

Distribution and Transport of Coal Tar Contaminants in the Chattanooga Creek Floodplain

By

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In Chattanooga, Tennessee, ~100,000 tons of coal tar were dumped into the Chattanooga Creek during the operations of the Chattanooga Coke Plant (1918-1987). As a result of the dumping, Chattanooga Creek has been placed on the National Priority List for Superfund Sites. According to the U.S. EPA, the floodplain and sediments along a 2.5 mile stretch of the Chattanooga Creek are the two main contaminant sources which contain uncontrolled coal tar constituents. The focus of my thesis proposal is to investigate the distribution and the transport mechanisms of coal tar constituents within an active urban floodplain.

Large concentrations of coal tar contaminants, such as polynuclear aromatic hydrocarbons (PAHs), heterocyclic aromatic compounds, phenolic compounds, and monaromatic hydrocarbons, have been found in the soils and creek-bottom sediments of Chattanooga Creek and the nearby Coke Plant. These contaminants are also expected to be present in the uninvestigated soils of the floodplain. To investigate the distribution and transport mechanisms of coal tar contaminants, three boreholes will be extracted and the concentration and distribution of the 16 priority PAHs listed by EPA will be measured. Using the three extracted boreholes, the following hypotheses will be tested:

- 1) Immiscible coal tar constituents are only present in the sediments deposited between 1918 and 1987.
- 2) Dissolved coal tar compounds (e.g. naphthalene) from the tar-rich zone migrate downward into the older sediments and diffuse upward into the newer deposits.
- 3) Vertical distribution of these coal tar compounds depends on the biological, hydrological, and geological transport mechanisms.