jones* at pp. 234, 236 (ASMC should be following the rules that take into consideration the Mulberry Fork's designation as a public water supply); *see also November 29, 2012 Testimony of BWWB Engineering Consultant Patrick Flannelly* at pp. 30-31 (Best usage is defined by what can reasonably be removed by conventional treatment; contributions of higher concentrations of pollutants by mining would violate both the State narrative and numeric water quality standards for source drinking water).

Board v. ASMC and Shepherd Bend Mine LLC (*Jones*) at p. 186 ("Several of these metals being discharged – the conventional water treatment process that we have at our Western Filter Plant cannot a hundred percent remove those certain concentrations from the water and some of these elements are regulated by EPA as primary drinking water standards and if concentrations come in at a high enough amount, it would give us a problem to be able to remove enough of it to comply with those standards.")

By law, the BWWB currently is only required to treat surface water according to conventional methods. Ala. Admin. Code r. 335-7-6-.04. If the concentrations of these toxic pollutants increase as a result of mining, it is very likely that the BWWB would have to implement advanced water treatment technology not mandated by law, technology that it does not currently possess or use, and technology which would require additional capital costs. *See November 29, 2012 Testimony of BWWB Engineering Consultant Patrick Flannelly* at p. 15, pp. 32-34, *Birmingham Water Works Board v. ASMC and Shepherd Bend Mine LLC* (*Flannelly*) (Applicable regulation does not require BWWB to employ advanced treatment methods, but certain concentrations of metals in source water would require advanced treatment to meet applicable drinking water standards). Some mining-related contaminants are not removed by the treatment process at the Western Filter Plant. *See* BWWB's "Treatability of Potential Mining Contaminants at Western Filter Plant" (Appendix A) (Chromium, manganese, molybdenum, sulfates and total dissolved solids). Others may be partially removed by treatment, but the effectiveness of that treatment depends upon maintaining certain minimum concentrations of those pollutants in the source water. *See id.* (Aluminum, antimony, arsenic, cadmium, copper, iron, lead, mercury, nickel, selenium, silver strontium, turbidity, total organic carbon, uranium and zinc).

The identity and concentrations of these pollutants is a key factor in determining whether and by what treatment the Mulberry Fork source water can be made safe and wholesome for drinking and other uses. At certain concentrations or with certain pollutants, effective treatment is simply not possible with the BWWB's current conventional treatment process. *See* BWWB's "Potential Mining Contaminants with Drinking Water Standards" (Appendix B). As a result, where and under what circumstances mining occurs is especially critical for source drinking water.

Currently, coal mining activities rank as the second largest source of impairment for stream miles in Alabama. *See* ADEM 2010 Integrated Water Quality Monitoring and Assessment 305(b) Report. As a result, surface mining in the drainage for the public water supply is especially concerning. Studies performed in other Appalachian states well illustrate and establish the precise nature of these problems and impairments. *See* discussion at pp. 12-16.

As stated in the Petition, nine out of every ten streams downstream from surface mining operations are impaired based on a genus-level assessment of aquatic life. Pond, et al., *Downstream Effects of Mountaintop Coal Mining* (Downstream Effects).[7] Many studies have

[7] Rather than citing to the wide body of available scientific literature on the environmental effects of surface mining or offering a careful compilation of all available Alabama resources, to date the ASMC has indicated its intention to rely on but two studies. *See November 14, 2012 ASMC Response to Riverkeeper's Records Request*. The first is the ASMC's own "Cumulative Hydrologic Impact Assessment" for the Mulberry Fork cited and discussed at pp. 16-26. The second is Davenport and Morse, *A Field-Based Aquatic Benchmark for Conductivity in Central Appalachian Streams.* This study was commissioned and underwritten by the Alabama Coal Association, which exists to provide a "unified voice" for the surface mining industry in Alabama.

Far from being a robust and independent scientific study, the Davenport and Morse study, based upon an artificially constricted set of sampling sites, has little scientific utility or benefit in analyzing the stream impacts of surface mining in Alabama because it does not systematically compare the variation in conductivity and macroinvertebrate health within a single subwatershed. The seven sampling sites are scattered across three subwatersheds (Locust Fork, Mulberry fork, and Upper Black Warrior), three counties, and 952 square miles. In addition, six were sampled in June and the site that is most apparently impaired (lowest percent EPT and the highest % dominant taxon) was sampled in March.

shown that coal mining activities negatively affect stream biota in nearly all parts of the globe *See id.* at 717 (*citing*, e.g., Lewis 1973a, b, Scullion and Edwards 1980, Winterbourn and McDiffett 1996, Garcia-Criado et al. 1999, Kennedy et al. 2003). Mountaintop mining creates large-scale impairment of surface water and groundwater. (Palmer et al., 2010; Ghose, 2007; McAuley and Kozar, 2006; Hitt and Hendryx, 2010; U.S. Department of Labor, 2010). The metals associated with these processes (such as mercury, lead, arsenic, selenium, cadmium, chromium, iron and manganese) have been shown in animal and/or human studies to pose adverse developmental or reproductive risks. Agency for Toxic Substances and Disease Registry.

Even when scientific studies are adjusted for other risk factors, coal mining and the attendant environmental pollution it brings has been identified as a factor for a number of adverse health outcomes. Recent peer reviewed public health studies focusing on mining in a given area irrespective of mining type (surface/underground) have found mining's adverse health effects for both children and adults are significant in coal mining areas of Appalachia. *See, e.g.*, Ahern, et al., *Residence in Coal-mining Areas and Low-Birth-Weight Outcomes*; Ahern, et al., *The Association between Mountaintop Mining and Birth Defects among Live Births in Central Appalachia, 1996-2003;* Ahern and Hendryx, *Cancer Mortality Rates in Appalachian Mountaintop Mining Areas*; Esch and Hendryx, *Chronic Cardiovascular Disease Mortality in Mountaintop Mining Areas of Central Appalachian States*; Hendryx, Ahern, and Nurkiewicz, *Hospitalization Patterns Associated with Appalachian Coal Mining*; Hendryx and Ahern,

Moreover, it is contradicted by data gathered by the ASMC and ADEM, which has not been cited by the ASMC. *See* Appendix C *ADEM - ASMC Data (1990 - 2009) Macroinvertebrate Assessment Results vs. Conductivity in the Black Warrior and Cahaba River Basins* (ADEM – ASMC data from a longer period of time suggests the opposite conclusion from Davenport and Morse: generally, the higher the stream's conductivity, the poorer the macroinvertebrate population fared).

Relations between Health Indicators and Residential Proximity to Coal Mining in West Virginia; (Hendryx, *Mortality Rates in Appalachian Coal Mining Counties: 24 Years Behind the Nation*; Hendryx, O'Donnell and Horn, *Lung Cancer Mortality is Elevated in Coal Mining Areas of Appalachia*; Hendryx, *Mortality from Heart, Respiratory and Kidney Disease in Coal Mining Areas of Appalachia*; Hendryx and Ahern, Mortality in Appalachian Coal Mining Regions: the Value of Statistical Life Lost; Hendryx and Zullig, *Higher Coronary Heart Disease and Heart Attack Morbidity in Appalachian Coal Mining Regions*; Hendryx, Fedorko and Anesetti-Rothermel, *A Geographical Information System-based Analysis of Cancer Mortality and Population Exposure to Coal Mining Activities in West Virginia*; Zullig and Hendryx, *A Comparative Analysis of Health-related Quality of Life for Residents of U.S. Counties with and without Coal Mining*; and Hendryx, et al., *Adult Tooth Loss for Residents of U.S. Coal Mining and Appalachian Counties*.

Some proponents of mining in Alabama insist that true mountain top mining (MTM), the controversial mining practice used in the central Appalachian region, does not occur in the lower Appalachian hills of Alabama, so that studies associated with MTM should be inapplicable here. Not only is this statement factually inaccurate, it is a distinction without a difference. The extraction process is exactly the same, only the scale is different. Even the Alabama Coal Association appears to concede that MTM occurs in Alabama; they have been actively involved in lobbying on regulatory issues affecting MTM, submitting comments to the Mountaintop Mining Advisory Panel of EPA's Science Advisory Board. *See* October 13, 2010 ACA Comments to U.S. EPA Scientific Advisory Board.

The direct impacts of MTM and associated fills on buried streams are undisputed. (*Downstream Effects* at p. 718) (citing U.S. EPA 2005). During MTM, several overburden layers of sedimentary rock are removed to access coal layers, which is identical to the Alabama surface mining process. The imposing abandoned highwalls all over the watershed, a relic from pre-law mining in Alabama, attest to the similarities between MTM in central Appalachia and surface mining here. "Some of the mined rock is returned to the mountaintop and graded, but excess spoil typically is placed in valleys adjacent to the surface mine, resulting in valley fills or hollow fills (detailed in Slonecker and Benger 2002)." *Id.* Similarly, excess spoil from Alabama surface mining is stored in piles or returned to the site; the former hills and hollows are leveled and graded. The valley fills of MTM permanently bury the ephemeral, intermittent, and perennial streams located adjacent to the mining operations, *see id.*, just as they do in Alabama.[8] The streams buried by the overburden are permanently eliminated, and MTM and associated valley fills have several important indirect effects on downstream waters, *see id*., just as they do in Alabama. *Precipitation and groundwater in mined watersheds percolate through the overburden on the mined sites and in the valley fills to dissolve minerals and heavy metals until they discharge from the toe of the fills into surface water.* That is the primary concern expressed by the BWWB about the Mulberry Fork source drinking water: that surface mining discharges elevated levels of pollutants and sediment that will degrade ground and surface water quality at the Mulberry Fork intake and impose difficult, if not impossible, treatment burdens on the utility, which reduces the Mulberry Fork's long range utility as a public water supply.

MTM has a similar negative effect on the public water supply. See Hendryx, et al., *Public Drinking Water Violations in Mountaintop Coal Mining Areas of West Virginia, USA*.

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[8] In connection with a 2011 Freedom of Information Act Request to the U.S. Corps of Engineers, Riverkeeper reviewed 47 Nationwide Permit 21 files from 2009-10; NWP 21 is the wetlands permit that allows streams and wetlands to be buried by fill as a part of the mining process. For those 47 regulatory files alone, 316,377 linear feet (or nearly 60 miles) of Alabama ephemeral, intermittent and perennial streams were filled by surface mining – and these waters continue to percolate through the overburden and other geologic disturbance at the mine site, which releases toxic pollutants to surface and ground water.

Recognizing the documented adverse effects of MTM on surface and ground water, that study set out to examine MTM impacts on public water systems. *Id.* at 169. Adjusting statistically for system size and water source, the authors analyzed EPA Safe Drinking Water Act violations for certain communities for the years 2001-2009. *Id.* Although MTM communities contained only 33% of the water systems surveyed, they were the location of 73% of the public water treatment violations. *Id*. at p. 173. The study found 73.0 violations per system in MTM areas, 16.7 violations per system in other mining areas, and 10.2 violations per system in non-mining areas. *Id*. at 169. When the violations were limited to inorganic and organic elements and compounds, MTM systems had 85% of the violations. *Id.* at 171.

The study concludes with the statement that

> [g]iven the evidence for impaired surface and ground water quality as a consequence of MTM (Hitt and Hendryx 2010; Palmer et al. 2012; EPA 2010; Lindberg et al. 2011), drinking water problems found in domestic wells in MTM areas (Tour and Papillo, 2004), and public health disparities in mining communities that may in part result from environmental conditions (Hendryx and Ahern, 2008, 2009; Ahern et al., 2011; Christian et al. 2011; Zulig and Hendryx, 2011) an incomplete record of public water quality in MTM areas is of concern. <u>In addition to improved monitoring efforts, a comprehensive effort to protect public drinking water should emphasize prevention, risk assessment and maintaining the integrity of the supply system</u>. (Rizak et al., 2003)

Id. at 174 (Emphasis added.) When you look at the landscape of Alabama coal mine permitting, regulation and performance against this sobering scientific backdrop, the only responsible and effective way to protect the Mulberry Fork source drinking water from substantial loss or reduction is to declare the proposed Petition area as unsuitable for mining.

2. There has never been a cumulative impacts assessment of mining in the Mulberry Fork subwatershed.

Until the ASMC is able to fully grasp the impacts of surface mining, and especially the cumulative effects of multiple surface mines discharging sediment, toxic heavy metals and other pollutants to surface and ground water, the Commission must declare the lands adjacent to the Mulberry Fork intake (or any drinking water intake) as unsuitable for mining. As outlined by the previous section, the risks are simply too great to do anything else. To date, neither the ASMC nor ADEM have ever taken a truly comprehensive look at the cumulative effects of surface mining discharges on general water quality, much less upon source drinking water quality. While the ASMC might dispute this point, asserting that a "Cumulative Hydrologic Impact Assessment" (CHIA) has been prepared for each of the individual mines permitted in the Mulberry Fork watershed, those reports are "cumulative" in name only.

The CHIA attached the ASMC's decision to permit Reed Minerals' No. 5 Mine (P-3957) is a good case in point. To its credit, that document loosely defines a Cumulative Impact Area (CIA), which includes several pre-law and currently regulated mine sites, specifically identifying the Red Star Mine, Horse Creek Mine, Quinton Mine and Shepherd Bend Mine. The document mentions that data from each of these mines was evaluated independently and used to predict potential effects from the proposed Reed Mine. However, the analysis looks at each mine in isolation and never evaluates the *combined* effects that the mines will have when their discharges actually aggregate in the Mulberry Fork. Furthermore, because any contaminants discharged upstream will eventually migrate downstream (such is the nature of river mechanics), to be valid the CIA must be expanded to look at the potentially cumulative effects of *all upstream mining operations*. The following is a list of all active, expired, and closed mining operations upstream of the Mulberry Fork drinking water intake:

- **Active Permits (20)** (*Have not yet reached original expiration date, or have been reissued*)

- Red Star Mine (Mulberry Fork)
- Burton Bend Mine No 2 (Mulberry Fork)
- Burton Mine (Mulberry Fork)
- Dilworth Washer (Mulberry Fork)
- Empire Town Creek Mine (Mulberry Fork)
- No Business Creek Mine (Mulberry Fork)
- Cane Creek Mine (Cane Creek)
- Sparks Branch Mine (Cane Creek)
- Surface Mine #1 – Drummond (Cane Creek/Blackwater Creek)
- Manchester East Mine – (Blackwater Creek)
- Poplar Springs Mine – (Blackwater Creek)
- Poplar Springs North Mine (Blackwater Creek)
- Old Union #2 Mine (Blackwater Creek)
- Old Union Mine (Blackwater Creek)
- Mine #2 – Evergreen/Twin Pines (Sipsey Fork)
- Mill Creek Mine (Sipsey Fork)
- Cold Springs West Mine (Sipsey Fork)
- Arkadelphia Prep Plant (Sipsey/Mulberry)
- Poplar Springs North (Clear Creek)
- Poplar Springs Mine (Clear Creek)

- **Expired Permits (13)** (*In reclamation, or awaiting 5-year liability period for successful re-vegetation – see ASMC Director Dr. Randall Johnson December 5, 2012 Email*)
  - Quinton Mine (Burnt Cane Creek)
  - Horse Creek Mine (Mulberry Fork)
  - Chapel Hill Mine (Mulberry Fork)
  - Mine #3 – Evergreen (Sipsey Fork)
  - Mine #4 – Evergreen (Sipsey Fork)
  - Hay Valley #1 (Cane Creek)
  - Hay Valley #2 (Cane Creek)
  - Grace Chapel Mine (Cane Creek)
  - Manchester West Mine (Blackwater Creek)
  - Elk River Mine (Blackwater Creek)
  - Ninna V Mine (Blackwater Creek)
  - Hickory Grove NW Mine (Clear Creek)
  - Hickory Grove North Mine (Sipsey Fork)

- **Closed Permits (76)** (*Have received full bond release, or have been revoked with bond forfeited*)

- Cobb Mine (Mulberry Fork)
- Union Chapel Mine (Mulberry Fork)
- Cordova Loading Facility (Mulberry Fork)
- Alabama Land and Mineral Barge Loading Facility (Mulberry Fork)
- Sipsey Mine (Mulberry/Sipsey Forks)
- Sipsey Prep Plant (Mulberry Fork)
- Magbee Bend Mine (Mulberry Fork)
- T&L Mine (Mulberry Fork)
- Cordell Creek Mine (Mulberry Fork)
- Dilworth Mine (Mulberry Fork)
- Briceston Mine (Mulberry Fork)
- Captain D Mine (Mulberry Fork)
- Pinhook Mine (Mulberry Fork)
- Mine #1 – Bas S Coal Co (Mulberry Fork)
- Empire Town Creek Mine #2 (Mulberry Fork)
- Mine #2 – Bas S Coal Co (Mulberry Fork)
- Carpet Rock Mine (Mulberry Fork)
- McCarne Mountain Mine (Mulberry Fork)
- Early Ridge Mine (Mulberry Fork)
- Rice Chapel Mine (Mulberry Fork)
- Arkadelphia 66 Mine (Mulberry Fork)
- Arkadelphia 5761 Mine (Mulberry/Sipsey Forks)
- Cane Creek Mine – Beaird (Cane Creek)
- Clark Hollow Mine (Cane Creek)
- Herron Mine (Cane Creek)
- Mary Lee Mine (Cane Creek)
- Cordova #1 Mine (Cane Creek)
- Copeland Mine (Cane Creek)
- Horse Creek Mine (Cane Creek)
- Wheeler Mine (Cane Creek)
- Wheeler Mine #2 (Cane Creek)
- McCollum Mine (Cane Creek)
- Fancy Lump Mine (Cane Creek)
- Dixie Mine (Cane Creek)
- Baker Mine (Cane Creek)
- Baker Mine #2 (Cane Creek)
- Surface Mine #1 (Cane Creek)
- Fancy Lump Mine #2 (Blackwater Creek)
- Fancy Lump Mine #3 (Blackwater Creek)

- Fancy Lump Mine #6 (Blackwater Creek)
- Mill Creek Mine #2 (Blackwater/Clear Creeks)
- Manchester Mine (Blackwater Creek)
- Manchester North Mine (Blackwater Creek)
- Macedonia No 5 Mine (Blackwater Creek)
- Mine #5 – Alabama Land and Mineral (Blackwater Creek)
- Nauvoo Mine #2 (Blackwater Creek)
- Nauvoo Mine #3 (Blackwater Creek)
- Mine #8 – Alabama Land and Mineral (Blackwater Creek)
- Nauvoo Mine #4 (Blackwater Creek)
- Little Blackwater Mine (Blackwater Creek)
- Nauvoo Black Creek Mine (Blackwater Creek)
- Mine #9 – Alabama Land and Mineral (Blackwater Creek)
- Rice Chapel Mine (Sipsey Fork)
- Leeth Hill Mine (Sipsey Fork)
- Fancy Lump Mine #5 (Sipsey Fork)
- Mill Creek Mine (Sipsey Fork/Smith Lake)
- Mobile Equipment Pit Mine (Sipsey Fork/Smith Lake)
- Ryan Creek Mine (Ryan Creek/Rock Creek/Smith Lake)
- Ryan Creek North Mine (Ryan Creek/Rock Creek/Smith Lake)
- Wheat Ardell Mine (Rock Creek/Smith Lake)
- Crooked Creek Mine (Rock Creek/Smith Lake)
- Mine #1 – T&B Excavating (Ryan Creek/Smith Lake)
- Wilson Bend Mine (Sipsey Fork/Smith Lake)
- Piney Ridge Mine (Sipsey Fork/Smith Lake)
- Black Pond #4 Mine (Sipsey Fork/Clear Creek/Smith Lake)
- Big Bear Mine (Sipsey Fork/Smith Lake)
- Hickory Grove SE Mine (Clear Creek)
- Black Pond Mine #6 (Clear Creek)
- Hickory Grove West Mine (Clear Creek)
- Hickory Grove Mine (Clear Creek)
- Poplar Springs Mine #1 (Clear Creek)
- Moccasin Branch Mine (Clear Creek)
- Poplar Springs Mine #2 (Clear Creek)
- Browns Creek Mine #3 (Clear Creek)
- Browns Creek Mine #2 (Clear Creek)
- Browns Creek Mine (Clear Creek)

Note that this list does not include pre-law mine sites, which also should be part of the analysis. Abandoned mine lands in the Black Warrior basin often contribute acid mine drainage and other forms of polluted runoff to receiving streams for decades after mining ends. Failure to include all of these upstream sources of contaminants is particularly troubling with respect to sediment. While the pernicious effects of most mining contaminants are driven by concentration, the nature of sediment is that it accumulates. That sediment then accumulates in sloughs and along the river bottom and can be re-suspended when flow volume and velocities increase. The main stem of the Mulberry Fork in the proposed Petition area, which is also the location of the BWWB drinking water intake, is the focal point for accumulation of sediment for all of the past and current mining operations listed above. In failing to account for the vast majority of these mines in its "Cumulative Hydrologic Impacts Assessment," the ASMC has also failed to consider several decades worth of sediment accumulation from surface mining. That means that the ASMC has wholly failed in its task to evaluate the cumulative impacts of surface mining on the source drinking water of the Mulberry Fork.

