To: Kevin Coyne at Kevin.R.Coyne@wv.gov

From: Appalachian Mountain Advocates

Date: October 8, 2012

Re: Public Comment on Water Quality Standards for 2014 Triennial Review.

Mr. Coyne:

In response to the West Virginia Department of Environmental Protection's ("WVDEP") solicitation for public input on potential revisions to West Virginia's water quality standards, which will be under review as part of the 2014 Triennial Review process, Appalachian Mountain Advocates ("AMA") submits the following comments.

AMA proposes revising West Virginia's water quality standards, found in Legislative Rule 47CSR2, to include an additional standard for conductivity. A chronic aquatic standard of 300 µS/cm is suggested based on the scientific analysis and data described below and attached hereto.

I. Elevated conductivity downstream of coal mining operations cause biological stream impairment.

On July 21, 2011, the United States Environmental Protection Agency ("EPA") sent out a memorandum outlining significant water quality impacts from surface mining operations. It stated that "[a] 2008 study by Pond et al. found evidence that mining activities have subtle to severe impacts on downstream aquatic life and the biological conditions of a stream, and concluded that nine out of every 10 streams downstream from surface coal mining operations were impaired based on a genus-level assessment of aquatic life.[52] In that study and additional work published in 2010, specific conductance was the factor most strongly correlated with a reduction of *Ephemeroptera* in streams impacted by mining and residential development.[53]" Ex. A, p. iii.

II. A chronic aquatic life standard for conductivity should be set at 300 µS/cm, based on the relevant scientific information.

A chronic standard should be set for conductivity to limit the harm to aquatic life in streams from coal mining areas in West Virginia. Specifically, "[t]he chronic aquatic life benchmark value for conductivity derived from all-year data from West Virginia is 300 µS/cm. It is applicable to parts of West Virginia and Kentucky within ecoregions 68, 69, and 70 (Omernick 1987). It is expected to be applicable to the same ecoregions extending into Ohio, Pennsylvania, Tennessee, Virginia, Alabama, and Maryland, but data from those states have not been analyzed. This is because the salt matrix and background is expected to be similar throughout the ecoregions. The benchmark may also be appropriate for other nearby ecoregions, such as Ecoregion 67, but it has only been validated for use in Ecoregions 68, 69, and 70 at this time. This benchmark level might not apply when the relative concentrations of dissolved ions are not dominated by salts of Ca^{2+}, Mg^{2+}, SO_4

$^{2-}$ and HCO_3^- or the natural background exceeds the benchmark. However, the salt mixture dominated by salts of SO_4^{-2} and HCO_3^- is believed to be an insurmountable physiological challenge for some species." Ex. B, p. xv.

Further, EPA's Science Advisory Board ("SAB") "concludes that 5% of native macroinvertebrate genera are extirpated where the conductivity level reaches 300 µS/cm, which is consistent with the endpoint typically selected by EPA when deriving numeric aquatic life criteria under section 304(a). Pond et al. (2008) demonstrates that substantial aquatic life effects have already occurred when conductivity levels reach 500 µS/cm, which suggests impairment of the aquatic life use as measured using genus- and family-level macroinvertebrate bioassessment indices." Ex. A, p. 16.

In addition, the SAB found that the relationship between conductivity and species extirpation was "relatively robust," validation using Kentucky data was "important," the use of extirpation as an end point was "extreme" and a more sensitive depletion concentration end point may be more appropriate, and EPA provided a "convincing case" for causality between conductivity and species loss. Ex. C.

A number of leading experts in stream ecology, biogeochemistry, and ecological risk assessment testified in federal court as to the significant degradation of streams below large scale surface mining. Emily Bernhardt of Duke University summarized the state of the science as early as 2005.

> The state of the science by the 2005 EIS was that "basinwide coal production was connected to increases in sulfate, conductivity, that mined streams had higher conductivity, and that conductivity was a specific measure of alkaline mine drainage and that that was associated–both mining and that alkaline mine drainage was associated with a decline in sensitive aquatic insects, invertebrates."

Ex. D at 142-43. Further, "[n]o peer-reviewed papers contradict these studies." Id. at 153. In fact, studies after 2005 overwhelmingly support and refine earlier research. Johnson in 2010 found that "the more mining you get, the more conductivity you're going to see in the major river" and the further downstream the impacts go. Id. at 153-56. There is no doubt that conductivity and associated ions are causing impairment. "The weight of evidence is very strong that conductivity and all of its associated ions and its likelihood of being affiliated with trace metals is very strongly associated with the loss of sensitive aquatic taxa and to an inability to pass the narrative criteria." Id. at 168. Further, "[y]ou continue to lose taxa as conductivity increases above 300, and even above 1000, when you lose fairly tolerant organisms." Id. at 204. "Between 500 and 1200, there are twelve taxa that you are likely to lose with increasing conductivity." Id. at 205. Further, "[c]onductivity is very weakly correlated with habitat." Id. at 235. Experts and the Corps agree that once monitoring detects elevated conductivity, it will be too late to stop it. Id. at 175-76 and 621.

III. Conclusion

For the above reasons related to the current, relevant scientific conclusions pertaining to conductivity in West Virginia, AMA encourages the promulgation of an additional water quality

standard for conductivity. A chronic aquatic standard of 300 µS/cm should be created to promote and maintain the health of West Virginia's aquatic wildlife.

Sincerely,

__/s/Amy G. Dawson____

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