



## News from the Savannah River National Laboratory

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Contact: Angeline French (803) 725-2854,  
[angeline.french@srnl.doe.gov](mailto:angeline.french@srnl.doe.gov)

### SRNL Atmospheric Technologies Group Plays Important Role in Graniteville Emergency Response

GRANITEVILLE, S.C. – At 2:45 a.m. Thursday, January 6, the unimaginable and horrible happened. Two Norfolk Southern freight trains collided in Graniteville, S.C., spilling chlorine, cresol, and sodium hydroxide in the area. The chlorine release caused the greatest airborne concern due to the high volatility and toxicity of the vapors. Hundreds of public safety officials and local emergency responders flocked to the area to assist.

The experts in SRNL's Atmospheric Technologies Group (ATG) also stepped up to put their unique skills to work to help in this emergency.

ATG personnel quickly responded to monitor the situation and provide consequence assessments to the SRS Emergency Operations Center, Aiken County emergency managers, and S.C. Department of Health and Environmental Control (DHEC). In the Atmospheric Technologies Center, the group applied their skills to provide advanced modeling of the release and specialized weather support.

In the event of a chemical release, atmospheric modeling to predict downwind transport and concentration is critical to aid decision makers in determining whether downwind locations are safe. Chlorine is commonly shipped by rail as a pressurized liquid. If it is released to the atmosphere, as happened in Graniteville, the chlorine rapidly vaporizes and forms a cold, dense cloud. At night, under stable atmospheric conditions, the cloud can persist in the vicinity of the release; however, during the daytime, atmospheric turbulence and surface heating can quickly cause the gaseous chlorine to be moved with the wind.

The team completed and posted model results on a special controlled website by 8 a.m., so off-site authorities involved in the response could monitor the consequence assessment. ATG support for the local responders — posting plume model results and providing weather forecasts — continued Friday and through the weekend.

This group provided practical support in real time. This modeling they provided was detailed and fine-tuned to this area, and the team was able to help interpret the plume and give the decision makers the best technical advice available. Emergency management decision makers also needed the team's weather forecasts, as well. They needed to know the dispersion of clouds and chance of rain to determine the hazards caused by mixing chemicals and rain water runoff. ATG personnel worked tirelessly to not only provide the forecasts, but also to help interpret them. The interaction among the modelers (meteorologists) and the unseen emergency responders provided an important input for the crucial and timely decisions made to protect people downwind from the catastrophe.

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In addition, the scientists were asked to calculate numerous “what if” scenarios. When emergency managers were considering physically moving the cars to allow crews to patch the ongoing release, ATG ran calculations to evaluate the impact if the move damaged the car that was not yet leaking, causing a new leak. The team explained that if the tanker ruptured at night, the impact on the community would be far greater and cover a much larger area than if it were to rupture in the daytime.

The team sent briefing packages to DHEC, County Emergency Management, DOE-HQ, and the Department of Homeland Security. With the increasing popularity of flat panel display technology, this new mounting system could have a wide variety of applications, enabling the use of such display screens in mobile medical labs, military vehicles, mobile command centers, environmental laboratories ... even recreational vehicles.

The Savannah River National Laboratory is the applied research and development laboratory at the U.S. Department of Energy’s Savannah River Site and is operated for the DOE by Washington Savannah River Company.

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