3. What the ASMC proffers as a "cumulative impacts assessment of mining in the Mulberry Fork subwatershed" is not cumulative nor does it actually address mining near the drinking water intake.

While we have just demonstrated that the CHIA for a mine located in the proposed Petition area has failed its fundamental task, the "cumulative" data provided by the ASMC to support the document and to suggest that surface mining has no impact on Mulberry Fork water quality is flawed just as fatally. On November 8, 2012 Riverkeeper filed a document request with the ASMC under the Alabama Open Records Act, Ala. Code § 36-12-40. That request asked for any comprehensive water quality studies and any cumulative hydrological impact assessments or studies of the Mulberry Fork, as well as specific documents the ASMC identified and relied upon in issuing the Reed Minerals No. 5 Mine (P-3957) on October 30, 2012. In that permit decision, the ASMC stated at p. 8 that it had performed a "Cumulative Hydrologic Impact

Assessment" for the Mulberry Fork consisting of "hydrologic monitoring data collected from 12 permitted coal mine outfalls collected in 2007 that are located within 13 km of the Burnt Cane Creek watershed boundary;" that samples were analyzed for "a broad spectrum of toxic metals; and that "[n]one of the results exceeded Alabama Water Quality Criteria." Moreover, that decision stated that there is no evidence that mining operations are contributing to, or will contribute to, degradation of water quality in the Mulberry Fork. The only document produced in response to the Riverkeeper request is an assessment that by its own terms is not cumulative, not representative of mining impacts, and does not address surface water quality.

The data provided to Riverkeeper by the ASMC in conjunction with that Mulberry Fork study does not in any way represent a scientific evaluation of cumulative effects of surface mining on the Mulberry Fork at or near the proposed Reed Minerals Mine No. 5 – or anywhere else. The data collection process for that effort was faulty from its inception with the selection of locations at which to collect samples. Most notably, the study arbitrarily selected a 13 kilometer radius from the Burnt Cane Creek watershed boundary as the area within which samples were to be collected. The problem here is that radius has absolutely no bearing whatsoever on cumulative impacts in a river system. Instead the study should have looked at sampling locations *within a given distance upstream* of the area of interest. Because of this critical design flaw, the study ended up including six (half of the total sample locations) sampling points in the Locust Fork watershed, plus one more location that drains to a point on the Mulberry Fork nearly eight miles *downstream* of the mouth of Burnt Cane Creek. That means that more than half the points selected for study have absolutely no influence on the area that was supposed to be the focus of the study.

Further compounding the problems with the study's faulty fundamental design is the fact that it neglected to include any sampling locations on the Mulberry Fork itself. That means that the study failed to include any data that might actually indicate what the cumulative effects are of each of the individual data points. What may be worse is that the study failed to include any samples taken at the Quinton and Red Star mines, which happen to be the two closest active mining operations to the study's focal point at the time of the survey. The exclusion of Quinton Mine from the study is particularly troubling because that mine's operators reported NPDES violations both before and after the time of study on their Discharge Monitoring Reports.

The problems with the ASMC's 12-sample study are even more confounding when we look at the manner in which samples were collected and parameters analyzed. To begin with, the ASMC only analyzed a single sample taken from each location, which means that the study provides nothing more than a snapshot of the conditions at one particular point in time. The standard of error for such a study would be through the roof, meaning that the data, as presented, has no statistical significance. What is even worse is that the snapshot created by the study is one taken during extreme weather conditions, in January and February of 2007 during the height of a record-setting drought in Alabama. NOAA's National Climatic Data Center characterizes the long-term conditions for northern Alabama in 2007 as "extreme drought," the most severe category. (To create a more accurate study of potential cumulative effects of surface coal mining, the ASMC should have looked at multiple samples from each location taken over a wide range of varying climatic and seasonal conditions.)

The ASMC boasts of "hydrologic monitoring data collected at 12 permitted NPDES outfalls," yet curiously neglects to mention several other very important factors regarding the validity of that data. First of all, many of the samples were collected from ponds that drained inactive mine areas. Timeline imagery from GoogleEarth taken on November 8, 2006, just two to three months prior to the collection of samples for the study, clearly shows that several of the ponds sampled were in areas that had already been reclaimed (see picture below depicting sample locations AL03567 and AL03568 on November 8, 2006).

Not only were the samples taken at highly suspect locations, but they also appear to have been taken in-pond, rather than from effluent at those locations. Moreover, the samples appear to have been taken and analyzed by National Coal of Alabama's laboratory, hardly an independent lab. Worse still, the study failed to provide data for any meaningful contaminants in the in-stream samples that were collected. While the study provides analyses of in-pond samples for suspended solids, cyanide, silver, arsenic, beryllium, cadmium, chromium, copper, mercury, nickel, lead, antimony, selenium, thallium, zinc, phenols, conductivity, dissolved oxygen, pH, and temperature, the associated samples collected from receiving waters were analyzed only for dissolved oxygen, temperature, conductivity, pH, hardness, calcium and magnesium. Nearly every in-pond sample showed detectable levels of chromium, nickel, antimony and zinc, with others also showing detectable levels of silver and thallium, yet the ASMC never discusses the potential for these contaminants to migrate offsite and accumulate in the receiving stream. Essentially, the ASMC collected some data regarding what is in the ponds, but almost none to demonstrate the quality of the water leaving those ponds and almost none regarding which contaminants are actually present in-stream. As a result, the ASMC cannot, in good conscience or with any scientific credibility, draw any meaningful conclusions from the data presented.

In addition to failing in its own attempt to complete a CHIA for the Mulberry Fork, the ASMC has also overlooked substantial information provided in ADEM's 2002 Surface Water Quality Screening Assessment of the Cahaba and Black Warrior River Basins (the Assessment). That document is essentially a compilation of all of the surface water quality data available at that time. It is an outdated study that nonetheless provides a much better picture of the cumulative effects of all pollutants in the Black Warrior River (and Cahaba) watershed and provides detailed data for each 11-digit Hydrologic Unit Code (HUC) subwatershed within the basin.

Not surprisingly, the Assessment paints a bleak picture of the health of the Mulberry Fork in the area near the drinking water intake due to the cumulative effects of mining. The assessment describes subwatershed 03160109190, which is the Baker Creek subwatershed occupying the western bank of the Mulberry Fork from Lost Creek up to Frog Ague Creek, as impaired due to sedimentation, with a primary suspected cause of mining. Several other subwatersheds in the area, Blackwater Creek, Lost Creek and Wolf Creek were also assessed as impaired due to sedimentation, among other impairments, with mining listed as a suspected cause of impairment. Appendix D of the Assessment lists the impairment potential due to mining of the area near the intake as "high." Appendix I shows that that subwatershed carries the highest sediment load in terms of tons/acre/year in the entire Mulberry Fork watershed, and that the largest contributor of sediment is mined lands. Appendix M indicates that the subwatershed across the river from the intake has higher concentrations of total dissolved solids than anywhere else in the Black Warrior River basin, averaging 1,732 mg/L.[9] Based on this assessment it would seem that the cumulative impacts of mining on the Mulberry Fork are quite clear and established by relevant data: not only has mining created poor water quality in this section of the river in the past, the addition of more mines upstream of the drinking water intake can only make water quality worse for the future. For the ASMC to ignore the conclusions of the Assessment and to instead offer an ad hoc look at a collection of unrelated mines in different subwatersheds as "cumulative" does not meet the rigorous scientific standards that an examination of source drinking water demands.

Cumulatively, given the documented history of both previous mining in the area and the negative effect it has had on water quality, the permitting of additional mines will push the source water quality of the Mulberry Fork into the red zone. With the introduction of additional contaminants in greater concentrations, the best case scenario is only that treatment costs will rise, an unacceptable outcome. The worst case scenario is that a catastrophic pond or treatment failure, or even a substantial rain event, will contaminate source water and compromise the Mulberry Fork's long range productivity as a drinking water supply. Even worse, greater concentrations of contaminants could be introduced into the drinking water supply of 200,000 before BWWB testing actually indicates their presence.

4. The ASMC cannot rely upon ADEM's scientifically flawed NPDES permits because these permits are not protective of water quality.

[9] The maximum tolerable raw water concentration for total dissolved solids at the Mulberry Fork intake according to Appendix B is 500 mg/L, which is substantially lower than the concentration cited in the Assessment.

Just as important to the lands unsuitable issue is the somewhat dysfunctional, shared regulatory responsibility for surfacing mining which exists between the ASMC and ADEM. The ASMC aligns itself with ADEM when it is considered advantageous, but disclaims responsibility and a role when the issue is surface water quality. In this case, the ASMC has no choice but to tie its evaluation of whether to designate the proposed Petition area as unsuitable for mining to ADEM's water quality permitting scheme. If that program fails to protect source water quality as we contend, the ASMC has no choice but to apply the lands unsuitable designation. According to the ASMC, the only putative protection of source drinking water at the Mulberry intake are the NPDES permits issued by ADEM and the engineering measures (overseen by the ASMC) designed to implement them. If the initial numbers in the NPDES permit and the analysis they represent are wrong, then source water is not being adequately preserved and all the engineering in the world will be of no benefit. Unfortunately, the record shows that ADEM's permitting process for surface coal mines is wholly inadequate to protect surface waters generally, much less so to protect the special and vulnerable resources of the public water supply.

First, as a matter of standard protocol and practice, ADEM never obtains adequate data and information prior to drafting NPDES mining permits so they can make a sound determination as to whether the permits will protect water quality. In general, ADEM relies upon one, single instream sample taken by an applicant to represent background concentrations of pollutants at the proposed mining site. In no context does one sample provide an accurate or statistically significant representation of actual instream conditions. ADEM should be requiring a minimum of 8 instream samples taken under varying conditions in order to establish baseline data predicated upon sound statistical analysis. Furthermore, both ADEM and the ASMC fail to obtain complete information that will actually be predictive of the potential constituents in mining effluent.

For the ASMC, the Shepherd Bend Mine is a textbook example of similar failures. As stated by BWWB Engineering Consultant Patrick Flannelly, for an ASMC permit, the application should contain not only an acid forming analysis to evaluate the neutralization potential of the overburden, but also a toxic forming analysis to identify what toxic metals could leach from the overburden under non-acidic conditions. *Flannelly* at p. 272. Although regulations require both, the toxic forming test was not performed for the Shepherd Bend Mine ASMC application, *id*. at p. 275, and its absence has been noted in other permit applications as well. Similarly, required flow data necessary to correctly calculate the probable hydrological consequences of the Shepherd Bend Mine was omitted, so the resulting modeling to predict water quality impacts during and after mining were wrong. *Id.* at 296.[10] What makes matters even worse is that what data the Shepherd Bend Mine applicant did gather was not used to perform the regression analysis to predict metal constituents in the mining discharge, so those values are also wrong. Finally, the statistical validity of data used from past adjacent mines is unreliable based on the number of days that these mines reported "no discharge," badly skewing the resulting values. *Id*. at 310-318.

The collection of data for ADEM NPDES coal mine permits is just as flawed. Currently ADEM allows applicants for new source coal mines to collect samples from distant active mining operations in order to perform a Reasonable Potential Analysis (RPA) which serves as the basis for the permit's parameters and limitations. Again, only a single, statistically-irrelevant sample is required. The fact that samples taken at other mines, in other subwatersheds may not

[10] This is so even though the Shepherd Bend Mine as proposed will have an outfall 800 feet away from the Mulberry Fork drinking water intake, so the accuracy of modeling and predictions is especially critical.

be representative of the effluent at the proposed mine due to differing compositions of vegetation, topography, soils, overburden, or mining coal from different seams. Either the ASMC or ADEM needs to require much more in-depth analysis of the onsite conditions at each individual proposed mining location, including multiple core samples, to determine the chemical/elemental constituents of the overburden and coal piles that will be exposed to stormwater runoff and groundwater. Without this type of in-depth, repetitive analysis prior to writing permits, ADEM is flying blind to the presence of numerous potential contaminants, meaning that neither ADEM nor the ASMC can be sure that NPDES permit limitations actually will protect surface water quality . . . because they do not have adequate, statistically significant data from the site to accurately predict future conditions.

Combine this lack of data with the overall "scarcity of information available specifically pertaining to instream water quality in coal mining areas" as well as the fact that "much remains to be done in assessing waters in areas of active coal mining" in Alabama," neither ADEM nor the ASMC has adequate information to understand either the individual or the cumulative effects of coal mining. *EPA October 1, 2010 Comment Letter* (Exhibit 10 to the Petition) at p. 2. This lack of information is unacceptable under any scenario, but particularly so where the integrity of source drinking water is concerned.

The precipitation event exemptions contained in ADEM's NPDES permits introduce even more uncertainty (and pollution) into efforts to preserve and protect source drinking water. While these exemptions are promulgated under federal regulation, *see* 40 CFR Part 434.63, the simple fact is that they are not designed with the integrity of public drinking water supplies in mind, perhaps because placing mines next to source water is inconceivable and incompatible. *See, e.g., Birmingham Water Works Board July 6, 2010 ASMC Comment Letter for Shepherd*

Bend Mine (Exhibit 1 to the Petition). Because many limitations are suspended or substantially weakened during significant precipitation events when surface water volume and velocities increase, unknown contaminants released within the proposed lands unsuitable area could likely reach the Mulberry Fork intake prior to complete mixing. The BWWB has no corresponding "exception" under the law that will excuse it temporarily from providing safe or wholesome drinking water during rain events of a certain magnitude.

The Shepherd Bend Mine NPDES permit again offers an example of how even allowable discharges of sediment (as well as those allowed by the precipitation exemption) can be a violation of the State's water quality standards. Warner Golden, P.E. is an engineer who has worked extensively with NPDES permits, the development of pollution abatement and control plans, and other wastewater modeling work. As a result, he is familiar with design features, best management practices and the SEDCAD modeling necessary to minimize a mine's discharge of harmful pollutants into water. He was retained as an expert by Riverkeeper in an administrative challenge to ADEM's Shepherd Bend NPDES permit and his affidavit is attached to the Petition as Exhibit 12.

In that affidavit, Golden states that the ADEM NPDES permit for the mine identifies 29 outfalls at the site, and authorizes the release of a variety of pollutants including iron, manganese, aluminum, sulfates, chlorides, total dissolved solids, and total suspended solids. Eleven of the 29 outfalls will release their discharges upstream of the Mulberry intake. These 11 outfalls discharging into the Mulberry Fork drain approximately 886 acres, 50%, of the site. The remaining 18 outfalls all discharge into the Mulberry Fork or its tributaries downstream of the intake, which are also designated for public water supply.

The Shepherd Bend NPDES permit contains general discharge limitations for iron, manganese, and TSS. However, the permit drops these limits during the vast majority of precipitation events. The permit does not set any discharge limitations for aluminum, total dissolved solids, sulfates, or chlorides. According to Golden, based on information contained in the permit application, draft permit, and final permit, and his experience, education, and training in reviewing NPDES permits and designing measures to minimize pollution, the proposed release of sediment from the mine's Basin 8 alone would cause or contribute to a violation of Alabama's water quality standards.

First, according to Golden, the SEDCAD analysis assumes that the sediment ponds will capture 90% of the sediment from the site and prevent it from being released. This is high capture for a sediment pond and could be difficult to achieve in practice, especially as the retention time for the pond is reduced as sediment builds up over time. Moreover, according to Shepherd Bend's SEDCAD analysis for pond 8, during the 10 year, 24 hour precipitation event, 3,142 tons of sediment will be washed from the 183 acres of open mine into the sediment pond for basin 8. Sediment pond 8 will then discharge approximately 329 tons of this sediment into downstream wetlands and the Mulberry Fork. This is the equivalent of more than 16 dump trucks of sediment. Notably, Shepherd Bend did not provide a SEDCAD analysis for precipitation events less than the 10 year, 24 hour precipitation event. While Golden states that it is not possible to precisely extrapolate the amount of sediment released in smaller precipitation events from the amount released in the 10 year, 24 hour precipitation event, the amount of sediment would be significant because of the steep slopes associated with the Shepherd Bend mine (which is also generally representative of the terrain of the Mulberry Fork drainage).

