Atmospheric Technologies Center

Savannah River National Laboratory's Atmospheric Technologies Group

The Savannah River National Laboratory's Atmospheric Technologies Center (ATC) provides applied meteorological services for a variety of specialized needs. The ATC, developed and operated by the SRNL Atmospheric Technologies Group, is staffed by meteorologists with extensive experience in weather forecasting, applied climatology, and air pollution transport and dispersion. Specific areas of support include:

- *Real-time modeling and assessment of unplanned releases of hazardous material to the air or surface waters over local, regional, and international scales.*
- *Weather forecasts and consultations for developing response actions to severe weather threats, and for planning weather-sensitive industrial operations, construction, and forest management activities.*
- *Development of custom meteorological data sets and climate statistics for applied research, engineering design, operations planning, safety analysis, and law enforcement.*

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Figure 1. Forecasters in the Atmospheric Technologies Center provide full-service weather support for a diverse clientele.

ATC Resources

To meet diverse operational needs, the ATC is equipped to access a variety of real-time sources of local, national, and international meteorological information.

The Weather INformation and Display (WIND) System. Local meteorological data collected from a network of towers on and near the Savannah River Site (SRS) are available to the ATC in real-time via computers networked to the ATG's WIND System. Eight towers located on the SRS measure wind speed, wind direction, temperature, and dew point. Additional instrumentation on a ninth SRS tower, ATG's Central Climatology Site, is used to measure precipitation, atmospheric pressure, and solar radiation. The ATG also operates instrumentation on a tall tower facility located near the SRS providing high quality measurements of wind, temperature, and moisture at several levels through 1000 ft. Wind and temperature data are also available from four monitoring stations in Augusta/Richmond County, GA. These stations were established as part of mutual aid agreements among DOE, and county governments to share meteorological information for use in emergency response.

Real-time measurements from the WIND System's monitoring network can be used by ATC meteorologists in conjunction with a suite of atmospheric dispersion models to assess local and regional transport of unplanned releases of hazardous material from SRS and the neighboring area.

Regional, National, and International Weather Data. Satellite communications are used to provide the ATC with a continuous feed of regional, national, and international meteorological information. This data feed includes: world-wide surface and upper air observations; National Weather Service (NWS) text forecasts, discussions, and severe weather bulletins; world-wide coverage of high resolution satellite imagery; domestic single-site and mosaic radar imagery; real-time lightning strike data from the National Lightning Detection Network, and output from NWS and European numerical weather prediction models. All of the information received via satellite is archived and can be retrieved, as needed, and viewed on workstations as text or graphical displays.

In addition, selected data streams are forwarded to computer resources for use as input to modeling systems that can be configured to generate near real-time predictions of contaminant transport following the unplanned release of hazardous material anywhere in the world.

Continuous displays from a local Doppler weather radar system are also available. This radar, located at Augusta's municipal airport, was purchased jointly by the Westinghouse Savannah River Company and a local television station (WJBF). The radar's feed is continuous, providing ATC meteorologists a timely supplement to NWS radars during fast-breaking severe weather situations. Real-time radar imagery is also provided to SRS's emergency response facilities and the general workforce through an internal cable TV system and intranet (ShRINE).

Output from ATG Advanced Modeling. The ATG has configured the advanced Regional Atmospheric Modeling System (RAMS) to generate detailed operational forecasts of weather conditions across much of the Southeast U.S. Using regional data from the ATC's satellite feed and local data from the WIND System, RAMS produces a local 6 hour forecast every 3 hours, and a regional 36 hour forecast every 12 hours. The RAMS output includes detailed forecasts of wind, temperature, mixing height, and other meteorological variables for the SRS and surrounding area. Output from these operational forecasts can be used to conduct detailed, real-time assessments of an unplanned hazardous material release anywhere in the region, and to supplement available NWS data in developing local and regional weather forecasts. RAMS can also be quickly configured to produce operational forecasts of hurricane trajectories in the southeast U.S.

Climatological Services

With extensive databases of local and regional observations, the ATC serves as a comprehensive source of historical meteorological data and climatological analyses. Specific areas of application include environmental field studies, engineering design, safety analysis, regulatory compliance, and operations planning.

Local data sets that are available include more than twenty years of wind, temperature, and humidity observations from the WIND System tower network and nearly fifty years of daily temperature, relative humidity, and precipitation measurements from additional recording stations across SRS. Most of these data are resident on the WIND System computers and can be easily retrieved from a relational database. Summaries of the data routinely collected onsite are issued monthly and annually. National and international databases available on CD-ROM include hourly precipitation and surface weather observations from hundreds of reporting stations. Upper air data for the U.S. is also available.

