United States Department of the Interior

FISH AND WILDLIFE SERVICE

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TAILS: O3E15000-2014-CPA-0101

Re: American Energy Corporation, Bennoc Area NPDES OIL00159, Belmont County, Ohio

Ms. Hyde:

This letter provides U.S. Fish and Wildlife Service (Service) comments on a proposed NPDES permit for discharges to unnamed tributaries to Piney Creek from the American Energy Corporation's (AEC) Century Mine coal waste disposal facility. The facility is located at 43521 Mayhugh Hill Road, Beallsville, Ohio. It is our understanding that the discharges proposed to be covered by the permit would be runoff from a coarse refuse disposal area that is currently a reclaimed surface coal mine. The outfalls are located at the outlets of ponds situated to collect runoff from the reclaimed area and the future coarse refuse disposal area. The proposed permit only includes numeric water quality standards for pH, total suspended solids, iron and manganese. The Ohio Environmental Protection Agency (OEPA) contends that the required biological and chemical monitoring is sufficient to demonstrate compliance with WQS for other contaminants associated with coal mining.

Piney Creek flows into Captina Creek, designated Exceptional Warmwater Habitat (OAC 3754-1-13) and an Outstanding State Water based on exceptional ecological values (OAC 3745-1-05). The average Index of Biotic Integrity score in Captina Creek is comparable to the best streams in Ohio (OEPA, 2010). Captina Creek also supports native freshwater mussels, and suitable mussel habitat is present throughout much of the stream. Museum records, however, suggest that only tolerant species may be present. In addition, Captina Creek supports the best remaining population of the eastern hellbender (*Cryptobranchus alleganiensis alleganiensis*) in Ohio. The eastern hellbender is a State endangered species that has declined by approximately 80% in Ohio since the 1980's and is being evaluated for Federal Candidate status. Captina Creek is a major source of fertilized hellbender eggs for use in Ohio's hellbender head-starting and augmentation project.

Studies of benthic communities impacted by surface coal mining activities have shown that as conductivity increases, the impairment to the aquatic community also increases. Pond et al. (2008) found that, as conductivity of mine-impacted streams increased, the benthic macroinvertebrate community lost richness, relative abundance, and showed shifts in species from sensitive to tolerant. Wang et al. (2013) conducted toxicity testing using sediments from Tennessee and Virginia streams impacted by coal and gas extraction. They found that survival of test species was impacted compared to reference sites (rainbow mussel (*Villosa iris*) 63%, wavy-rayed mussel (*Lampsilis fasciola*) 50%, amphipod (*Hyalella azteca*) 38%, midge (*Chironomus dilutes*) 38%). Growth of the juvenile rainbow mussel was also significantly impaired with increased conductivity and increased concentrations of sulfate, chloride, calcium, and magnesium ions (Wange et al. 2013). In addition, the sensitivity of larval mussels to high conductivity has been documented (Cope et al. 2008).

In addition to total conductivity, the composition of major ions present varies by site and geographic location and affects the overall level of impairment. Kunz et al. (2013) sampled water from three sites impacted by surface coal mining activities, and reconstituted water in the laboratory with only the major ions present. Toxicity tests using the reconstituted water showed that toxicity to test organisms (a unionid mussel (*Lampsilis siliquoidea*), an amphipod (*Hyalella azteca*) and a cladoceran (*Ceriodaphnia dubia*)) varied with ion composition, even though total conductivity among the treatments was similar.

High conductivity in Piney Creek and Perkins Run (another coal mine wastewater-receiving tributary of Captina Creek) has been documented. Conductivity of Piney Creek averages 2442 µS/cm, and Perkins Run averages 4650 and 6063 µS/cm, well above the US EPA proposed benchmark of 300 µS/cm for protection of aquatic life developed for the central Appalachians and Allegany Plateau waters. OEPA (2010) documented that, during low flow conditions, conductivity in Captina Creek exceeded reference conditions downstream of these mine discharges, and remained elevated downstream to the confluence of the Ohio River, a distance of approximately 20 miles.

Impacts to biota from mine discharges in Piney Creek have been documented. In a 2009 biological and water quality study of the Captina Creek watershed, OEPA (2010) reports "The macroinvertebrates [in Piney Creek] are adversely impacted by the high concentration of TDS, conductivity and metals from the AEC mine discharge at river mile 2.8. Mayflies are very sensitive to TD and are almost completely absent from Piney Creek donstream from the mine discharge. It is recommended that AEC provide better treatment of their discharge to remove the high TDS or to avoid discharging during low flow conditions when the TDS concentrations are exacerbated by lack of dilution. If this occurs, Piney Creek could potentially meet Exceptional Warmwater Habitat."