The SEDCAD analysis for pond 10 reveals identical problems and similarly demonstrates that discharges at this pond alone would violate Alabama's water quality standards. It is important to understand that the analysis by Golden is not based upon a possible permit violation or catastrophic event, but instead looks at what the mine is legally allowed to discharge under the Shepherd Bend NPDES permit.

ADEM's NPDES permits also contain pH exemptions during certain treatment conditions that allow coal mines to discharge water with a pH of up to 10.5 s.u. This is a violation of State water quality standards, which provide that "sewage, industrial wastes or other wastes shall not cause the pH to deviate more than one unit from the normal or natural pH, nor be less than 6.0, nor greater than 8.5." See Ala. Admin. Code r. Code 335-6-10-.09(2)(e)2. Again, this exception is taken from federal regulation – but that regulation in no way addresses the use of the receiving waters as a public water supply. Allowing a pH level as high as 10.5 can exacerbate the toxicity of other contaminants in the effluent, increasing the solubility of the many toxic heavy metals known to be present in Alabama coal. *See, e.g., Flannelly* at pp. 278-280. When the pH exemption was written into federal regulation, there is no evidence that the authors considered the possibility of mining discharges in such close proximity to a public drinking water source.

There exists another permit exception (again, allowed by federal regulation) which under certain circumstances suspends the monitoring requirements for total manganese if the drainage, before any treatment, has a pH equal to or more than 6.0 s.u. and a total iron concentration of less than 10.0 mg/L. 40 C.F.R. § 434. Manganese is regulated as a secondary drinking water contaminant, *see* Ala. Admin. Code r. 335-7-3-.02, and the BWWB lists manganese as a contaminant not currently removable by their treatment processes. The maximum concentration that the BWWB can treat in the raw water at the intake is 0.05 mg/L and the maximum amount allowed by applicable regulation in finished water is also 0.05 mg/L. *See* Appendix A (*BWWB Treatability of Potential Contaminants*) and Appendix B (*BWWB Possible Contaminants with Drinking Water Standards)*. In higher concentrations, manganese can contribute to or cause the following documented problems: staining, bad taste, unsightly appearance, and clogging of pipes and fixtures. New Hampshire Department of Environmental Services Fact Sheet on Iron and Manganese. Again, the relevant exemption is allowed by federal regulation – but that regulation in no way addresses the circumstances where the discharge of unchecked or excessive amounts of manganese could compromise the drinking water supply.

5. Because Alabama mines routinely violate already flawed permits, the mere issuance of an NPDES permit with "protective" limits is not adequate to protect source drinking water.

The ASMC has asserted that NPDES permits are written to be protective of water quality, and therefore, if the mines are in compliance with their permits, source water quality at the intake should not be affected. Unfortunately, there are two fundamental problems with this "logic." First, as we and many of the Petition's supporters point out (*see* letters by Dr. Shane C. Street, Associate Professor of Analytical Chemistry at the University of Alabama and Warner Golden, P.E.) the NPDES permits written by ADEM are not, in fact, protective of water quality standards. *See* discussion at pp. 26-32. And second, surface mines frequently violate the limitations of their permits, as demonstrated by the tables in Appendix D. If NPDES permits are not inherently protective of water quality, plus there is ample precedent to suggest that the limitations of NPDES permits are not consistently followed, the ASMC cannot be assured that the quality of the Mulberry Fork source drinking water will be protected. Where, as here, the evidence in the administrative record demonstrates that surface mining could produce a substantial loss or reduction of the long range productivity of the water supply, the ASMC has no alternative but to designate the Petition area as unsuitable for mining,

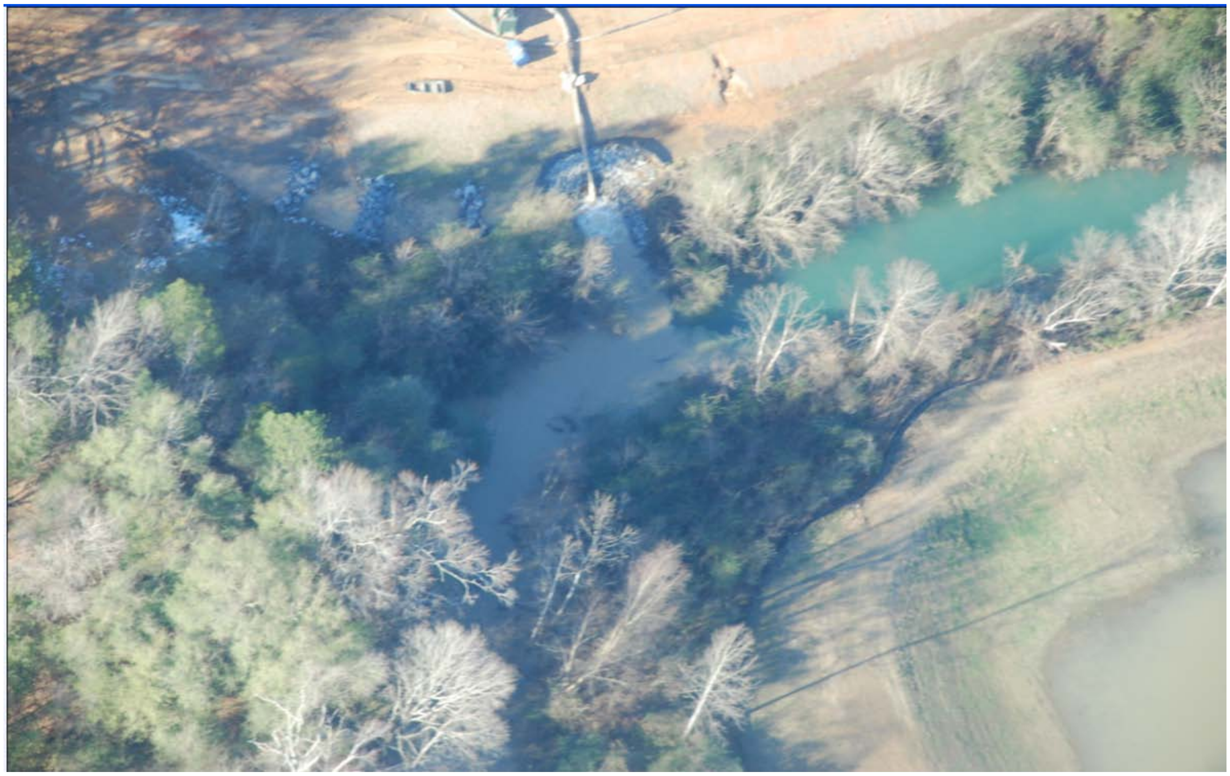
The six spreadsheets attached summarize violations reported on DMRs at the Quinton Mine (273 days of violation), Horse Creek Mine (119 days of violation), Manchester Mine (721 days of violation), Poplar Springs Mine (4,251 days of violation), Hickory Grove Mine (2,254 days of violation), and the Hickory Grove North Mine (4351 days of violation), demonstrating a total of well in excess of 10,000 days of violation at just these six mines. The violations summarized span a decade from 2002 through 2011 and represent excursions of all three parameters (pH, TSS, and Iron) commonly limited by NPDES permits at that time.[11] In the past few years, ADEM (with EPA's influence) has begun to take a slightly improved approach to writing NPDES permits with more inclusive parameters that better represent the heavy metals and other pollutants known to be present in Warrior coal or to be associated with surface mining. As new parameters are being added in to NPDES permits, we are beginning to see violations of these new parameters as well. *See, e.g.,* Narley Mine (NPDES No. AL0075752; P-3954).

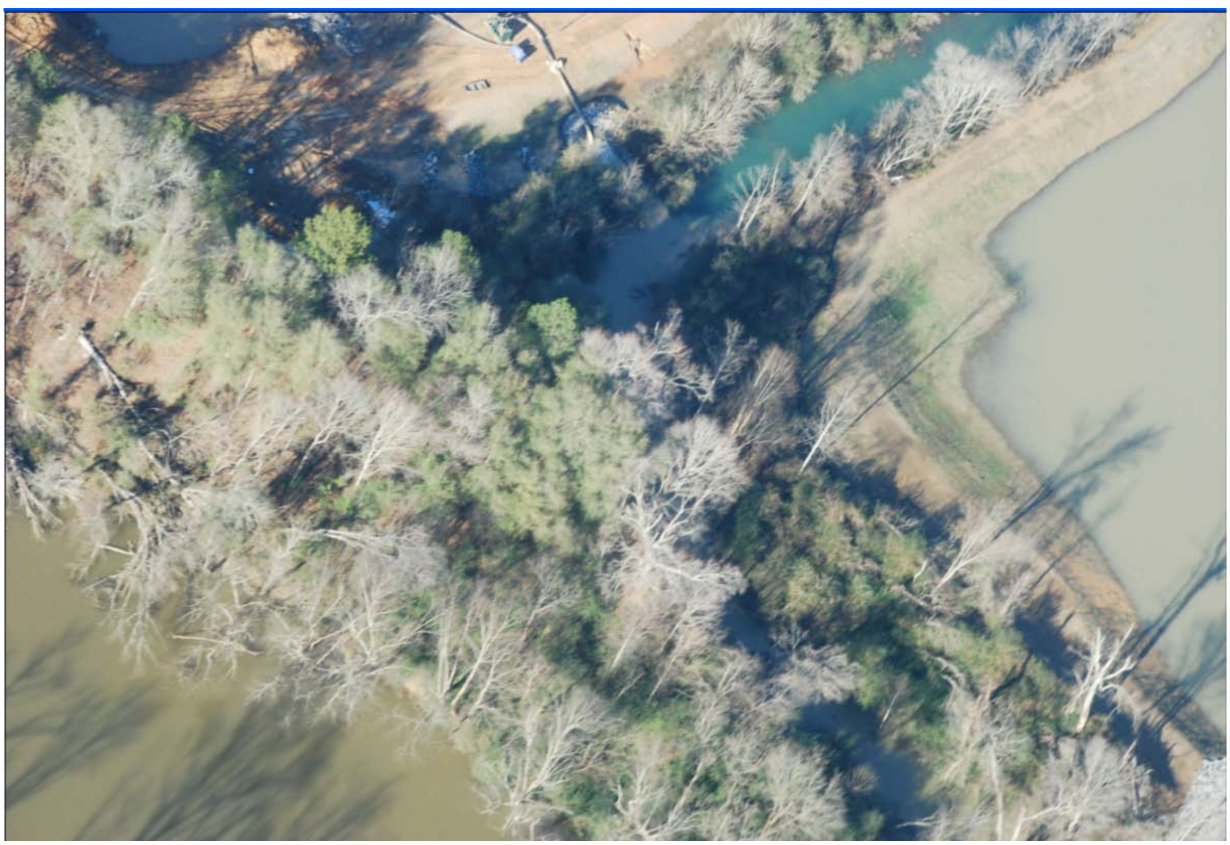
The tables in the appendices represent examples only and in no way constitute an exhaustive list of all the NPDES permit violations at Alabama coal mines. Rather, they are a representation of the type of violations seen all too often and demonstrate the frequency with which surface coal mines are capable of violating their permits. The violations highlighted here were selected because (unlike the mines the ASMC chose for their "Cumulative Hydrologic Impact Assessment" for the Mulberry Fork) <u>all</u> of these mines discharge to waters that drain to the source for the Mulberry Fork drinking water intake. Moreover, these results are reported over time, and reflect seasonal variations in flow and other factors that influence pollutant

[11] Limitations for manganese are and were also included in most NPDES permits at this time, but were subject to exemptions under most circumstances. *See* discussion at pp. 32-33.

concentrations. A comprehensive examination of Discharge Monitoring Reports (DMRs) from other mines in the Mulberry Fork drainage and other locations throughout Alabama would undoubtedly uncover more violations – but the ones enumerated in Appendix D are disturbing enough, particularly when you understand that they allow pollutants to aggregate in the source drinking water. In fact, Riverkeeper has seen evidence of significant violation histories at the Meredyth Mine, East Brookwood Mine, Pleasant Grove South Mine, Narley Mine, Rosa Mine, and Shannon Mine, all of which are documented by ADEM's "eFile" reporting system.

Riverkeeper has also witnessed coal mines actively, intentionally bypassing their treatment ponds, rendering both regulations and permit limitations completely meaningless. Both ADEM and the ASMC continue with the polite fiction that coal mines only discharge during rain events and they calculate their respective permits accordingly. The photos below were taken during a flight over Burton Mine No 2 (ASMC Permit Number P-3942, NPDES Permit No. AL0068888 on January 18, 2013:





Burton Mine No. 2 is owned by McWane, Inc, and is operated by Reed Minerals, Inc., the same company that currently holds a permit to engage in surface mining activities at Mine No. 5 just a few miles upstream of the drinking water intake on the Mulberry Fork. The pictures show mine operators pumping muddy water out of a sediment pond before proper settling has taken place. In other words, the operators are discharging surface mining runoff laden with sediment and other contaminants without treatment. The photos above clearly demonstrate a noticeable difference in the color of the receiving stream, Burton Creek, prior to and after receiving the contaminated water being pumped out of pond number 019. This difference is a violation of the State's narrative water quality standards, which provide that "there shall be no turbidity of other than natural origin that will cause substantial visible contrast with the natural appearance of waters or interfere with any beneficial uses which they serve." *See generally* Ala. Admin. Code r. 335-6-10-.09.

Since Riverkeeper reported this incident on January 18, 2013 to the ASMC and ADEM, responsible regulatory officials have stated that Reed Minerals notified ADEM they would be bypassing the NPDES outfall at Basin 019 to avoid "dam failure due to erosion at the outfall of Basin 019 caused by Mulberry Fork flooding." That explanation seems unlikely, but even if it is accurate, that means the regulatory authorities allowed the mine operators to build the treatment pond in the floodplain. Mining activities in the flood plain should never be allowed.

These pictures also underscore engineering problems that can compromise the treatment capabilities of some mines. The storm that precipitated the flooding would not even qualify the mine for the precipitation exemption – yet their treatment structures failed nonetheless. [12]

[12] The operator is not allowed to claim a rainfall exemption unless a storm exceeds a 1 year, 24 hour event standard. According to the National Weather Service, the greatest rainfall during a 24 hour period at the mine was 1.89 inches for the period ending at 7:00 a.m. on January 15. According to Technical Paper NO. 40, widely used as the standard to determine the depth of rainfall for given events, a qualifying rain event for Walker County is 3.5 inches. So the

No matter how many times ADEM and ASMC try to pretend that regulations are in place to strike the proper balance between protecting water quality and allowing competing uses of public resource waters, the stark evidence presented here demonstrates that many mine operators hold little regard for those regulations.[13] In its response to comments regarding the issuance of NPDES Permit Number AL0079936 for the Reed Minerals No. 5 Mine, ADEM writes, "The requirements of the draft permit are designed to protect the existing designated use classification of the receiving streams by minimizing the discharges of pollutants from the proposed facility into waters of the State . . . . The proposed permit established limits that will enable water discharged from the Mine to be protective of the designated use of the receiving stream." However, the evidence shows how those limits are frequently violated. If this kind of discharge can occur with the regulatory acquiescence of the ASMC and ADEM, what does that mean for general water quality, much less the integrity of the public water supply?

In response to comments regarding the issuance of ASMC Permit Number P-3957 for that same mine, the ASMC writes, "Rule 880-X-10C-.17(2) requires that all surface discharge from the disturbed areas pass through a siltation structure to prevent, to the extent possible, any contribution of additional suspended solids to the stream flow or runoff outside the permit area. The use of sedimentation ponds is the best technology currently available." However, we have presented evidence of a mine operator intentionally bypassing its sedimentation ponds and dumping unknown quantities of suspended solids directly into the receiving stream, outside of

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operator experienced a major treatment failure under ordinary circumstances, circumstances that the mine should have been prepared to handle.

[13] Riverkeeper challenged an NPDES permit issued to M-Coal Corp. for the Rosa Mine because the proposed mine would discharge additional sediment to the Locust Fork, even though the Locust Fork is on the State's § 303(d) List as impaired for sedimentation. *See Black Warrior Riverkeeper v. ADEM and M-Coal Corp.*, (Ala. Civ. App. No. 2100356 2012). ADEM based its original decision to permit the operation (upheld on appeal) on a study commissioned by M-Coal which purported to demonstrate that the mine would actually decrease the sediment load to that section of the Locust Fork. Since March 2011, M-Coal has self-reported 123 NPDES permit violations for total suspended solids (e.g., sediment) at Rosa Mine, even though the mine has been idle during part of that time.

the permit area. *The visible contrast between the clean water flowing to the mine and the dirty slug of sediment that quickly contaminates the stream as it leaves the mine site represents exactly the kind of event that the BWWB has expressed concerns about being able to treat effectively if mines are located adjacent to the source drinking water.* *See Flannelly* at pp. 48-49 (a "drought busting storm," possibly in low flow conditions, could have "acute effects" on the drinking water"); p. 86 (A "huge slug" of sediment coming out of a basin right near the water intake would negatively affect BWWB).

In most cases, ADEM and ASMC have the luxury of being able to detect violations and retroactively impose sanctions against violators – at least in theory.[14] As the BWWB makes clear, this kind of "reactive" approach is wholly inadequate for a water system that must engage in complex and effective risk management. *See Flannelly* at. p. 12 ("Relying on something that has supposedly never happened before as a basis for saying it's never going to happen again is

[14] Riverkeeper joined with other Alabama advocacy groups to file a petition with the EPA to withdraw ADEM's authority to administer the State's Water Program for a number of reasons, including the failure to adequately enforce state clean water laws. ADEM Director Lance LeFleur candidly concedes that his agency is "bare bones" by design; that Alabama government essentially wants (and budgets for) the least amount of regulation and oversight possible.

This state of affairs is exemplified by the ADEM's FY2013 budget. The State legislature allocated ADEM $2.9 million for its operating budget, which represents a 30% decrease from FY2012. The legislature made a one- time transfer of $4.1 million from the (former) Scrap Tire Fund into the General Fund for ADEM in FY2013. ADEM has been told to expect no contributions from the General Fund in FY2014; unless recently increased permit fees make up the difference, it is possible that ADEM would lack sufficient funding to maintain its Water Program.

