

Chemistry 104

Fall, 2003

Purpose: To use chemical and instrumental methods of analysis to ascertain the probable cause of a massive fish kill in an estuary of the Chesapeake Bay.

Introduction: The *New York Times* printed the following story on July 5, 2001:

Recovery of River From Chemical Spill Could Take Years

HOOSICK, N.Y., July 4 (AP) — It will be years before the Hoosick River recovers from a spill of highly toxic chemicals from a factory last week, a state environmental official says.

In the meantime, Rensselaer County has lifted bans on swimming and wading in the river, according to the county executive, Kathy Jimino. She warned that there could still be hot spots where concentrations of copper sulfate remain.

“Potential fishers, swimmers and boaters should keep in mind that sporadic areas of pooling may still exist where higher concentration levels remain,” Ms. Jimino said. “Always be cautious, particularly near stagnant areas.”

Jennifer Meicht, a spokeswoman for the State Department of Environmental Conservation, said that thousands more fish could die as they swim into the dead eight-mile stretch of river and starve.

Already, hundreds of thousands of fish have died since nearly 2,000 gallons of an acidic copper sulfate solution spilled into the river from the Oak-Mitsui plant in Hoosick Falls last Thursday morning.

The river glowed with the toxic blue chemicals, and dead fish floated along the stretch from Hoosick Falls to the Schaghticoke Dam in Rensselaer County, just northeast of Albany.

The chemicals drained out of the building while being transferred from one tank to another.

The state will hold the company responsible for the spill and its clean-up costs. It immediately ordered the company to hire workers to recover and count the dead fish. The spill remains under investigation.

Workers placed floating booms across the river to catch dead fish while siphons pumped up the contaminated water.

This story reports just one of thousands of events that disrupt aquatic systems each year. Some, such as the one reported in the newspaper article, have their origin directly traceable to human activity. Others represent natural disruption of ecosystems, caused by disease or prolonged periods of high temperature. Regardless of the cause, we need to investigate each event to ensure that permanent damage to our environment may be avoided and that we can learn to manage our increasingly complex world more efficiently.

This experiment is a simulation of a potential real-world situation designed to allow you to assume the role of an environmental chemist-detective. You will make a series of measurements designed to assess water quality, assemble the data, and use the literature (largely accessible via the web) to establish, if possible, the probable cause(s) of a hypothetical fish kill.