



Oak Ridge National Laboratory



Analysis of WMD Materials in Waste and Storm Water Treatment Infrastructures in Southeastern US Cities

Dr. R. T. Jubin, jubinrt@ornl.gov, 865-574-4934

Prevent, Protect, Respond, Recover

Homeland Security Challenge:

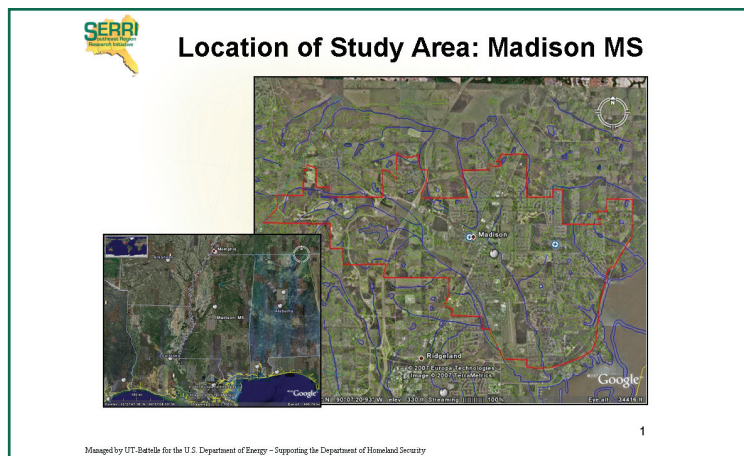
There is great concern that weapons of mass destruction (WMD) could impact drinking water, stormwater, and wastewater systems and cause serious public health and environmental issues. Secondary impacts of an RDD event include runoff into stormwater and sewer systems during precipitation events or as a result of cleanup and decontamination activities.

Research Project Solution:

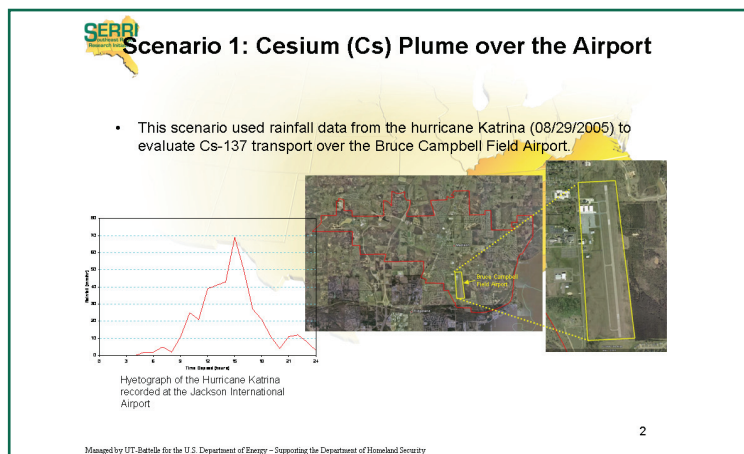
The objective of this project is to develop a methodology to predict the distribution and fate of selected WMD material dispersed in a wastewater or stormwater treatment and handling system. This work has resulted in the development of a new capability and estimation tool called Simplified Fate and Transport Estimate or SIMFATE. The developed methodology relies on three primary components: (1) HPAC (developed by the U.S. Department of Defense) to estimate WMD release and deposition footprints (2) SWMM (developed by the U.S Environmental Protection Agency) to estimate dynamic performance of the stormwater system and (3) SIMFATE to account for the dynamic performance of a wastewater collection and treatment system. The output of the methodology is an estimate of the fate and transport of selected WMD materials. The relevant WMD material of interest may ultimately be of a nuclear, chemical, or biological nature. The complete methodology has been demonstrated using data for a simulated radiologic attack occurring in the city of Madison MS. The calculations focused on estimating the time-dependant distribution and fate of the radiological material (Cs-137) and accounted for meteorological conditions (rain) in transporting the material.

National Implications:

The project is aimed at protecting public health and the environment from WMD materials in water resources (e.g., drinking water and water supply systems). The tool developed by the project will allow first responders to estimate impacts of a terrorist activity on stormwater and wastewater system infrastructures specifically designed to protect human health and the environment. Although the project is based on a particular radiological material (Cs-137) for needs in Madison, MS, the tool developed here can be easily customized to be used nationwide to evaluate the potential impact of WMD materials (biological, chemical, radiological, or nuclear) on stormwater and wastewater systems. This tool, in turn, will contribute to improved preparedness and mitigation plans while also allowing an assessment of the resilience of wastewater and stormwater treatment and handling systems.



View of the Madison, Mississippi, area of the study.



Madison area with model showing the dispersion of cesium in a potential attack.

www.serri.org

For More Information on SERRI, contact;

Warren Edwards, Director, SERRI
865-574-8277, edwardswc@ornl.gov

Ben Thomas, Operations Manager
865-574-5438, thomasbjr@ornl.gov

SERRI is managed by the Department of Energy's Oak Ridge National Laboratory for the U.S. Department of Homeland Security