One example of this failure to enforce in the surface mining context is the case of National Coal of Alabama. During the ASMC permit process for National Coal's proposed Brushy Pond Mine (P-3939) in 2010, one stakeholder requested that ADEM conduct a compliance review of National Coal's seven other Alabama mines, all of which reported significant environmental compliance issues. ADEM at the time promised a response, but never conducted the requested review. Riverkeeper's Enforcement Coordinator John Kinney then performed the compliance review in April 2012 review based upon National Coal's self reporting to ADEM's "eFile" website. He documented at least 9,758 NPDES permit violations at known National Coal mines during 2008-2009 alone, based upon the CWA counting methodology specified by federal law. It wasn't until October 1, 2010,that ADEM finally negotiated an Order by Consent with National Coal of Alabama for ongoing permit violations and other deficiencies at seven of the operator's active mines in Alabama – with a penalty of $87,200, which was wholly inadequate given the pervasiveness, the type and the length of the ongoing violations.

certainly not the best practice from a risk management perspective); pp. 110-101 ("The best practice for risk management is to be proactive"); p. 90 ("If you look at operations that are designed [with] protection in mind, we have to consider that risk is a function of a probability that something will occur and the consequence that will happen when that [occurs]. And where the consequences are high, then the operations should be designed to make sure that the probability is as low as is possible") In this case, where the substantial loss or reduction of source drinking water for over 200,000 Alabama citizens would be compromised by these actions and possible violations, neither the BWWB nor the ASMC can afford the luxury of an ad hoc, after-the-fact approach. The only safe recourse is to proactively designate lands that drain to the source drinking water supply as unsuitable for mining.

6. *Historically and currently, surface mining degrades water quality and cannot coexist with the public water supply.*

Not only do we have direct evidence that surface coal mine permits are based upon flawed data and analysis, that their operations can frequently skirt the requirements of regulations or permits, but we also have ample evidence to suggest that coal mining activities have deleterious effects on the surface waters that receive their discharges. *See ADEM Draft 2012 § 303(d) List*.

In addition to numerous peer reviewed studies concluding that coal mines degrade surface water quality (*see* pp. 7-16), ADEM's § 303(d) list of impaired streams clearly demonstrates that surface coal mining is the most significant threat to surface water quality in the Black Warrior River watershed. Of the 376.13 total miles of impaired stream segments in the basin (excluding acreage figures for atmospheric deposition) 58%, or 218.71 miles are impaired at least in part due to surface mining activities. The table below summarizes the specific stream segments appearing on the list and the pollutants of concern associated with surface coal mining.

BWR Impaired Stream Segments Due to Surface Mining

1.	Lost Creek	Siltation	6.53 miles
2.	Cane Creek (Oakman)	Metals, pH, Siltation	7.15 miles
3.	Cane Creek (Oakman)	Metals, pH, Siltation	3.49 miles
4.	Cane Creek (Oakman)	Metals, pH, Siltation	7.38 miles
5.	Black Branch	Metals, pH, Siltation	3.15 miles
6.	Lost Creek	Siltation	17.33 miles
7.	Wolf Creek	Siltation	38.40 miles
8.	Old Town Creek	Nutrients, Siltation	2.71 miles
9.	Locust Fork	Siltation	14.25 miles
10.	Locust Fork	Siltation	14.86 miles
11.	Locust Fork	Siltation	18.15 miles
12.	Locust Fork	Siltation	27.18 miles
13.	Pegues Creek	Siltation	4.23 miles
14.	Daniel Creek	Metals	10.42 miles
15.	North River	Nutrients, Siltation	43.48 miles
		Total	***218.71 miles***

Furthermore, at least an additional 64.6 miles of streams that have been impaired due in part to surface mining activities have already been removed from the 303(d) list following approval of TMDLs for those segments. Those stream segments are presented in the table below.

BWR Stream Segments with TMDLs Due to Surface Mining

1.	Hurricane Creek	Al, Fe	31.4 miles
2.	Little Hurricane Creek	Al, As, Cu, Cr, Fe, Pathogens	10 miles
3.	North Fork Hurricane Creek	Al	6.4 miles
4.	Bayview Lake	Siltation	440 acres
5.	Camp Branch	pH, Siltation, Habitat Alteration	4.2 miles
6.	Village Creek	Metals, pH, Siltation	12.6 miles
		Total	***64.6 miles***

In light of this evidence, ASMC simply cannot argue that surface coal mining has no deleterious effects on water quality. If surface coal mining is the greatest threat to water quality in the Black Warrior River watershed, and surface mining is allowed to take place in the vicinity of surface waters designated as public water supply, then it stands to reason that surface mining should also be considered the greatest threat to drinking water quality in the watershed. When there is even a threat to a public water supply, we must err on the side of caution and take whatever steps are necessary to eliminate that threat. In this case, eliminating the threat to the public water supply is simple. The ASMC must designate the lands under consideration in this petition as unsuitable for mining and protect the long range viability of the public water supply. The ASMC should then begin to strongly consider whether it would be prudent to expand the lands unsuitable area even further upstream from the drinking water intake.

7. ***The best way to manage the risk that mining presents to the public water supply is to protect the source with a lands unsuitable designation.***

Designating the proposed Petition area as lands unsuitable for mining would represent an important first step toward meaningful source water protection for Alabama. The Safe Drinking Water Act was originally passed by Congress to protect public health through regulation of the nation's public drinking water supplies. "The bargain made by some communities of a century ago was to trade source water protection for a future reliance on water treatment. The wisest choice is to marry the two together whenever possible," according to Dr. Jeffrey Griffiths, Director, Graduate Programs in Public Health, Tufts University School of Medicine.) The 1996 amendments of the Safe Drinking Water Act took the law a step further, realizing treatment alone is inadequate to protect public health, that drinking water sources must also be protected. The Source Water Assessment Program (SWAP) established by the 1996 amendments called for state source water assessment programs to be established by 2003.

SWAPs have four primary goals:

(1) Delineate or map the source water assessment area (the land area that contributes water and pollutants to the water supply).

(2) Conduct an inventory of potential contamination sources in the delineated area.
(3) Determine the susceptibility of the water supply to identified contamination sources.
(4) Make the results public.

SWAPs are important tools for water providers and states to ensure the long-term protection and viability of water supplies. SWAPs also provide an arena for drinking water customers to become informed about their water source and efforts to protect it

While the 1996 Safe Drinking Water Act amendments required state source water assessment programs to be established by 2003, there is no mention of a state Source Water Assessment Program (SWAP) on ADEM's Drinking Water Branch website. To date, we have only seen one Source Watershed Assessment that has taken place for the Mulberry Fork source drinking water This assessment was published in 2007 as an amendment to a prior 2002 assessment, and obtained by request to the BWWB.[15] The 2007 BWWB Mulberry Fork Source Watershed Assessment is not mentioned or available for review on the BWWB's website; it is mentioned in the BWWB's 2012 Consumer Confidence Report; and it is available for review at the BWWB's offices

While there is a BWWB "Cahaba River/Lake Purdy Watershed Protection Policy," one does not exist for the Mulberry source. After a review of the 2007 BWWB Source Watershed Assessment, it is clear that much of the pertinent information is lacking with regard to upstream contaminant threats. Interestingly, ADEM provided BWWB with the "potential sources of

[15] According to a January 29, 2013 email, BWWB Assistant General Manager Darryl Jones stated that the utility plans to "update all of our source water assessments later this year and consider[s] coal mining as a potential problem for our treatment plants."

contamination," which numbered only fourteen. Of note are three coal mines which had active ADEM NPDES permits in relatively close proximity to the Mulberry Intake: Horse Creek Mine, Red Star Mine, and Quinton Mine. These public comments have identified many more upstream threats than those which appear in this assessment. *See* discussion at pp. 17-20.

A map in the assessment delineates the "Source Watershed Protection Area" or Mulberry Fork SWPA. Appendix E. The SWPA was defined by ADEM as "a buffer zone of 500 feet around the source water that extends ¼ mile downstream of the intake to 15 miles upstream of the intake." A 500 foot buffer is more than is currently required by applicable regulation; coal mines in Alabama are allowed to mine within 100 feet of an existing stream, creek, or river. 30 C.F.R § 780.28. *It appears that ADEM has permitted coal mines to operate within the 500 foot buffer they themselves prescribed for the Mulberry Fork SWPA.* This is troubling, particularly considering the emphasis on the importance of an established SWPA within the assessment. What is the point of establishing such a buffer if it is completely ignored? Moreover, according to the SWPA, the proposed Petition area represents only a beginning of the source protection area; it omits the most upstream portion of the SWPA from Cordova to its "15 miles upstream of the intake" point.

Source water protection is widely regarded as a critical and cost-effective way to ensure a clean source of drinking water for future generations. In protecting source water there are many corollary benefits such as healthy watersheds, good water quality, wildlife habitat, recreational opportunities, and healthy communities. Without a healthy watershed - the land area that drains to a particular body of water - it is impossible to have a clean water source. The two go hand-in-hand, which is why the concept of source water protection has been embraced by states, water providers, agencies, local and national organizations, associations, and communities across the United States.

According to Trust for Public Land (TPL): "Watershed protection is the first and most fundamental step in a multiple barrier approach to protecting drinking water. The American Academy of Microbiology, in their 1996 study on water safety, argued that one of the best tools for reducing the transmission of waterborne diseases is the establishment of watershed protection programs. Healthy, functioning watersheds naturally filter pollutants and moderate water quantity by slowing surface runoff and increasing the infiltration of water into the soil. The result is less flooding and soil erosion, cleaner water downstream and greater groundwater reserves. When communities invest in land protection as a way to protect their drinking water, they are investing in the long-term health and quality of life of their citizens - guiding growth away from sensitive water resources, providing new park and recreational opportunities, protecting farmland and natural habitat - and likely saving money with reduced treatment costs."

The AWWA and the TPL have been stalwart advocates of source water protection for the last decade, and have produced a wealth of information about how to go about protecting our precious sources of clean drinking water. A study of 27 water suppliers conducted by the Trust for Public Land and the American Water Works Association in 2002 found that the more forest cover in a watershed the lower the treatment costs. For every 10% increase in forest cover in the source area, treatment and chemical costs decreased approximately 20% up to about 60% forest cover." A similar study was conducted in 1997 by the Department of Agricultural Economics at Texas A&M University. From a sample of 12 geographically representative suppliers, with three years of data, researchers found that for every 4% increase in raw water turbidity there is a 1% increase in treatment costs. Increased turbidity, which indicates the presence of sediment, algae and other microorganisms in the water, is a direct result of increased development, poor forestry practices, mining or intensive farming in the watershed.

With no known forest lands protected along the Mulberry Fork source water area, the Petition sets in motion a first step towards addressing this critical need. In order to ensure this water supply will be healthy for future generations, the lands unsuitable designation is but a start. Focusing on better land conservation practices is another approach. By granting this Petition, the ASMC is indirectly encouraging the protection of forested lands in the source water drainage area and maintaining stable or even lower treatment costs for drinking water. ADEM and the ASMC give source water protection only cursory consideration in their permitting process, which is not enough. Much more can be done to ensure sources of drinking, cooking, and bathing water are adequately protected from unnecessary and harmful pollution that costs us all.

Cumulative assessments must be performed to look at not only a single proposed pollution permit for a coal mine, but also at all other existing and past mines upstream in concert with all other pollution sources, and the overall well-being of the river. A decision should not be made on allowing more pollution discharges into the river without due consideration of *all* data that exists about the river system and impacts to it. Likewise, no permitting process should be allowed to move forward along or upstream of a river segment with a classified use of public water supply without in-depth consultation with the local drinking water treatment provider and adequate public notice to the population served by the source. No permitting decision should ever be made without meaningfully addressing very real concerns from a downstream drinking water utility, which is effectively what happened during the permitting processes for Shepherd Bend and Reed Minerals No. 5 mines.

The Petition well illustrates that not enough water quality data exists for the Mulberry Fork. Cross-agency communication and collaboration must improve to ensure adequate data is collected, analyzed, and used to make sound decisions that benefit the entire community. Among the agencies which collect water quality data up and down the Mulberry Fork - ADEM, BWWB, the ASMC, USGS, Geological Services of Alabama and EPA - it is unclear whether there has been an effort to comprehensively compile and use all existing data in determining surface mining's impacts on the river and the public water supply. However, the ASMC's identification of just two responsive documents to Riverkeeper's request for records – the Cumulative Hydrologic Impact Assessment for the Mulberry Fork and the Davenport and Morse study—suggest that this kind of data is not being shared or properly considered.

Due to the prevalence of coal mining in Alabama, the ASMC must be an essential part of future attempts to support source water protection efforts, particularly in the northeast part of the state. Until a more comprehensive, cross-agency collaboration exists in Alabama, the ASMC has a strict duty to take the necessary steps within its legal mandate to protect source drinking water. Fortunately, the authors of SMCRA afford the ASMC this authority through the lands unsuitable for mining process.

8. The substantial loss or reduction of long-range productivity of the Mulberry Fork water supply would impose greater economic and social costs on the region than the potential loss of the surface mining revenues of the Petition area.

According to the economic assessment included in a *Technical Study* by the Pennsylvania Department of Environmental Protection Bureau of Mining and Reclamation for a Petition to Declare Muddy Run Watershed as Lands Unsuitable for Mining, the coal reserves that may be sterilized by an unsuitable for mining designation must be examined to estimate economic impacts on local wages and tax revenues. Employment and coal production estimates are based on the *Annual Statistical Report-Fiscal Year 2011* compiled by the Alabama Department of Industrial Relations (the most recent year that the report is available). To reflect local conditions, Walker County, the location of the Mulberry Fork intake, was used.

In 2011, the 393 surface mine employees Walker County produced approximately 2.55 million tons of coal, for an average productivity rate of approximately 6,479 tons per worker per year.[16] However, given the wide variance between metallurgical and steam coal prices, and without being certain of the proportion of steam coal versus metallurgical mined in Walker County, it is impossible to use yearly *U.S. Department of Energy's Energy Information Administration* prices to reach a reasonably accurate average price per ton, using figures for the past five years (which would capture both highs and lows in the market). However, the ASMC should be able to work out a reasonable estimate of price per ton based upon the kind of coal mined at the thirteen Walker County surface coal mines currently in operation.[17] In evaluating the Petition, the ASMC is required to review the available coal reserves and calculate economic opportunity costs of designating the land as unsuitable for mining.

Just as critical, however, the ASMC must balance this assessment with facts and figures about the range of costs for the BWWB (and ratepayers) if the Mulberry Fork intake has to install new treatment systems, be closed or idled as a result of contamination from surface mining. The ASMC should also consider the costs of associated public health impacts, including if drinking water is contaminated and ingested by BWWB customers before the water utility can

[16] These numbers are taken directly from *Annual Statistical Report-Fiscal Year 2011* ; however, two mines (Parrish and Drummond # 1) do not report the number of employees for those surface mines. Whether this represents sharing of employees between mines (so they are not counted twice) or is a failure to report which may result in an undercounting of employees cannot be ascertained from the report.

[17] The *Annual Statistical Report-Fiscal Year 2011* lists thirteen Walker County surface mines in operation during 2011: Manchester West; Parrish; Drummond # 1; Burton's Branch; Town Creek; Crescent valley; Kansas; Dutton Hill; Sparks branch; Jap Creek; Choctaw; Reese's Branch; and Coal Valley. Based upon the ASMC's records, the Commissions should be able to determine what percentage of the 2011 tons mined at these sites were steam coal versus metallurgical, and then calculate an average price per ton.

identify the contamination and halt their use of the source water. Finally, the ASMC must also factor in recent climate and market trends, which suggest that water is increasing in value as a resource, even as coal's value to society declines.

For the year ending 2012, coal made up 37.6 percent of U.S. electricity in 2012 — down from 44.6 percent in the first quarter of 2011. See *U.S. Energy Information Administration Short Term Energy Outlook* (EIA). That drop represents an almost 20 percent decline in coal generation over the last two years. The use of natural gas has grown, driven by the increasing relative cost advantages of natural gas over coal for power generation in many regions. The EIA expects the coal share of total electricity generation to remain flat – rising slightly to 39.0 percent in 2013 and 39.6 percent in 2014, as natural gas prices increase relative to coal prices. *Id.* However, lower-than-projected natural gas prices along with the electric power industry's response to future environmental regulations could cause the coal share of total generation to fall below this estimated forecast. *Id.*

Metallurgical coal is experiencing a similar slump. According to ASMC Director Dr. Randall Johnson, most of Alabama's metallurgical coal is exported to Brazil, Europe and China. *Birmingham News January 3, 2013*. In early 2011, metallurgical coal hit an all-time high of \$330 per ton in some markets; however, "the price has fallen just as fast" and coal "that was selling for more than \$300 per ton is going for half that much today." *Id*. Dr. Johnston stated that "A lot of coal is being stockpiled and not being burned . . . they're holding on to it." *Id.* The next several months will likely indicate whether the downturn is a cyclical slump or something more long-term; Dr. Johnson observes that "We'll have to get through the winter to see if this is going to turn around." *Id.* Throughout the U.S., many smaller coal companies have closed mines; the largest publicly-traded Alabama coal company, Walter Energy, has seen its stock price fall from nearly $150 per share in 2011, *id*., to about $37 per share on January 29, 2013. In order to remain profitable, "coal companies must make their operations more efficient." *Birmingham News January 3, 2013*. Some, like Rock Mountain Mining, a division of Twin Pines L.L.C., are doing so through layoffs; in November, they laid off 124 employees. *Id.* Others, like Drummond Company, are bringing back less labor intensive ways (meaning fewer jobs) to surface mine, like reconditioning an old large scale drag line that makes many employees unnecessary. *Id.*

In view of the foregoing facts, it is clear that the economic costs associated with designating the proposed Petition area are declining. Moreover, Alabama has ample coal reserves not associated with source drinking water that it can rely on to supply the State's needs for steam and metallurgical coal.[18]

By contrast, water is becoming an issue of focus and concern. For example, during 2012, the U.S. suffered from one of the most extreme droughts on record. *See NOAA State of the Climate Drought Annual 2012* During April, Alabama ranked in the top ten driest category for April. *Id.* Nearly half of Alabama declared a primary natural disaster area area by U.S. Agriculture Secretary Thomas Vilsack. According to the U.S. Drought Monitor, about 91 percent of the State was either abnormally dry or in a full-blown drought by midsummer. *Alabama Drought July 5, 2012.* Since 2007, Alabama has experienced some form of drought every year, with the exception of 2009. *NOAA State of the Climate Drought Annual 2007*; *Alabama Drought 2007-*

[18] It is questionable how much coal Alabama actually needs for its own needs, given other recent trends. As stated previously, metallurgical coal is primarily shipped to Brazil, Europe and China to support their steel industries. With respect to power generation, most of the coal necessary to fuel Alabama's steam plants is shipped from Wyoming, Kentucky, and West Virginia. *Alabama Energy Facts - Institute for Energy Research*. Surface mines in Wyoming can produce and ship coal for less than local sources, so that is where Alabama utilities generally obtain steam coal.

