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FOR IMMEDIATE RELEASE

Additional tests find high levels of toxic chemicals in Kingston, TN fly ash deposits and Emory River fish

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More detailed testing conducted on samples taken from the TVA coal ash spill near Kingston, TN have confirmed high levels of toxic elements present in water, sediment and fish tissue.

Scientists working in coordination with Appalachian Voices and the Waterkeeper Alliance's Upper Watauga Riverkeeper Program collected samples from the Emory, Clinch and Tennessee rivers at the Kingston Fossil Plant coal ash spill.

Preliminary analyses of ash, water, sediments, and fish tissues collected near the spill site 18 days following the dike failure revealed the following:

- 1) the total recoverable toxic elements arsenic, barium, cadmium, lead, and selenium in water exceeded protective drinking water and/or aquatic life criteria levels;
- 2) ash and ash-laden river sediments had arsenic levels that exceeded the EPA removal limits; selenium levels increased dramatically downstream of the spill;
- 3) selenium levels in fish were at and beyond the thresholds of toxicity for reproduction and growth;
- 4) fish suffered internal and external impacts from the spill, with abnormal changes to gills in particular;
- 5) detailed analysis of floating ash particles (cenospheres) found that approximately 10% of these particles contain an iron oxide coating that may be transporting arsenic into water.

The tests were conducted at Appalachian State University in Boone, NC, by Dr. Shea Tuberty, Associate Professor of Biology; Dr. Carol Babyak, Assistant Professor of Chemistry; Dr. Sarah Carmichael, Assistant Professor of Geology; and Dr. Susan L. Edwards, Assistant Professor of Biology.

Tuberty and Babyak conducted tests for 17 different toxic elements in triplicate using standard EPA methods. The samples were collected from seven locations upstream and downstream of the spill on January 8 and 9 by researchers from the Tennessee Aquarium Conservation Institute, Appalachian State University and the Watauga Riverkeeper Program of Appalachian Voices.

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Total recoverable metals water testing results from Emory River mile 2.2, where ash clogs the river, revealed arsenic levels were 260 times the allowable amounts in drinking water. Lead measured 16 times higher than the drinking water standard while barium and cadmium were three times higher. Selenium measured 1.9 times higher than the Tennessee acute aquatic life criteria and 7.6 times higher than the Tennessee chronic aquatic life criteria. Water samples taken from six other locations on the Emory, Clinch and Tennessee Rivers did not exceed water quality criteria for any of the seventeen tested elements.

River sediments were also tested for 17 toxic elements with arsenic and selenium found at elevated levels. Arsenic levels at Emory mile 2.2 were 2.86 times the EPA residential removal action limit. Selenium levels in sediment were elevated at all of the locations downstream of the spill: Emory River mile 2.2, 1.6 and 0.1 and Clinch River mile 3.3 and Tennessee River mile 567 (around 6-7 miles downstream).

“By sampling in seven different locations,” said Dr. Shea Tuberty, “we were able to determine that the most acute impacts to the water itself are occurring in the immediate vicinity of the accumulated ash. It is troubling however, that elevated levels of arsenic and selenium were found downstream in the sediments where they will act as a continuing source of pollution to the aquatic environment until safely removed.”

Special research permits were obtained from the Tennessee Wildlife Resource Agency, and fish collected by a team of experts from the Tennessee Aquarium Conservation Institute in Chattanooga. Dr. Anna George evaluated the fish community and found fewer fish in the immediate area of the ash spill. “We observed many fish with lesions and lost scales,” said Dr. George. “Both are conditions that may be attributed to stress or degraded water quality.”

While most fish were returned to the river unharmed, a few fish were brought back to the Appalachian State University research labs where they were analyzed for 17 toxic elements. The muscle, liver, spleen and reproductive organs of red ear sunfish, large mouth bass and channel catfish were tested. Consistent with elevated selenium levels found in water and sediment, fish collected from the Emory River exhibited unusually high levels of selenium in their spleen and reproductive organs both upstream of the spill and at the spill site itself.

“Since these samples were collected only two weeks after the spill, the levels of toxic elements in their tissues are considered the background levels taken up by the fish over their entire lifetimes,” said Tuberty. “We will have to continue monitoring the fish tissue levels over the next several months and years to determine the full adverse impact on the fish populations.”

Dr. Dennis Lemly, one of the nation’s experts on selenium toxicity in fish, said, “We found selenium concentrations in important fish species in the Emory River were already at toxic thresholds (the tipping point). This means that the river ecosystem cannot assimilate additional selenium from the ash spill,” he said. “There is no margin of safety, and additional selenium uptake will result in bioaccumulation to levels that severely impact fish reproduction.”

Dr. Susan Edwards conducted detailed examinations of gill tissues and found that gills from animals taken from the region of the spill showed marked alterations in morphology when compared to the same species of fish taken from a non-affected site. “The results from the morphological examination of these gills were similar to those reported previously in studies involving environmental metal pollutants,” Dr. Edwards said.

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Floating coal ash particles (cenospheres) were collected and analyzed by scanning electron microscopy. Approximately 10% of these particles contained an iron oxide coating with detectable levels of arsenic. Analyses of cenospheres without this iron oxide coating did not show detectable arsenic. According to the research team, it is likely that arsenic is not the only heavy metal that adheres to the iron oxide coating on the ash particle, but further study is necessary to confirm this.

“Overall, these test results indicate much more severe impacts to water, sediment and fish than has been previously reported by TVA which tells us they haven’t been sampling in the right places,” said Watauga Riverkeeper Donna Lisenby. “Perhaps the recent changeover to EPA oversight of the Kingston Ash spill will correct this serious deficiency.”

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*The full scientific report is available at
www.appvoices.org/index.php?/site/av_news/tva_ash_spill_results/*

A conference call will be held at 1:00 pm (Eastern standard time) on Monday May 18, 2009 for members of the news media and others to ask questions of the researchers who authored the report. The call in number is 605-475-6006 and the access code is 149769.

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