Simulation of Incineration of Waste Generated from Cleanup following Chemical/Biological Incidents

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For chemical and biological (CB) threat agents, incineration is a likely treatment technology that would be used either on-site or off-site to destroy residual agents and to reduce the volume of the waste streams. Past experiments and operational performance have demonstrated that incineration is an effective technology for destroying chemical and biological agents; however, the substrates on which these agents will be bound have a profound impact on the behavior of the waste streams in the incinerators. Full-scale testing may not be able to encompass the variety of materials and agents that might be generated in a real-world CB incident, and logistical and public perception issues may make it very difficult or impossible to do testing at a specific incineration facility with the specific types of materials that would be containing these trace level contaminants.

The Configured Fireside Simulator (CFS) was originally developed for the Department of Defense to evaluate operations of the chemical demilitarization incinerators processing the U.S.'s chemical warfare agent stockpile. It was later adapted to provide for the ability to run "what if" scenarios of waste streams contaminated with CB agents. This included the EPA's pilot-scale Rotary Kiln Incinerator Simulator facility, as well as three commercial incinerators based on design criteria for actual operating facilities, including a Medical/Pathological Waste Incinerator, a Hazardous Waste Burning Rotary Kiln, and a Waste-to-Energy Stoker type combustor. CFS uses chemical kinetic data for destruction of chemical warfare agents, coupled with biological agent destruction kinetic data derived from bench- and pilot-scale experiments performed at EPA's Research Triangle Park, NC facility.

This presentation will describe the operation of the CFS software and will highlight new enhancements that have recently been added to expand the capabilities of the simulation.