08; *NOAA State of the Climate Drought 2010*; *Birmingham News September 2, 2011*; *NOAA State of the Climate Drought Annual 2012*. Looking at the State's water needs in this context, the preservation of a source water supply under pressure should take precedence over surface coal mining.

As reasoned by the Pennsylvania Department of Environmental Protection's Bureau of Mining and Reclamation, even where the estimate of the minable reserves of the proposed petition area was $62.3 million and the probability of contamination only "slight," the fact that the possibility, "although unlikely" existed was enough to support a lands unsuitable designation for the area under consideration. *See Technical Study* at pp. 54-55. The source water of the Mulberry Fork is equally deserving of such protection.

Conclusion

The Mulberry Fork drinking water intake is characterized as the "workhorse" of the BWWB's water system. *Flannelly* at p. 64. The intake is used "all the time except when it breaks or we have a significant water quality issue." *Id.* Since 1989, the intake has been the source of drinking water for every possible use from residential to commercial and business to medical facilities. *Jones* at. p. 173-174. Water from the plant is generally distributed "west of I-65, as far north as Warrior, Kimberly, Arkadelphia Road, [and] Corner" down to "Gardendale, Fultondale, to downtown Birmingham," and to wholesale customers "Brookside, Graysville [and] Pleasant Grove" not to mention at various times to Ensley, West End, Oxmoor Valley, Homewood, and parts of Vestavia, and Hoover. *Id.* at 171-172.

As stated previously, the BWWB cannot suspend or claim exception to the applicable legal requirements to provide safe drinking water to its customers. If additional surface mining introduces greater concentrations of contaminants into source drinking water, the BWWB faces the substantial possibility of penalties, fines, corrective action plans and other enforcement. *Id.* at p. 189. Of course, enforcement, although serious, pales in comparison to what would happen if the area's source drinking water is contaminated.

In 2006-2007, the BWWB had to shut down the Mulberry intake for seven months to avoid having an enforceable violation for bromide that contaminated the source water. *Id.* at p. 210. The source of the bromide was traced to Arab, some 90 miles upstream of the intake, and the BWWB (not ADEM) took legal action against the polluter to reduce the bromide contamination so that the source water could again be used. *Id.* at 211. Because the Black Warrior is home to a series of dams, and as the Mulberry Fork has the ability to act as much like a pool as a free flowing river, the water "[tends] to hang out." *Id.* at 63. The hydrology depends upon Smith Lake upstream and the Bankhead Pool downstream. *Flannelly* at p. 61. To expel the bromide-contaminated water, the Mulberry Fork had to be flushed of contaminants by a water release from Bankhead Lock and Dam. *Id.* at 212. The amount of bromide from 90 miles upstream that precipitated the treatment issues was at a concentration of 0.05 mg/L. *Flannelly* at p. 66. That figure represents "a very small concentration of that chemical that . . . was untreatable," but it nonetheless forced the BWWB to shut the intake down for seven months. *Flannelly* at p. 66. With the Mulberry Fork intake shut down and the need "critical" due to drought, the BWWB had to find a way to restore the Mulberry Fork to avert a water shortage, which it did by pursuing the discharger to remediate the problem and flushing the system. *Id. at pp.* 64-65. The Mulberry Fork lacked the assimilative capacity for bromide under low flow conditions, just as the BWWB has offered evidence that the source water similarly could not assimilate the metals or adequately treat sediment that would be released by a surface mine in close proximity to the drinking water intake.

The BWWB has expressed realistic concerns about the contamination of the Mulberry Fork source water from mining and what that could mean for operations. But those concerns about contamination go beyond the drinking water intake. The water from the Mulberry Fork intake travels to the Western Filter Plant for treatment, a distance of some 22 miles via a pipe that is six feet in diameter. *Jones* at p. 218. If contaminated source water made it to this pipe, the entire 28 million gallons that the pipe contains would have to be flushed. *Id.* The BWWB lacks the ability to dump the entire 28 million gallons of contaminated water, so what the utility could do in these circumstances is both debatable and concerning. *Id. at 219.*

Given the great risks and the high stakes, the only feasible way to manage the risk to the Mulberry Fork source drinking water is for the ASMC to designate the Mulberry Fork drainage as lands unsuitable for mining. There is ample precedent for such a decision and it is past time for source drinking water protection to be a priority in Alabama. The state of Pennsylvania is at the forefront of the lands unsuitable designation process. Previously, their Department of Environmental Protection's Bureau of Mining and Reclamation has designated the watersheds of Upper Powell Run, Bells Gap Run, Little Muddy Run and Muddy Run as unsuitable for surface mining activities. *See Technical Study*. Petitions are pending for the following watersheds: Silver and Big Creek; Rasler Run; Lower Indian Creek; and Laurel Run watershed. The ASMC must follow their lead and designate the proposed Petition area of the Mulberry Fork source water drainage as unsuitable for mining, given the grave and substantial risk that surface mining activities pose to the long term productivity and health of the water supply.

Respectfully submitted,

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APPENDIX A

Potential mining contaminants with drinking water standards

Parameter[1]	Type of Standard	Enforcement Mechanism	Standard (mg/L)[2]	Driver
Aluminum	Secondary	SMCL	0.05 to 0.20	Regulatory violation
Antimony	Primary	MCL	0.006	Regulatory violation
Arsenic	Primary	MCL	0.01	Regulatory violation
Bromide	NS	Through DBP MCL	N/A	THM MCL = 0.080 mg/L HAA5 MCL = 0.06 mg/L Increased DBP carcinogenicity with increased bromine incorporation
Benzene	Primary	MCL	0.005	Regulatory violation
Toluene	Primary	MCL	1	Regulatory violation
Ethylbenzene	Primary	MCL	0.7	Regulatory violation
Xylene	Primary	MCL	10	Regulatory violation
Cadmium	Primary	MCL	0.005	Regulatory violation
Chromium (total)	Primary	MCL	0.1	Regulatory violation
Copper	Primary	MCL	1.3	Regulatory violation
Gross Alpha	Primary	MCL	15 pCi/L	Regulatory violation
Gross Beta	Primary	MCL	4 millirems/yr	Regulatory violation
Iron	Secondary	SMCL	0.3	Red water (aesthetic consequences); secondary MCL violation
Lead	Primary	MCL	0.015	Regulatory violation
Manganese	Primary	MCL	0.05	Regulatory violation
Molybdenum	UCMR3	Monitoring	N/A	WHO guideline; USEPA is evaluating occurrence information under UCMR3
Mercury	Primary	MCL	0.002	Regulatory violation
Nickel	NS	NS	NS	WHO guideline based on several potential health endpoints, including eczema and perinatal lethality
Nitrate	Primary	MCL	10	Regulatory violation
Pyritic Sulfur	NS	NS	NS	Potential conversion to sulfate or hydrogen sulfide (aesthetic consequences)
Radium 226 and 228 (combined)	Primary	MCL	5 pCi/L	Regulatory violation
Selenium	Primary	MCL	0.05	Regulatory violation
Silver	Secondary	SMCL	0.1	Regulatory violation
Strontium	UCMR3	Monitoring	N/A	USEPA is evaluating occurrence information under UCMR3; no aesthetic impacts
Sulfate	Secondary	SMCL	250	Regulatory violation
Turbidity	Primary	Treatment Technique	N/A	Increased turbidity in raw water will impact plant operations (coagulant/filter aid dose, residuals handling)
Total Dissolved Solids	Secondary	SMCL	500	Regulatory violation
Total Organic Carbon	Primary	Treatment Technique	N/A	Increased TOC in raw water will impact plant operations for TOC removal (Stage 1 D/DBPR compliance) and DBP MCLs
Uranium	Primary	MCL	0.03	Regulatory violation
Zinc	Secondary	SMCL	5	Regulatory violation

NS - no standard; N/A - not applicable; MCL - maximum contaminant level; SMCL - secondary maximum contaminant level; UCMR - unregulated contaminant monitoring rule; DBP - disinfection by-product; THM - trihalomethane; HAA5 - sum of 5 haloacetic acids; Stage 1 D/DBPR - Disinfectant/Disinfection By-Products Rule; pCi/L - picocuries per Liter

[1] Parameters highlighed in bold font are included on the list of constituents for which monitoring is currently required under the final permit

[2] All values in milligrams per liter (mg/L) unless otherwise stated

PLAINTIFF'S EXHIBIT 14

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APPENDIX B

PLAINTIFF'S EXHIBIT 15

Treatability of potential mining contaminants at Western Filter Plant

Contaminants that may be partially removed by treatment processes at the Western Filter Plant:

Contaminant	Treatable With Current Plant Configuration	Maximum Tolerable Raw Water Concentration (Estimated)[1]	Assumptions / Comments
Aluminum	Yes	300 mg/L	Under optimized conditions, the current process may achieve up to 50% removal; residuals handling concerns
Antimony	Yes	0.024 mg/L	Under optimized conditions, the current process may achieve up to 80% removal; residuals handling concerns
Arsenic	Yes	0.026 mg/L	Under optimized conditions, the current process may achieve up to 70% removal; residuals handling concerns
Cadmium	Yes	0.4 mg/L	Under optimized conditions, the current process may achieve up to 90% removal; residuals handling concerns
Copper	Yes	3.47 mg/L	Under optimized conditions and depending on speciation of copper, the current process may achieve up to 70% removal; residuals handling concerns
Iron	Yes	3.0 mg/L	Under optimized conditions, the current process may achieve up to 90% removal; aeration or pre-oxidation is required to achieve removal of dissolved iron; residuals handling concerns
Lead	Yes	1.2 mg/L	Under optimized conditions, the current process may achieve up to 99% removal; residuals handling concerns
Mercury	Yes	0.08 mg/L	Under optimized conditions, the current process may achieve up to 98% removal; residuals handling concerns
Nickel	Yes	108 μg/L	Maximum tolerable raw water concentration based on World Health Organization guideline; under optimized conditions, the current process may achieve up to 35% removal; removal depends on the speciation of the nickel, pH and other factors; residuals handling concerns
Selenium	Yes	0.047 mg/L	Under optimized conditions, the current process may achieve up to 15% removal; residuals handling concerns
Silver	Yes	0.333 mg/L	Under optimized conditions, the current process may achieve up to 70% removal
Strontium	Yes	10.7 millirems per year (based on MCL for gross beta)	Under optimized conditions, the current process may achieve up to 70% removal; residuals handling concerns
Turbidity	Yes	N/A - Treatment technique-type standard	Assume removal to < 1 NTU at all times in combined filter effluent (CFE) samples and ≤ 0.3 NTU in 95% of CFE samples; residuals handling issue from increased source water loading
Total Organic Carbon	Yes	N/A - Treatment technique-type standard	Increase in TOC in raw water can impact required coagulant dose, DBP concentrations, and Stage 1/2 D/DBPR compliance
Uranium	Yes	48 μg/L	Under optimized conditions, the current process may achieve up to 50% removal; residuals handling concerns
Zinc	Yes	12.5 mg/L	Under optimized conditions, the current process may achieve up to 60% removal; residuals handling concerns

N/A - not applicable

[1] Maximum tolerable raw water concentration is based on achieving finished water concentrations of listed contaminants equivalent to 80% of the MCL and 100% of the SMCL (for parameters with secondary standards). Treatment that is assumed to be achieved through the existing surface water treatment plant is accounted for in the calculation per comments.

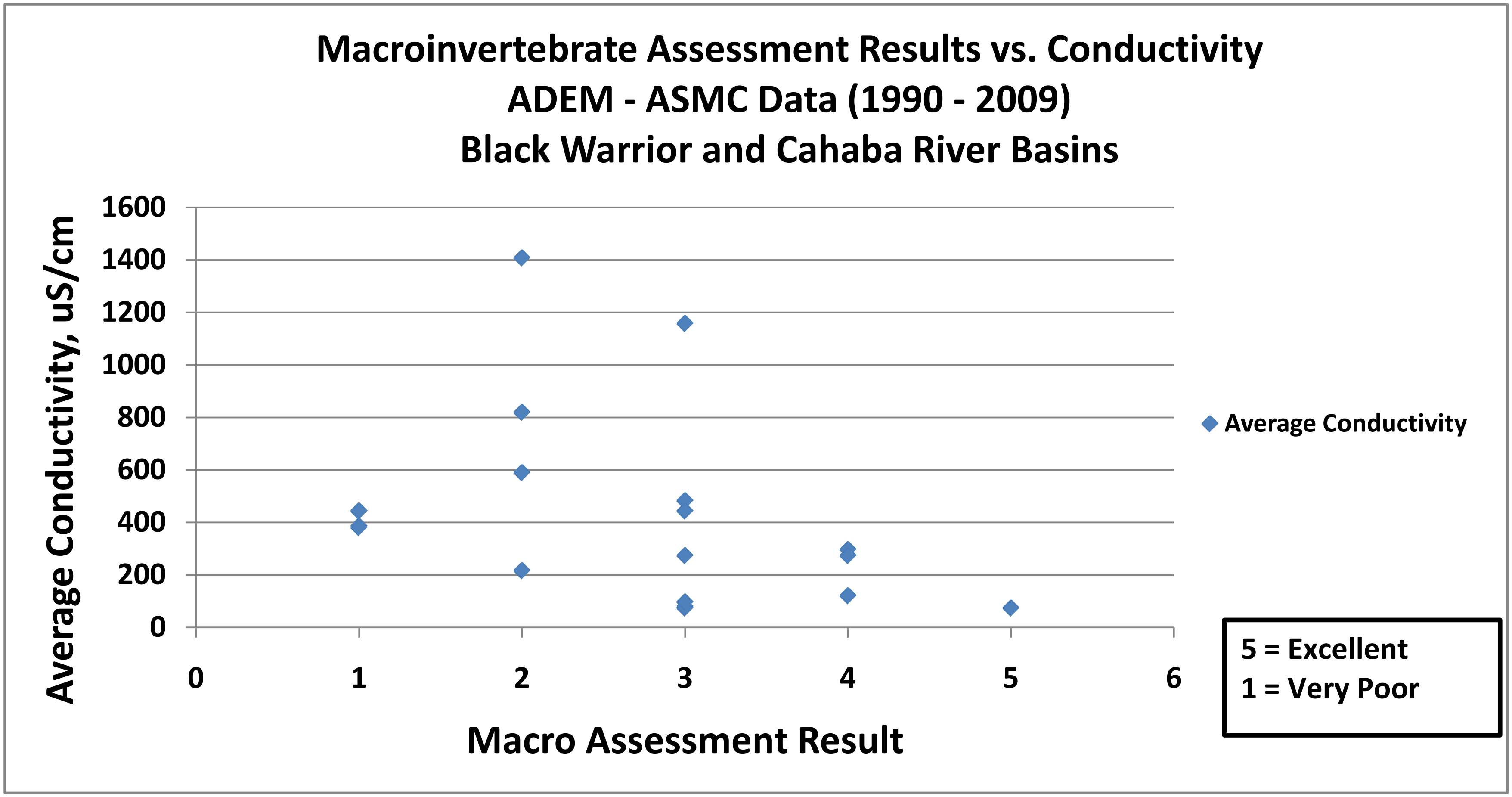
Contaminants that are not removed by treatment processes at the Western Filter Plant:

Contaminant	Treatable With Current Plant Configuration	Maximum Tolerable Raw Water Concentration (Estimated)[1]	Comments
Bromide	No	0.050 mg/L	Higher bromide creates challenge with DBP Rule compliance
Benzene	No	0.004 mg/L	May be removed by adsorption or air stripping
Toluene	No	0.800 mg/L	May be removed by adsorption or air stripping
Ethylbenzene	No	0.560 mg/L	May be removed by adsorption or air stripping
Xylene	No	8.00 mg/L	May be removed by adsorption or air stripping
Chromium	No	0.080 mg/L	Potential regulation on hexavalent chromium at low level creates additional challenge with very low level occurrence in raw water; may be removed by ion exchange, or reduction/coagulation/filtration
Gross Alpha	No	12.0 pCi/L	May be removed by reverse osmosis
Gross Beta	No	3.20 millirems/year	May be removed by ion exchange or reverse osmosis
Manganese	No	0.05 mg/L	May be removed by oxidation; assumes manganese (Mn) is primarily non-particulate; residuals handling concerns
Molybdenum	No	0.07 mg/L	Maximum tolerable raw water concentration based on World Health Organization guideline; may be removed by ion exchange
Nitrate	No	8.00 mg/L	May be removed by ion exchange, reverse osmosis, or biological treatment
Pyritic Sulfur	No	167 mg/L[2]	See comments for sulfate for removing any pyritic sulfur that has converted
Radium 226 and 228 (combined)	No	4.00 pCi/L	May be removed by ion exchange, reverse osmosis, or lime softening; residuals handling concerns
Sulfate	No	250 mg/L	May be removed by reverse osmosis, ion exchange, or biological processes
Total Dissolved Solids	No	500 mg/L	May be removed by reverse osmosis or electrodialysis

N/A - not applicable; NPDWR - national primary drinking water regulation; WHO - world health organization

[1] Maximum tolerable raw water concentration is based on achieving finished water concentrations of listed contaminants equivalent to 80% of the MCL and 100% of the SMCL (for parameters with secondary standards).