In addition, while suitable habitat for freshwater mussels exists throughout large portions of Captina Creek, museum records suggest a limited mussel assemblage composed of mainly tolerant species. Given the effects of mine-affected water on mussels, as demonstrated by Cope et al. (2008), Kunz et al. (2013), and Wang et al. (2013), the existing mine wastewater discharges to Captina Creek tributaries may be precluding the re-establishment of a diverse mussel assemblage in Captina Creek.

The impact of high conductivity and high ionic concentrations of Ca^{+2}, Mg^{+2}, K^{+}, HCO_3, and SO_4 on amphibians and specifically the hellbender salamander has not been characterized, however, direct toxicity from exposure to high concentrations of ions through intake through the gills may lead to osmoregulatory stress. With osmoregulatory stress, uptake and metabolism of nutrients may also be impaired, causing a decrease in reproductive fitness. Lipps (2013) notes that low flow conditions (under which OEPA found elevated conductivity in Captina Creek) typically correspond with the hellbender breeding season and that a reduction in TDS in hellbender enclosures at the St. Louis Zoo correlated with the first successful captive reproduction of the species. He cites Schoenfuss et al. (2009) in stating that increased osmolality of water has been correlated to decreases in fish sperm motility. Despite significant search effort over the last decade, no hellbender eggs have been found in Captina Creek downstream of Piney Creek and Perkins Run. Wastewater discharges into Piney Creek and Perkins Run may be inhibiting hellbender fitness and reproduction in Captina Creek downstream of these two tributaries

The proposed NPDES permit does not include numeric limits for contaminants that are currently impacting the macroinvertebrate community in Piney Creek, may be impeding the colonization of freshwater mussels in Captina Creek, and may be inhibiting eastern hellbender fitness and reproduction in Captina Creek. OEPA (2010) states "To protect the biological integrity of Captina Creek, which includes state endangered eastern hellbender populations, it is recommended that OVCC and AEC provide better treatment of waste mine water to reduce the conductivity, metals, and TDS concentrations and minimize or eliminate discharges during low flow conditions." We concur, and recommend that this NPDES permit include appropriate

numeric criteria to protect aquatic life in Piney Creek and Captina Creek. Thank you for the opportunity to provide comments on the proposed permit. We would be happy to discuss this issue further and can be reached by contacting Jeromy Applegate or Deborah Millsap in this office.

Sincerely,

Mary Knapp

Mary Knapp, Ph.D.
Field Supervisor

References:

Cope WG, Bringolf RB, Buchwalter DB, Newton TJ, Ingersoll CG Wang N, Augspurger T, Dwyer FJ, Barnhart MC, Neves RJ, and Hammer E. 2008. Differential exposure, duration, and sensitivity of unionoidean bivalve life stages to environmental contaminants. Journal of the North American Benthological Society 27:451-462.

Kunz JL, Conley JM, Buchwalter DB, Norberg-King TJ, Kemble NE, Wang N, Ingersoll CG. 2013. Use of reconstituted waters to evaluate effects of elevated major ions associated with mountaintop coal mining on freshwater invertebrates. Environmental Toxicology and Chemistry 32:1-7.

Lipps GJ Jr. 2013. Eastern Hellbender (*Cryptobranchus alleganiensis alleganiensis*) Pages 187-208. In: Pfingsten RA, Davis JG, Matson TO, Lipps G Jr., Wynn D, and Armitage BJ (Editors). Amphibians of Ohio. Ohio Biological Survey Bulletin New Series, Volume 17 (1). Columbus.

OEPA (Ohio Environmental Protection Agency). 2010. Biological and water quality study of the Captina Creek watershed. Division of Surface Water, Columbus, OH, 42 pp. + appendices.

Pond GJ, Passmore ME, Borsuk FA, Reynolds L, Roses CJ. 2008. Downstream effects of mountaintop coal mining: comparing biological conditions using family-and genus-level macroinvertebrate bioassessment tools. Journal of the North American Benthological Society 27:717–737.

Schoenfuss H, Levitt J, Rai R, Julius M, Martinovic D. 2009. Treated wastewater effluent reduces sperm motility along an osmolality gradient. Archives of Environmental Contamination and Toxicology 56:397-407.

Wang N, Ingersoll CG, Kunz JL, Brumbaugh WG, Kane CM, Evans RB, Alexander S, Walker C, and Bakaletz S. 2013. Toxicity of sediments potentially contaminated by coal mining and natural gas extraction to unionid mussels and commonly tested benthic invertebrates. Environmental Toxicity and Chemistry 32:207-221.

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