

## Detection of heavy metals in the surface waters of the Sequatchie River

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Pollution and its effects on the environment have been studied increasingly over the past decade as public awareness and government mandates demand solutions to the problems created by human industries.<sup>1</sup> The anthropogenic release of metal contaminants into the environment is a persistent problem in Tennessee. As the 4th largest industrial center in the state, Chattanooga area pollution sources include manufacturing, fertilization, electricity generation, waste water treatment and mining operations. Several point sources of pollution are located throughout the Tennessee River Valley.

The goal of this project is to analyze water collected from the Sequatchie River for toxic metals using inductively coupled plasma – optical emission spectroscopy (ICP-OES). ICP-OES is a form of emission spectroscopy where the metal atoms excited in the plasma emit radiation proportional to their concentration. Each element emits radiation at distinct wavelengths and therefore this instrument can be used for quantitative and qualitative analysis. Using ICP-OES, we will be able to identify metal ions that specifically affect the target area. Calibration curves will be constructed from standard solutions to directly analyze the unknowns.

**Role of the Undergraduate Student:** As a researcher, I strongly feel that undergraduate research and exposure to the scientific method are crucial in preparing our students for successful and productive careers in science. The student who performs research with me will gain an extensive hands-on experience with analytical methods and instrumentation. The student will also have the opportunity to present the research at a regional meeting and/or national meeting. The student on this project must have completed Chem 341 and 351/352 with at least a B. The student will be expected to work 40 hours/week, May 5 – July 11. The project will culminate in a student written paper at the end of the summer.

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<sup>1</sup> Alloway, B.J.; Ayres, D.C. *Chemical Principles of Environmental Pollution*. Oxford: Alden, 1993.