APPENDIX C



Macroinvertebrate Assessment Results vs. Conductivity
ADEM - ASMC Data (1990 - 2009)
Black Warrior and Cahaba River Basins
Average Conductivity, uS/cm
1600
1400
1200
1000
800
600
400
200
0
0
1
2
3
4
5
6
Macro Assessment Result
Average Conductivity
5 = Excellent
1 = Very Poor

APPENDIX D

Quinton Mine (AL0076538) - NPDES Permit Violations					
Date	**Outfall #**	**Parameter**	**Permit Limit**	**Discharge**	**# of Violations**
Feb '08	042	Iron (Fe) Maximum Concentration MONTHLY AVERAGE	3.0 mg/L	3.17 mg/L	29
Feb '06	041	pH DAILY MIN	6.0 s.u.	5.66 s.u.	1
Feb '06	042	TSS Maximum Concentration DAILY MAX	70 mg/L	177 mg/L	1
Feb '06	042	TSS Maximum Concentration MONTHLY AVERAGE	35 mg/L	73.00 mg/L	28
Feb '06	042	Iron (Fe) Maximum Concentration DAILY MAX	6.0 mg/L	7.48 mg/L	1
Feb '06	042	Iron (Fe) Maximum Concentration MONTHLY AVERAGE	3.0 mg/L	3.15 mg/L	28
Feb '06	065	Iron (Fe) Maximum Concentration MONTHLY AVERAGE	3.0 mg/L	3.51 mg/L	28
Jan '06	042	TSS Maximum Concentration DAILY MAX	70 mg/L	141 mg/L	1
Jan '06	042	TSS Maximum Concentration MONTHLY AVERAGE	35 mg/L	74.50 mg/L	31
Dec '05	042	Iron (Fe) Maximum Concentration DAILY MAX	6.0 mg/L	7.15 mg/L	1
Dec '05	042	Iron (Fe) Maximum Concentration MONTHLY AVERAGE	3.0 mg/L	3.83 mg/L	31
Apr '05	065	TSS Maximum Concentration DAILY MAX	70 mg/L	127 mg/L	1
Apr '05	065	TSS Maximum Concentration MONTHLY AVERAGE	35 mg/L	127 mg/L	30
Apr '05	065	Iron (Fe) Maximum Concentration DAILY MAX	6.0 mg/L	7.10 mg/L	1
Apr '05	065	Iron (Fe) Maximum Concentration MONTHLY AVERAGE	3.0 mg/L	7.10 mg/L	30
Mar '05	065	Iron (Fe) Maximum Concentration MONTHLY AVERAGE	3.0 mg/L	3.64 mg/L	31
				Total	273

Horse Creek Mine (AL0076554) - NPDES Permit Violations					
Date	**Outfall**	**Parameter**	**Limit**	**Discharge**	**# of Violations**
Jan '06	128	TSS Maximum Concentration MONTHLY AVERAGE	35 mg/L	44.50 mg/L	31
Feb '06	128	Iron (Fe) Maximum Concentration MONTHLY AVERAGE	3.0 mg/L	3.38 mg/L	28
Apr '05	108	TSS Maximum Concentration MONTHLY AVERAGE	35 mg/L	40.00 mg/L	30
Apr '05	108	Iron (Fe) Maximum Concentration MONTHLY AVERAGE	3.0 mg/L	9.16 mg/L	30
Apr '05	108	Iron (Fe) Maximum Concentration DAILY MAX	6.0 mg/L	9.16 mg/L	
				Total	119

Manchester Mine (AL0025399) NPDES Violations					
Date	**Outfall**	**Parameter**	**Permit Limit**	**Discharge**	**# of Violations**
Feb '07	010	pH DAILY MINIMUM	6.0 s.u.	5.80 s.u.	1
Nov '06	010	pH DAILY MINIMUM	6.0 s.u.	5.70 s.u.	1
Nov '06	010	pH DAILY MINIMUM	6.0 s.u.	5.26 s.u.	1
Mar '06	010	pH DAILY MINIMUM	6.0 s.u.	5.83 s.u.	1
Feb '06	010	pH DAILY MINIMUM	6.0 s.u.	5.64 s.u.	1
Jan '06	010	pH DAILY MINIMUM	6.0 s.u.	5.40 s.u.	1
Jan '06	031	Iron (Fe) MONTHLY AVERAGE	3.0 mg/L	3.66 mg/L	31
Dec '05	010	pH DAILY MINIMUM	6.0 s.u.	5.65 s.u.	1
Sep '05	010	pH DAILY MINIMUM	6.0 s.u.	5.82 s.u.	1
Jun '05	010	pH DAILY MINIMUM	6.0 s.u.	5.86 s.u.	1
Jun '05	029	Total Suspended Solids (TSS) DAILY MAX	70 mg/L	78 mg/L	1
Jun '05	029	Total Suspended Solids (TSS) MONTHLY AVERAGE	35 mg/L	40 mg/L	30
Jun '05	029	Iron (Fe) DAILY MAX	6.0 mg/L	8.54 mg/L	1
Jun '05	029	Iron (Fe) MONTHLY AVERAGE	3.0 mg/L	4.44 mg/L	30
Nov '04	010	pH DAILY MINIMUM	6.0 s.u.	5.75 s.u.	1
Sep '04	002	Total Suspended Solids (TSS) DAILY MAX	70 mg/L	86 mg/L	1
Sep '04	002	Total Suspended Solids (TSS) MONTHLY AVERAGE	35 mg/L	50 mg/L	31
May '04	002	pH DAILY MAXIMUM	9.0 s.u.	9.82 s.u.	1
May '04	029	pH DAILY MAXIMUM	9.0 s.u.	9.29 s.u.	1
Apr '04	029	pH DAILY MAXIMUM	9.0 s.u.	9.59 s.u.	1
Mar '04	021	Iron (Fe) DAILY MAX	6.0 mg/L	7.90 mg/L	1
Mar '04	021	Iron (Fe) MONTHLY AVERAGE	3.0 mg/L	5.64 mg/L	31
Feb '04	002	Total Suspended Solids (TSS) DAILY MAX	70 mg/L	146 mg/L	1
Feb '04	002	Total Suspended Solids (TSS) MONTHLY AVERAGE	35 mg/L	79 mg/L	29
Feb '04	010	pH DAILY MINIMUM	6.0 s.u.	5.7 s.u.	1
Sep '03	019	Total Suspended Solids (TSS) MONTHLY AVERAGE	35 mg/L	46 mg/L	30
Sep '03	025	Total Suspended Solids (TSS) DAILY MAX	70 mg/L	111 mg/L	1
Sep '03	025	Total Suspended Solids (TSS) MONTHLY AVERAGE	35 mg/L	111 mg/L	30
Sep '03	025	Iron (Fe) MONTHLY AVERAGE	3.0 mg/L	4.67 mg/L	30
Jul '03	019	Total Suspended Solids (TSS) MONTHLY AVERAGE	35 mg/L	67 mg/L	31
Jul '03	025	Total Suspended Solids (TSS) DAILY MAX	70 mg/L	172 mg/L	1
Jul '03	025	Total Suspended Solids (TSS) MONTHLY AVERAGE	35 mg/L	172 mg/L	31
Jul '03	025	Iron (Fe) MONTHLY AVERAGE	3.0 mg/L	4.72 mg/L	31
May '03	025	Total Suspended Solids (TSS) MONTHLY AVERAGE	35 mg/L	46 mg/L	31
May '03	025	Iron (Fe) MONTHLY AVERAGE	3.0 mg/L	4.60 mg/L	31
Apr '03	025	Iron (Fe) MONTHLY AVERAGE	3.0 mg/L	3.43 mg/L	30
Feb '03	025	Total Suspended Solids (TSS) MONTHLY AVERAGE	35 mg/L	38 mg/L	28
Feb '03	025	Iron (Fe) DAILY MAX	6.0 mg/L	8.2 mg/L	1
Feb '03	025	Iron (Fe) MONTHLY AVERAGE	3.0 mg/L	8.2 mg/L	28
Feb '03	029	Total Suspended Solids (TSS) DAILY MAX	70 mg/L	72 mg/L	1
Feb '03	029	Total Suspended Solids (TSS) MONTHLY AVERAGE	35 mg/L	41 mg/L	28
Feb '03	029	Iron (Fe) DAILY MAX	6.0 mg/L	6.37 mg/L	1
Feb '03	029	Iron (Fe) MONTHLY AVERAGE	3.0 mg/L	3.34 mg/L	28

Dec '02	025	pH DAILY MINIMUM	6.0 s.u.	5.3 s.u.	1
Dec '02	025	Iron (Fe) MONTHLY AVERAGE	3.0 mg/L	5.66 mg/L	31
Nov '02	025	Total Suspended Solids (TSS) DAILY MAX	70 mg/L	72 mg/L	1
Nov '02	025	Total Suspended Solids (TSS) MONTHLY AVERAGE	35 mg/L	72 mg/L	30
Nov '02	025	Iron (Fe) DAILY MAX	6.0 mg/L	7.49 mg/L	1
Nov '02	025	Iron (Fe) MONTHLY AVERAGE	3.0 mg/L	7.49 mg/L	30
Oct '02	010	pH DAILY MINIMUM	6.0 s.u.	5.6 s.u.	1
Oct '02	010	pH DAILY MINIMUM	6.0 s.u.	5.4 s.u.	1
Oct '02	025	Iron (Fe) DAILY MAX	6.0 mg/L	14.32 mg/L	1
Oct '02	025	Iron (Fe) MONTHLY AVERAGE	3.0 mg/L	14.32 mg/L	31
				Total	721

Poplar Springs Mine (AL0077348) - NPDES Violations

Date	Outfall	Parameter	Permit Limit	Discharge	# of Violations
Dec '08	098	TSS MONTHLY AVERAGE	35 mg/L	40 mg/L	31
Dec '08	114	TSS MONTHLY AVERAGE	35 mg/L	43 mg/L	31
Dec '08	128	TSS MONTHLY AVERAGE	35 mg/L	66 mg/L	31
Dec '08	150	TSS MONTHLY AVERAGE	35 mg/L	37 mg/L	31
Dec '08	150	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.16 mg/L	31
Dec '08	153	Fe (Iron) DAILY MAXIMUM	6.0 mg/L	7.64 mg/L	
Dec '08	153	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	4.25 mg/L	31
Dec '08	157	TSS MONTHLY AVERAGE	35 mg/L	57 mg/L	31
Dec '08	001	TSS DAILY MAXIMUM	70 mg/L	75 mg/L	
Dec '08	001	TSS MONTHLY AVERAGE	35 mg/L	49 mg/L	31
Dec '08	001	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.76 mg/L	31
Dec '08	003	TSS MONTHLY AVERAGE	35 mg/L	38 mg/L	31
Dec '08	007	TSS MONTHLY AVERAGE	35 mg/L	42 mg/L	31
Mar '09	150	TSS MONTHLY AVERAGE	35 mg/L	39 mg/L	31
Mar '09	150	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.57 mg/L	31
Apr '09	001	TSS MONTHLY AVERAGE	35 mg/L	44 mg/L	30
Apr '09	015	TSS DAILY MAXIMUM	70 mg/L	74 mg/L	
Apr '09	015	TSS MONTHLY AVERAGE	35 mg/L	74 mg/L	30
Apr '09	015	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	4.31 mg/L	30
Apr '09	082	TSS MONTHLY AVERAGE	35 mg/L	58 mg/L	30
Apr '09	100	TSS DAILY MAXIMUM	70 mg/L	100 mg/L	
Apr '09	100	TSS MONTHLY AVERAGE	35 mg/L	100 mg/L	30
Apr '09	100	Fe (Iron) DAILY MAXIMUM	6.0 mg/L	9.06 mg/L	
Apr '09	100	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	9.06 mg/L	30
Apr '09	150	TSS DAILY MAXIMUM	70 mg/L	160 mg/L	
Apr '09	150	TSS MONTHLY AVERAGE	35 mg/L	160 mg/L	30
Apr '09	150	Fe (Iron) DAILY MAXIMUM	6.0 mg/L	15.97 mg/L	
Apr '09	150	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	15.97 mg/L	30
Apr '09	151	TSS MONTHLY AVERAGE	35 mg/L	60 mg/L	30
Apr '09	151	Fe (Iron) DAILY MAXIMUM	6.0 mg/L	6.48 mg/L	
Apr '09	151	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	6.48 mg/L	30
Apr '09	157	TSS MONTHLY AVERAGE	35 mg/L	68 mg/L	30
May '09	015	TSS DAILY MAXIMUM	70 mg/L	200 mg/L	
May '09	015	TSS MONTHLY AVERAGE	35 mg/L	200 mg/L	31
May '09	015	Fe (Iron) DAILY MAXIMUM	6.0 mg/L	6.46 mg/L	
May '09	015	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	6.46 mg/L	31

May '09	099	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.08 mg/L	31
May '09	100	TSS DAILY MAXIMUM	70 mg/L	130 mg/L	
May '09	100	TSS MONTHLY AVERAGE	35 mg/L	130 mg/L	31
May '09	100	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.76 mg/L	31
May '09	151	TSS MONTHLY AVERAGE	35 mg/L	44 mg/L	31
Sep '09	001	TSS MONTHLY AVERAGE	35 mg/L	49 mg/L	30
Sep '09	005	TSS DAILY MAXIMUM	70 mg/L	608 mg/L	
Sep '09	005	TSS MONTHLY AVERAGE	35 mg/L	608 mg/L	30
Sep '09	005	Fe (Iron) DAILY MAXIMUM	6.0 mg/L	20.76 mg/L	
Sep '09	005	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	20.76 mg/L	30
Sep '09	015	TSS DAILY MAXIMUM	70 mg/L	344 mg/L	
Sep '09	015	TSS MONTHLY AVERAGE	35 mg/L	344 mg/L	30
Sep '09	015	Fe (Iron) DAILY MAXIMUM	6.0 mg/L	9.36 mg/L	
Sep '09	015	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	9.36 mg/L	30
Sep '09	018	TSS MONTHLY AVERAGE	35 mg/L	42 mg/L	30
Sep '09	018	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.45 mg/L	30
Sep '09	100	TSS MONTHLY AVERAGE	35 mg/L	40 mg/L	30
Sep '09	150	TSS MONTHLY AVERAGE	35 mg/L	42 mg/L	30
Oct '09	001	TSS MONTHLY AVERAGE	35 mg/L	43 mg/L	31
Oct '09	005	TSS DAILY MAXIMUM	70 mg/L	126 mg/L	
Oct '09	005	TSS MONTHLY AVERAGE	35 mg/L	81 mg/L	31
Oct '09	014	TSS DAILY MAXIMUM	70 mg/L	76 mg/L	
Oct '09	014	TSS MONTHLY AVERAGE	35 mg/L	41 mg/L	31
Oct '09	015	TSS DAILY MAXIMUM	70 mg/L	408 mg/L	
Oct '09	015	TSS MONTHLY AVERAGE	35 mg/L	408 mg/L	31
Oct '09	015	Fe (Iron) DAILY MAXIMUM	6.0 mg/L	11.27 mg/L	
Oct '09	015	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	11.27 mg/L	31
Oct '09	018	TSS MONTHLY AVERAGE	35 mg/L	48 mg/L	31
Oct '09	018	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.55 mg/L	31
Dec '09	005	TSS DAILY MAXIMUM	70 mg/L	180 mg/L	
Dec '09	005	TSS MONTHLY AVERAGE	35 mg/L	180 mg/L	31
Dec '09	005	Fe (Iron) DAILY MAXIMUM	6.0 mg/L	8.80 mg/L	
Dec '09	005	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	8.80 mg/L	31
Dec '09	014	TSS DAILY MAXIMUM	70 mg/L	72 mg/L	
Dec '09	014	TSS MONTHLY AVERAGE	35 mg/L	70 mg/L	31
Dec '09	015	TSS MONTHLY AVERAGE	35 mg/L	46 mg/L	31
Dec '09	018	TSS DAILY MAXIMUM	70 mg/L	80 mg/L	
Dec '09	018	TSS MONTHLY AVERAGE	35 mg/L	66 mg/L	31
Dec '09	018	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	4.13 mg	31
Dec '09	082	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	4.41 mg/L	31
Dec '09	099	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	4.00 mg/L	31

Dec '09	113	TSS DAILY MAXIMUM	70 mg/L	168 mg/L	
Dec '09	113	TSS MONTHLY AVERAGE	35 mg/L	92 mg/L	31
Dec '09	114	TSS MONTHLY AVERAGE	35 mg/L	47 mg/L	31
Dec '09	150	TSS MONTHLY AVERAGE	35 mg/L	46 mg/L	31
Jan '10	001	TSS MONTHLY AVERAGE	35 mg/L	88 mg/L	31
Jan '10	001	TSS DAILY MAXIMUM	70 mg/L	88 mg/L	
Jan '10	001	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.57 mg/L	31
Jan '10	005	TSS MONTHLY AVERAGE	35 mg/L	90 mg/L	31
Jan '10	005	TSS DAILY MAXIMUM	70 mg/L	90 mg/L	
Jan '10	005	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.20 mg/L	31
Jan '10	014	TSS MONTHLY AVERAGE	35 mg/L	80 mg/L	31
Jan '10	014	TSS DAILY MAXIMUM	70 mg/L	80 mg/L	
Jan '10	014	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.63 mg/L	31
Jan '10	015	TSS MONTHLY AVERAGE	35 mg/L	54 mg/L	31
Jan '10	018	TSS MONTHLY AVERAGE	35 mg/L	80 mg/L	31
Jan '10	018	TSS DAILY MAXIMUM	70 mg/L	80 mg/L	
Jan '10	018	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.28 mg/L	31
Jan '10	082	TSS MONTHLY AVERAGE	35 mg/L	38 mg/L	31
Jan '10	100	TSS MONTHLY AVERAGE	35 mg/L	102 mg/L	31
Jan '10	100	TSS DAILY MAXIMUM	70 mg/L	102 mg/L	
Jan '10	100	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.80 mg/L	31
Jan '10	114	TSS MONTHLY AVERAGE	35 mg/L	45 mg/L	31
Jan '10	114	TSS DAILY MAXIMUM	70 mg/L	78 mg/L	
Jan '10	151	TSS MONTHLY AVERAGE	35 mg/L	66 mg/L	31
Feb '10	014	TSS MONTHLY AVERAGE	35 mg/L	96 mg/L	28
Feb '10	014	TSS DAILY MAXIMUM	70 mg/L	164 mg/L	
Feb '10	014	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	4.66 mg/L	28
Feb '10	014	Fe (Iron) DAILY MAXIMUM	6.0 mg/L	8.14 mg/L	
Feb '10	099	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.18 mg/L	28
Feb '10	100	TSS MONTHLY AVERAGE	35 mg/L	74 mg/L	28
Feb '10	100	TSS DAILY MAXIMUM	70 mg/L	74 mg/L	
Feb '10	100	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.70 mg/L	28
Feb '10	108	pH Daily Maximum	9.0 s.u.	9.28 s.u.	1
Feb '10	148	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.31 mg/L	28
Feb '10	150	TSS MONTHLY AVERAGE	35 mg/L	86 mg/L	28
Feb '10	150	TSS DAILY MAXIMUM	70 mg/L	86 mg/L	
Feb '10	150	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	6.65 mg/L	28
Feb '10	150	Fe (Iron) DAILY MAXIMUM	6.0 mg/L	6.65 mg/L	
Feb '10	151	TSS MONTHLY AVERAGE	35 mg/L	54 mg/L	28
Mar '10	001	TSS MONTHLY AVERAGE	35 mg/L	46 mg/L	31
Mar '10	001	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.17 mg/L	31

Mar '10	021	TSS MONTHLY AVERAGE	35 mg/L	52 mg/L	31
Mar '10	082	TSS MONTHLY AVERAGE	35 mg/L	62 mg/L	31
Mar '10	100	TSS MONTHLY AVERAGE	35 mg/L	60 mg/L	31
Mar '10	151	TSS MONTHLY AVERAGE	35 mg/L	68 mg/L	31
Apr '10	001	TSS MONTHLY AVERAGE	35 mg/L	284 mg/L	30
Apr '10	001	TSS DAILY MAXIMUM	70 mg/L	284 mg/L	
Apr '10	001	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	9.20 mg/L	30
Apr '10	001	Fe (Iron) DAILY MAXIMUM	6.0 mg/L	9.20 mg/L	
Apr '10	014	TSS MONTHLY AVERAGE	35 mg/L	36.5 mg/L	30
Apr '10	018	TSS MONTHLY AVERAGE	35 mg/L	37 mg/L	30
Apr '10	082	TSS MONTHLY AVERAGE	35 mg/L	88 mg/L	30
Apr '10	082	TSS DAILY MAXIMUM	70 mg/L	88 mg/L	
Apr '10	099	TSS MONTHLY AVERAGE	35 mg/L	36 mg/L	30
Apr '10	099	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	4.86 mg/L	30
Apr '10	099	Fe (Iron) DAILY MAXIMUM	6.0 mg/L	7.60 mg/L	
Apr '10	100	TSS MONTHLY AVERAGE	35 mg/L	68 mg/L	30
Apr '10	100	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	4.30 mg/L	30
Apr '10	114	TSS MONTHLY AVERAGE	35 mg/L	46 mg/L	30
Apr '10	114	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	4.13 mg/L	30
Apr '10	157	TSS MONTHLY AVERAGE	35 mg/L	46 mg/L	30
May '10	014	TSS MONTHLY AVERAGE	35 mg/L	90 mg/L	31
May '10	014	TSS DAILY MAXIMUM	70 mg/L	112 mg/L	
May '10	014	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	10.9 mg/L	31
May '10	014	Fe (Iron) DAILY MAXIMUM	6.0 mg/L	18.07 mg/L	
May '10	018	TSS MONTHLY AVERAGE	35 mg/L	36 mg/L	31
May '10	018	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.01 mg/L	31
May '10	021	TSS MONTHLY AVERAGE	35 mg/L	39 mg/L	31
May '10	082	TSS MONTHLY AVERAGE	35 mg/L	220 mg/L	31
May '10	082	TSS DAILY MAXIMUM	70 mg/L	412 mg/L	
May '10	082	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.46 mg/L	31
May '10	099	TSS MONTHLY AVERAGE	35 mg/L	44 mg/L	31
May '10	099	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	4.89 mg/L	31
May '10	157	TSS MONTHLY AVERAGE	35 mg/L	42 mg/L	31
Jun '10	014	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	4.46 mg/L	30
Jun '10	114	TSS MONTHLY AVERAGE	35 mg/L	48 mg/L	30
Jun '10	157	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	4.56 mg/L	30
Nov '10	003	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.51 mg/L	30
Dec '10	003	TSS MONTHLY AVERAGE	35 mg/L	96 mg/L	31
Dec '10	003	TSS DAILY MAXIMUM	70 mg/L	164 mg/L	
Dec '10	003	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	6.005 mg/L	31
Dec '10	003	Fe (Iron) DAILY MAXIMUM	6.0 mg/L	8.13 mg/L	

Dec '10	012	TSS MONTHLY AVERAGE	35 mg/L	44 mg/L	31
Dec '10	012	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	4.355 mg/L	31
Dec '10	099	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	5.38 mg/L	31
Dec '10	099	Fe (Iron) DAILY MAXIMUM	6.0 mg/L	8.92 mg/L	
Dec '10	108	TSS MONTHLY AVERAGE	35 mg/L	85 mg/L	31
Dec '10	108	TSS DAILY MAXIMUM	70 mg/L	110 mg/L	
Dec '10	108	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	6.0 mg/L	31
Dec '10	108	Fe (Iron) DAILY MAXIMUM	6.0 mg/L	7.62 mg/L	
Jan '11	003	TSS MONTHLY AVERAGE	35 mg/L	41 mg/L	31
Jan '11	003	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	4.76 mg/L	31
Jan '11	014	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	6.12 mg/L	31
Jan '11	014	Fe (Iron) DAILY MAXIMUM	6.0 mg/L	6.12 mg/L	
Jan '11	082	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.02 mg/L	31
Jan '11	099	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.46 mg/L	31
Jan '11	108	TSS MONTHLY AVERAGE	35 mg/L	42 mg/L	31
Jan '11	108	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	4.05 mg/L	31
Jan '11	113	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.48 mg/L	31
Jan '11	113	Fe (Iron) DAILY MAXIMUM	6.0 mg/L	6.08 mg/L	
Jan '11	114	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.88 mg/L	31
Jan '11	157	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.04 mg/L	31
Jan '11	157	Fe (Iron) DAILY MAXIMUM	6.0 mg/L	6.58 mg/L	
Feb '11	003	TSS MONTHLY AVERAGE	35 mg/L	36 mg/L	28
Feb '11	003	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.08 mg/L	28
Feb '11	014	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	5.56 mg/L	28
Feb '11	018	TSS MONTHLY AVERAGE	35 mg/L	46 mg/L	28
Feb '11	018	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	4.71 mg/L	28
Feb '11	020	TSS MONTHLY AVERAGE	35 mg/L	39.5 mg/L	28
Feb '11	021	TSS MONTHLY AVERAGE	35 mg/L	43 mg/L	28
Feb '11	157	TSS MONTHLY AVERAGE	35 mg/L	42 mg/L	28
Feb '11	157	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.28 mg/L	28
Mar '11	020	TSS MONTHLY AVERAGE	35 mg/L	36 mg/L	31
Mar '11	104	TSS MONTHLY AVERAGE	35 mg/L	36 mg/L	31
				Total Violations	4251

Hickory Grove Mine (AL0052787) - NPDES Violations

Date	Outfall	Parameter	Permit Limit	Discharge	# of Violations
Aug '08	083	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.08 mg/L	31
Nov '08	083	TSS MONTHLY AVERAGE	35 mg/L	62 mg/L	30
Nov '08	083	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.26 mg/L	30
Dec '08	056	TSS MONTHLY AVERAGE	35 mg/L	56 mg/L	31
Dec '08	081	TSS DAILY MAXIMUM	70 mg/L	72 mg/L	
Dec '08	081	TSS DAILY MAXIMUM	70 mg/L	134 mg/L	
Dec '08	081	TSS MONTHLY AVERAGE	35 mg/L	103 mg/L	31
Dec '08	081	Fe (Iron) DAILY MAXIMUM	6.0 mg/L	6.06 mg/L	
Dec '08	081	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	4.42 mg/L	31
Dec '08	082	TSS MONTHLY AVERAGE	35 mg/L	56 mg/L	31
Dec '08	083	TSS MONTHLY AVERAGE	35 mg/L	48 mg/L	31
Dec '08	084	TSS MONTHLY AVERAGE	35 mg/L	38 mg/L	31
Mar '09	081	TSS MONTHLY AVERAGE	35 mg/L	60 mg/L	31
Apr '09	081	TSS MONTHLY AVERAGE	35 mg/L	44 mg/L	30
Apr '09	081	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.56 mg/L	30
May '09	081	TSS DAILY MAXIMUM	70 mg/L	104 mg/L	
May '09	081	TSS MONTHLY AVERAGE	35 mg/L	104 mg/L	31
May '09	081	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	4.53 mg/L	31
Aug '09	082	pH DAILY MINIMUM	6.0 s.u.	4.4 s.u.	1
Aug '09	083	pH DAILY MINIMUM	6.0 s.u.	5.8 s.u.	1
Aug '09	083	Fe (Iron) DAILY MAXIMUM	6.0 mg/L	8.4 mg/L	
Aug '09	083	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	5.03 mg/L	31
Sep '09	081	TSS DAILY MAXIMUM	70 mg/L	96 mg/L	
Sep '09	081	TSS MONTHLY AVERAGE	35 mg/L	96 mg/L	30
Sep '09	081	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.28 mg/L	30
Sep '09	082	TSS DAILY MAXIMUM	70 mg/L	148 mg/L	
Sep '09	082	TSS MONTHLY AVERAGE	35 mg/L	148 mg/L	30
Sep '09	082	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.63 mg/L	30
Sep '09	083	TSS DAILY MAXIMUM	70 mg/L	148 mg/L	
Sep '09	083	TSS MONTHLY AVERAGE	35 mg/L	84 mg/L	30
Sep '09	083	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	4.08 mg/L	30
Oct '09	081	TSS DAILY MAXIMUM	70 mg/L	126 mg/L	
Oct '09	081	TSS MONTHLY AVERAGE	35 mg/L	126 mg/L	31
Oct '09	081	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.83 mg/L	31
Oct '09	082	TSS DAILY MAXIMUM	70 mg/L	121 mg/L	
Oct '09	082	TSS MONTHLY AVERAGE	35 mg/L	79 mg/L	31

Oct '09	083	TSS DAILY MAXIMUM	70 mg/L	96 mg/L	
Oct '09	083	TSS MONTHLY AVERAGE	35 mg/L	51 mg/L	31
Nov '09	081	TSS DAILY MAXIMUM	70 mg/L	132 mg/L	
Nov '09	081	TSS MONTHLY AVERAGE	35 mg/L	132 mg/L	30
Nov '09	081	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.67 mg/L	30
Nov '09	082	TSS DAILY MAXIMUM	70 mg/L	204 mg/L	
Nov '09	082	TSS MONTHLY AVERAGE	35 mg/L	109 mg/L	30
Nov '09	083	TSS DAILY MAXIMUM	70 mg/L	108 mg/L	
Nov '09	083	TSS MONTHLY AVERAGE	35 mg/L	56 mg/L	30
Nov '09	083	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.45 mg/L	30
Dec '09	081	TSS DAILY MAXIMUM	70 mg/L	86 mg/L	
Dec '09	081	TSS MONTHLY AVERAGE	35 mg/L	46 mg/L	31
Dec '09	082	TSS DAILY MAXIMUM	70 mg/L	84 mg/L	
Dec '09	082	TSS DAILY MAXIMUM	70 mg/L	124 mg/L	
Dec '09	082	TSS MONTHLY AVERAGE	35 mg/L	104 mg/L	31
Dec '09	082	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	4.14 mg/L	31
Dec '09	083	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	5.09 mg/L	31
Jan '10	081	TSS MONTHLY AVERAGE	35 mg/L	152 mg/L	31
Jan '10	081	TSS DAILY MAXIMUM	70 mg/L	152 mg/L	
Jan '10	081	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	5.77 mg/L	31
Jan '10	082	TSS MONTHLY AVERAGE	35 mg/L	66 mg/L	31
Jan '10	082	TSS DAILY MAXIMUM	70 mg/L	104 mg/L	
Jan '10	082	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.17 mg/L	31
Jan '10	083	pH DAILY MINIMUM	6.0 s.u.	5.9 s.u.	1
Jan '10	083	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.89 mg/L	31
Jan '10	084	pH DAILY MINIMUM	6.0 s.u.	5.9 s.u.	1
Feb '10	081	TSS MONTHLY AVERAGE	35 mg/L	55 mg/L	28
Feb '10	081	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	4.08 mg/L	28
Feb '10	082	TSS MONTHLY AVERAGE	35 mg/L	77 mg/L	28
Feb '10	082	TSS DAILY MAXIMUM	70 mg/L	77 mg/L	
Feb '10	082	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	4.12 mg/L	28
Feb '10	083	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	4.54 mg/L	28
Mar '10	081	TSS MONTHLY AVERAGE	35 mg/L	108 mg/L	31
Mar '10	081	TSS DAILY MAXIMUM	70 mg/L	192 mg/L	
Mar '10	081	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	4.98 mg/L	31
Mar '10	081	Fe (Iron) DAILY MAXIMUM	6.0 mg/L	6.09 mg/L	
Mar '10	082	TSS MONTHLY AVERAGE	35 mg/L	96 mg/L	31
Mar '10	082	TSS DAILY MAXIMUM	70 mg/L	140 mg/L	
Mar '10	082	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	4.39 mg/L	31
Mar '10	083	TSS MONTHLY AVERAGE	35 mg/L	44 mg/L	31
Mar '10	083	TSS DAILY MAXIMUM	70 mg/L	84 mg/L	

Mar '10	083	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.81 mg/L	31
Mar '10	084	TSS MONTHLY AVERAGE	35 mg/L	38 mg/L	31
Apr '10	056	TSS MONTHLY AVERAGE	35 mg/L	37 mg/L	30
Apr '10	081	TSS MONTHLY AVERAGE	35 mg/L	66 mg/L	30
Apr '10	081	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	4.05 mg/L	30
Apr '10	082	TSS MONTHLY AVERAGE	35 mg/L	45 mg/L	30
Apr '10	082	TSS DAILY MAXIMUM	70 mg/L	80 mg/L	
May '10	056	TSS MONTHLY AVERAGE	35 mg/L	40 mg/L	31
May '10	081	TSS MONTHLY AVERAGE	35 mg/L	40 mg/L	31
May '10	081	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.07 mg/L	31
May '10	082	TSS MONTHLY AVERAGE	35 mg/L	40 mg/L	31
Jun '10	056	TSS MONTHLY AVERAGE	35 mg/L	42.5 mg/L	30
Jan '11	056	TSS MONTHLY AVERAGE	35 mg/L	60 mg/L	31
Jan '11	056	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	4.69 mg/L	31
Jan '11	081	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	8.13 mg/L	31
Jan '11	081	Fe (Iron) DAILY MAXIMUM	6.0 mg/L	8.13 mg/L	
Jan '11	083	TSS MONTHLY AVERAGE	35 mg/L	82 mg/L	31
Jan '11	083	TSS DAILY MAXIMUM	70 mg/L	82 mg/L	
Jan '11	083	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	4.0 mg/L	31
Jan '11	084	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.31 mg/L	31
Feb '11	081	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	5.73 mg/L	28
Feb '11	084	TSS MONTHLY AVERAGE	35 mg/L	40 mg/L	28
Feb '11	084	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.41 mg/L	28
Mar '11	081	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.03 mg/L	31
Mar '11	082	TSS MONTHLY AVERAGE	35 mg/L	38 mg/L	31
Mar '11	082	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.69 mg/L	31
Mar '11	084	TSS MONTHLY AVERAGE	35 mg/L	43 mg/L	31
Mar '11	084	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.33 mg/L	31
				Total Violations	2254

Hickory Grove North Mine (AL0074934) - NPDES Violations					
Date	Outfall	Parameter	Permit Limit	Discharge	# of Violations
Nov '08	033	TSS MONTHLY AVERAGE	35 mg/L	43 mg/L	30
Nov '08	033	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	4.53 mg/L	30
Dec '08	006	TSS MONTHLY AVERAGE	35 mg/L	46 mg/L	31
Dec '08	007	TSS MONTHLY AVERAGE	35 mg/L	41 mg/L	31
Dec '08	009	TSS DAILY MAXIMUM	70 mg/L	103 mg/L	
Dec '08	009	TSS MONTHLY AVERAGE	35 mg/L	78 mg/L	31
Dec '08	009	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.17 mg/L	31
Dec '08	029	TSS MONTHLY AVERAGE	35 mg/L	49 mg/L	31
Dec '08	031	TSS DAILY MAXIMUM	70 mg/L	102 mg/L	
Dec '08	031	TSS DAILY MAXIMUM	70 mg/L	176 mg/L	
Dec '08	031	TSS MONTHLY AVERAGE	35 mg/L	139 mg/L	31
Dec '08	031	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	5.59 mg/L	31
Dec '08	032	TSS MONTHLY AVERAGE	35 mg/L	55 mg/L	31
Dec '08	033	TSS DAILY MAXIMUM	70 mg/L	186 mg/L	
Dec '08	033	TSS MONTHLY AVERAGE	35 mg/L	109 mg/L	31
Dec '08	033	Fe (Iron) DAILY MAXIMUM	6.0 mg/L	6.74 mg/L	
Dec '08	033	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	5.85 mg/L	31
Dec '08	036	TSS MONTHLY AVERAGE	35 mg/L	69 mg/L	31
Dec '08	036	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	4.84 mg/L	31
Jan '09	007	TSS MONTHLY AVERAGE	35 mg/L	46 mg/L	31
Jan '09	009	TSS DAILY MAXIMUM	70 mg/L	81 mg/L	
Jan '09	009	TSS MONTHLY AVERAGE	35 mg/L	65 mg/L	31
Jan '09	031	TSS DAILY MAXIMUM	70 mg/L	78 mg/L	
Jan '09	031	TSS MONTHLY AVERAGE	35 mg/L	78 mg/L	31
Jan '09	031	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.67 mg/L	31
Jan '09	032	TSS MONTHLY AVERAGE	35 mg/L	64 mg/L	31
Jan '09	032	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.89 mg/L	31
Jan '09	033	TSS DAILY MAXIMUM	70 mg/L	76 mg/L	
Jan '09	033	TSS MONTHLY AVERAGE	35 mg/L	72 mg/L	31
Jan '09	033	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.88 mg/L	31
Jan '09	036	TSS MONTHLY AVERAGE	35 mg/L	59 mg/L	31
Feb '09	006	TSS MONTHLY AVERAGE	35 mg/L	36 mg/L	28
Feb '09	009	TSS MONTHLY AVERAGE	35 mg/L	44 mg/L	28
Feb '09	033	TSS DAILY MAXIMUM	70 mg/L	80 mg/L	
Feb '09	033	TSS MONTHLY AVERAGE	35 mg/L	64 mg/L	28
Feb '09	036	TSS MONTHLY AVERAGE	35 mg/L	46 mg/L	28

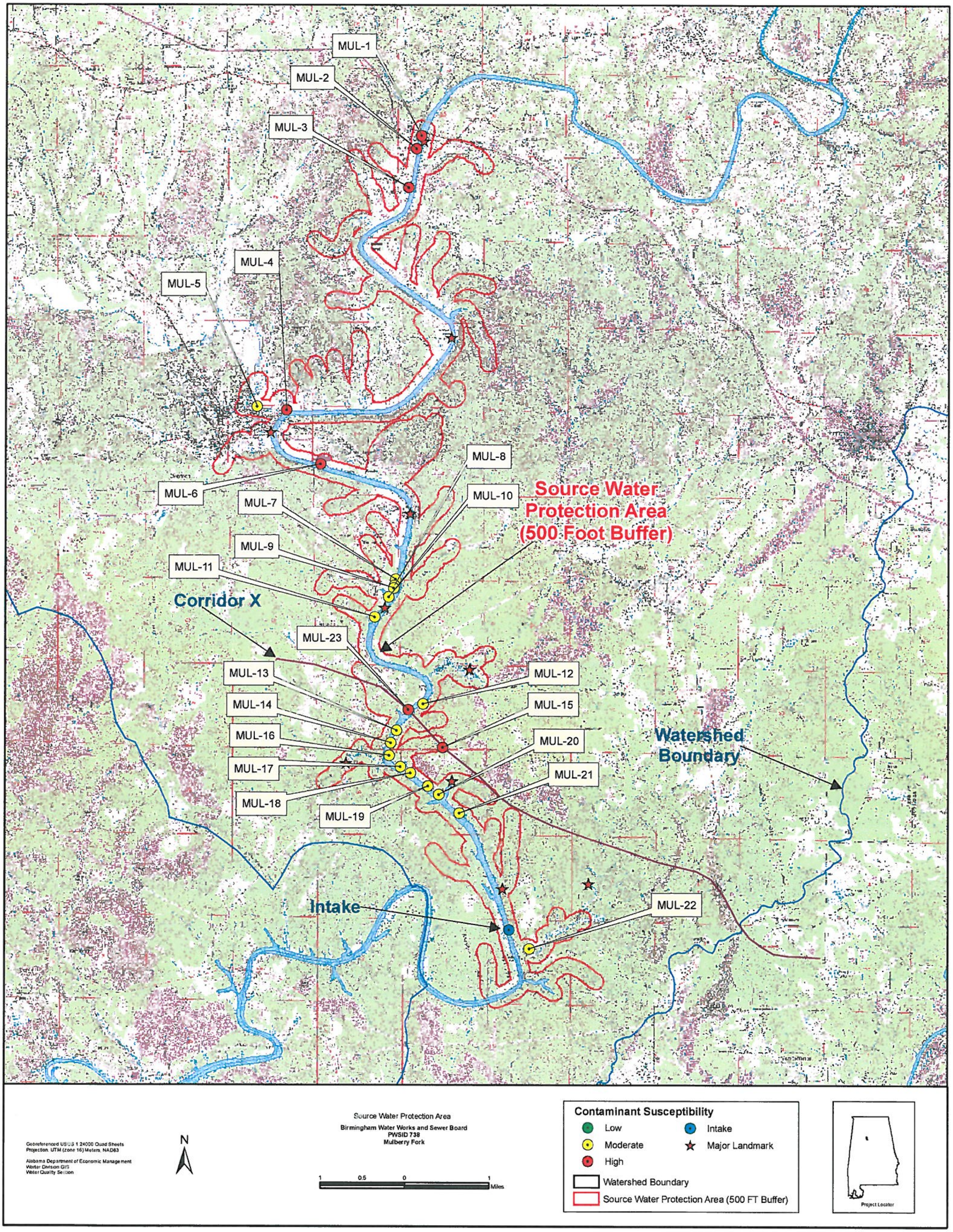
Mar '09	008	TSS MONTHLY AVERAGE	35 mg/L	42 mg/L	31
Mar '09	009	TSS MONTHLY AVERAGE	35 mg/L	36 mg/L	31
Mar '09	031	TSS MONTHLY AVERAGE	35 mg/L	51 mg/L	31
Mar '09	033	TSS MONTHLY AVERAGE	35 mg/L	49 mg/L	31
Mar '09	036	TSS MONTHLY AVERAGE	35 mg/L	57 mg/L	31
Apr '09	006	TSS DAILY MAXIMUM	70 mg/L	80 mg/L	
Apr '09	006	TSS MONTHLY AVERAGE	35 mg/L	64 mg/L	30
Apr '09	006	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.31 mg/L	30
Apr '09	008	TSS DAILY MAXIMUM	70 mg/L	112 mg/L	
Apr '09	008	TSS MONTHLY AVERAGE	35 mg/L	112 mg/L	30
Apr '09	008	Fe (Iron) DAILY MAXIMUM	6.0 mg/L	10.33 mg/L	
Apr '09	008	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	10.33 mg/L	30
Apr '09	009	TSS MONTHLY AVERAGE	35 mg/L	64 mg/L	30
Apr '09	009	Fe (Iron) DAILY MAXIMUM	6.0 mg/L	7.44 mg/L	
Apr '09	009	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	7.44 mg/L	30
Apr '09	029	TSS MONTHLY AVERAGE	35 mg/L	48 mg/L	30
Apr '09	031	TSS MONTHLY AVERAGE	35 mg/L	68 mg/L	30
Apr '09	031	Fe (Iron) DAILY MAXIMUM	6.0 mg/L	6.86 mg/L	
Apr '09	031	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	6.86 mg/L	30
Apr '09	033	TSS DAILY MAXIMUM	70 mg/L	80 mg/L	
Apr '09	033	TSS DAILY MAXIMUM	70 mg/L	102 mg/L	
Apr '09	033	TSS MONTHLY AVERAGE	35 mg/L	91 mg/L	30
Apr '09	033	Fe (Iron) DAILY MAXIMUM	6.0 mg/L	6.68 mg/L	
Apr '09	033	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	5.94 mg/L	30
Apr '09	036	TSS MONTHLY AVERAGE	35 mg/L	56 mg/L	30
Apr '09	036	Fe (Iron) DAILY MAXIMUM	6.0 mg/L	7.56 mg/L	
Apr '09	036	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	7.56 mg/L	30
May '09	006	TSS MONTHLY AVERAGE	35 mg/L	60 mg/L	31
May '09	008	TSS DAILY MAXIMUM	70 mg/L	120 mg/L	
May '09	008	TSS MONTHLY AVERAGE	35 mg/L	120 mg/L	31
May '09	008	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	4.16 mg/L	31
May '09	009	TSS DAILY MAXIMUM	70 mg/L	144 mg/L	
May '09	009	TSS DAILY MAXIMUM	70 mg/L	116 mg/L	
May '09	009	TSS MONTHLY AVERAGE	35 mg/L	130 mg/L	31
May '09	009	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	4.44 mg/L	31
May '09	029	TSS MONTHLY AVERAGE	35 mg/L	40 mg/L	31
May '09	031	TSS MONTHLY AVERAGE	35 mg/L	50 mg/L	31
May '09	031	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	5.47 mg/L	31
May '09	033	TSS DAILY MAXIMUM	70 mg/L	136 mg/L	
May '09	033	TSS DAILY MAXIMUM	70 mg/L	76 mg/L	
May '09	033	TSS MONTHLY AVERAGE	35 mg/L	106 mg/L	31

May '09	033	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	4.75 mg/L	31
May '09	036	TSS DAILY MAXIMUM	70 mg/L	220 mg/L	
May '09	036	TSS DAILY MAXIMUM	70 mg/L	76 mg/L	
May '09	036	TSS MONTHLY AVERAGE	35 mg/L	148 mg/L	31
May '09	036	Fe (Iron) DAILY MAXIMUM	6.0 mg/L	6.06 mg/L	
May '09	036	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	4.72 mg/L	31
Aug '09	006	TSS MONTHLY AVERAGE	35 mg/L	58 mg/L	31
Aug '09	006	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.27 mg/L	31
Aug '09	009	TSS MONTHLY AVERAGE	35 mg/L	36 mg/L	31
Aug '09	036	TSS MONTHLY AVERAGE	35 mg/L	58 mg/L	31
Sep '09	006	TSS DAILY MAXIMUM	70 mg/L	92 mg/L	
Sep '09	006	TSS MONTHLY AVERAGE	35 mg/L	92 mg/L	30
Sep '09	006	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.81 mg/L	30
Sep '09	008	TSS MONTHLY AVERAGE	35 mg/L	60 mg/L	30
Sep '09	031	TSS MONTHLY AVERAGE	35 mg/L	50 mg/L	30
Sep '09	033	TSS DAILY MAXIMUM	70 mg/L	98 mg/L	
Sep '09	033	TSS MONTHLY AVERAGE	35 mg/L	51 mg/L	30
Oct '09	006	TSS DAILY MAXIMUM	70 mg/L	100 mg/L	
Oct '09	006	TSS MONTHLY AVERAGE	35 mg/L	79 mg/L	31
Oct '09	007	TSS DAILY MAXIMUM	70 mg/L	92 mg/L	
Oct '09	007	TSS MONTHLY AVERAGE	35 mg/L	81 mg/L	31
Oct '09	008	TSS DAILY MAXIMUM	70 mg/L	117 mg/L	
Oct '09	008	TSS MONTHLY AVERAGE	35 mg/L	117 mg/L	31
Oct '09	009	TSS DAILY MAXIMUM	70 mg/L	76 mg/L	
Oct '09	009	TSS MONTHLY AVERAGE	35 mg/L	61 mg/L	31
Oct '09	031	TSS DAILY MAXIMUM	70 mg/L	119 mg/L	
Oct '09	031	TSS MONTHLY AVERAGE	35 mg/L	76 mg/L	31
Oct '09	033	TSS DAILY MAXIMUM	70 mg/L	248 mg/L	
Oct '09	033	TSS DAILY MAXIMUM	70 mg/L	72 mg/L	
Oct '09	033	TSS MONTHLY AVERAGE	35 mg/L	160 mg/L	31
Oct '09	033	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.36 mg/L	31
Oct '09	036	TSS DAILY MAXIMUM	70 mg/L	168 mg/L	
Oct '09	036	TSS MONTHLY AVERAGE	35 mg/L	100 mg/L	31
Nov '09	006	TSS DAILY MAXIMUM	70 mg/L	72 mg/L	
Nov '09	006	TSS MONTHLY AVERAGE	35 mg/L	44 mg/L	30
Nov '09	008	TSS DAILY MAXIMUM	70 mg/L	104 mg/L	
Nov '09	008	TSS MONTHLY AVERAGE	35 mg/L	104 mg/L	30
Nov '09	008	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.67 mg/L	30
Nov '09	009	TSS MONTHLY AVERAGE	35 mg/L	60 mg/L	30
Nov '09	036	TSS MONTHLY AVERAGE	35 mg/L	42 mg/L	30
Dec '09	033	TSS DAILY MAXIMUM	70 mg/L	84 mg/L	

Dec '09	033	TSS MONTHLY AVERAGE	35 mg/L	55 mg/L	31
Dec '09	033	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.15 mg/L	31
Dec '09	036	TSS MONTHLY AVERAGE	35 mg/L	43 mg/L	31
Jan '10	008	TSS MONTHLY AVERAGE	35 mg/L	42 mg/L	31
Jan '10	009	TSS MONTHLY AVERAGE	35 mg/L	80 mg/L	31
Jan '10	009	TSS DAILY MAXIMUM	70 mg/L	80 mg/L	
Jan '10	009	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.61 mg/L	31
Jan '10	029	TSS MONTHLY AVERAGE	35 mg/L	44 mg/L	31
Jan '10	031	TSS MONTHLY AVERAGE	35 mg/L	42 mg/L	31
Jan '10	033	TSS MONTHLY AVERAGE	35 mg/L	85 mg/L	31
Jan '10	033	TSS DAILY MAXIMUM	70 mg/L	136 mg/L	
Jan '10	033	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	4.93 mg/L	31
Jan '10	036	TSS MONTHLY AVERAGE	35 mg/L	148 mg/L	31
Jan '10	036	TSS DAILY MAXIMUM	70 mg/L	148 mg/L	
Jan '10	036	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	5.47 mg/L	31
Feb '10	009	TSS MONTHLY AVERAGE	35 mg/L	48 mg/L	28
Feb '10	009	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.10 mg/L	28
Feb '10	033	TSS MONTHLY AVERAGE	35 mg/L	50 mg/L	28
Feb '10	033	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.28 mg/L	28
Feb '10	036	TSS MONTHLY AVERAGE	35 mg/L	66 mg/L	28
Feb '10	036	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	4.32 mg/L	28
Mar '10	008	TSS MONTHLY AVERAGE	35 mg/L	40 mg/L	31
Mar '10	009	TSS MONTHLY AVERAGE	35 mg/L	46 mg/L	31
Mar '10	009	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.04 mg/L	31
Mar '10	029	TSS MONTHLY AVERAGE	35 mg/L	49 mg/L	31
Mar '10	031	TSS MONTHLY AVERAGE	35 mg/L	67 mg/L	31
Mar '10	031	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.40 mg/L	31
Mar '10	033	TSS MONTHLY AVERAGE	35 mg/L	62 mg/L	31
Mar '10	033	TSS DAILY MAXIMUM	70 mg/L	92 mg/L	
Mar '10	033	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.79 mg/L	31
Mar '10	036	TSS MONTHLY AVERAGE	35 mg/L	67 mg/L	31
Mar '10	036	TSS DAILY MAXIMUM	70 mg/L	94 mg/L	
Mar '10	036	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	4.61 mg/L	31
Apr '10	007	TSS MONTHLY AVERAGE	35 mg/L	39 mg/L	30
Apr '10	009	TSS MONTHLY AVERAGE	35 mg/L	112 mg/L	30
Apr '10	009	TSS DAILY MAXIMUM	70 mg/L	112 mg/L	
Apr '10	009	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	6.26 mg/L	30
Apr '10	009	Fe (Iron) DAILY MAXIMUM	6.0 mg/L	6.26 mg/L	
Apr '10	029	TSS MONTHLY AVERAGE	35 mg/L	40 mg/L	30
Apr '10	030	TSS MONTHLY AVERAGE	35 mg/L	40 mg/L	30
Apr '10	031	TSS MONTHLY AVERAGE	35 mg/L	120 mg/L	30

Apr '10	031	TSS DAILY MAXIMUM	70 mg/L	120 mg/L	30
Apr '10	031	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	5.65 mg/L	30
Apr '10	032	TSS MONTHLY AVERAGE	35 mg/L	44 mg/L	30
Apr '10	033	TSS MONTHLY AVERAGE	35 mg/L	92 mg/L	30
Apr '10	033	TSS DAILY MAXIMUM	70 mg/L	172 mg/L	
Apr '10	033	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	4.25 mg/L	30
Apr '10	033	Fe (Iron) DAILY MAXIMUM	6.0 mg/L	6.27 mg/L	
Apr '10	036	TSS MONTHLY AVERAGE	35 mg/L	188 mg/L	30
Apr '10	036	TSS DAILY MAXIMUM	70 mg/L	188 mg/L	
Apr '10	036	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	7.26 mg/L	30
Apr '10	036	Fe (Iron) DAILY MAXIMUM	6.0 mg/L	7.26 mg/L	
May '10	007	TSS MONTHLY AVERAGE	35 mg/L	37 mg/L	31
May '10	009	TSS MONTHLY AVERAGE	35 mg/L	63 mg/L	31
May '10	009	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	5.74 mg/L	31
May '10	031	TSS MONTHLY AVERAGE	35 mg/L	47 mg/L	31
May '10	031	TSS DAILY MAXIMUM	70 mg/L	76 mg/L	
May '10	031	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	4.96 mg/L	31
May '10	033	TSS MONTHLY AVERAGE	35 mg/L	47 mg/L	31
May '10	033	TSS DAILY MAXIMUM	70 mg/L	80 mg/L	
May '10	033	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	4.62 mg/L	31
May '10	036	TSS MONTHLY AVERAGE	35 mg/L	45 mg/L	31
May '10	036	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	4.17 mg/L	31
Jun '10	006	TSS MONTHLY AVERAGE	35 mg/L	40 mg/L	30
Jun '10	029	TSS MONTHLY AVERAGE	35 mg/L	38 mg/L	30
Jun '10	029	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	3.03 mg/L	30
Jun '10	031	TSS MONTHLY AVERAGE	35 mg/L	64 mg/L	30
Jun '10	031	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	5.95 mg/L	30
Jun '10	033	TSS MONTHLY AVERAGE	35 mg/L	46 mg/L	30
Jun '10	036	TSS MONTHLY AVERAGE	35 mg/L	68 mg/L	30
Jun '10	036	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	5.24 mg/L	30
Dec '10	007	TSS MONTHLY AVERAGE	35 mg/L	88 mg/L	31
Dec '10	007	TSS DAILY MAXIMUM	70 mg/L	88 mg/L	
Dec '10	007	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	4.25 mg/L	31
Jan '11	009	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	8.68 mg/L	31
Jan '11	009	Fe (Iron) DAILY MAXIMUM	6.0 mg/L	8.68 mg/L	
Jan '11	036	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	5.06 mg/L	31
Feb '11	036	TSS MONTHLY AVERAGE	35 mg/L	42 mg/L	28
Feb '11	036	Fe (Iron) MONTHLY AVERAGE	3.0 mg/L	4.85 mg/L	28
				Total Violations	4351

APPENDIX E



MUL-1
MUL-2
MUL-3
MUL-4
MUL-5
MUL-6
MUL-7
MUL-8
MUL-9
MUL-10
MUL-11
MUL-12
MUL-13
MUL-14
MUL-15
MUL-16
MUL-17
MUL-18
MUL-19
MUL-20
MUL-21
MUL-22
MUL-23
Source Water Protection Area (500 Foot Buffer)
Corridor X
Watershed Boundary
Intake
Georeferenced USGS 1 24000 Quad Sheets
Projection. UTM (zone 16) Meters, NAD83
Alabama Department of Economic Management
Warter Division GIS
Water Quality Section
N
Source Water Protection Area
Birmingham Water Works and Sewer Board
PWSID 738
Mulberry Fork
1 0.5 0 1 Miles
Contaminant Susceptibility
Low
Moderate
High
Intake
Major Landmark
Watershed Boundary
Source Water Protection Area (500 FT Buffer)
Project Locator