The ATC will develop specialized meteorological data sets for use in a variety of atmospheric or air quality modeling systems, or conduct more advanced analyses of climate statistics, such as estimates of recurrence frequencies for severe weather phenomena.

ATC Web Site. To ensure the SRS workforce is well informed on developing hazardous weather situations, or can plan effectively for conducting outdoor work, the ATC provides access to current local weather conditions and forecasts through the ShRINE intranet resource. Current weather (wind, temperature, humidity, pressure, and heat stress category) are updated every 15 minutes. Displays from the WJBF Doppler radar, updated every 5 minutes, as well as a daily forecast issued by the Atmospheric Technologies Center duty forecaster are also posted. Monthly and annual climate statistics are also available. In addition, customers can configure and download custom data sets of SRS temperature and precipitation. Other links provide guidance on heat stress, wind chill, and severe weather safety.

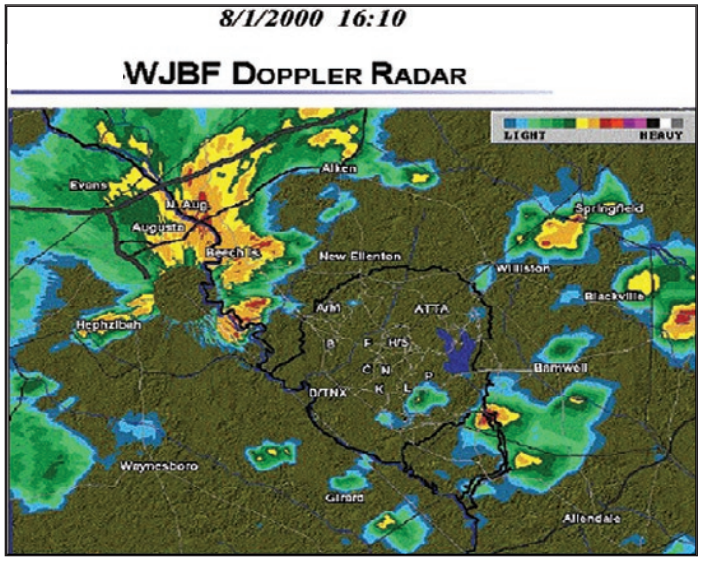

Figure 2. Doppler radar images provide vital information for forecasting and tracking severe weather.

Partial List of Customers

- *DOE Headquarters / Other Federal Agencies* – transport modeling and weather support for a variety of missions related to nuclear non-proliferation and nuclear forensics
- *DOE-SR/SRNS Senior and Facility Management; Local County Emergency Management Directors* – forecast support during severe weather events; consequence assessment modeling and analysis during hazardous materials emergencies
- *U. S. Forest Service* – weather forecasts for planning prescribed burns and wildfire management
- *SRNS RadCon Program/SRS Closure and D&D units* – weather forecasts for planning radiological operations
- *Construction* – consultations and forecasts in support of construction activities
- *Environmental, Safety, and Health Department* – specialized data bases and climate statistics for regulatory compliance activities
- *Design Services Department* – risk assessments and frequency statistics for severe weather phenomena
- *Savannah River Ecology Laboratory* – data bases and climate statistics supporting environmental research initiatives
- Washington *Safety Management Solutions* – data bases and climate statistics supporting environmental research initiatives

For more information of Atmospheric Technologies Center services and support, contact:

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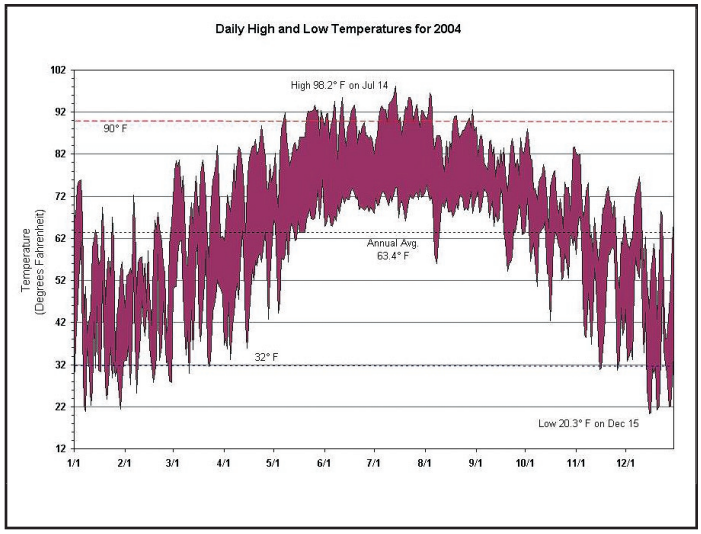

Figure 3. Climatological summaries and reports available through the ATC web page provide useful information for engineering design, regulatory compliance, and operations planning.

Figure 4. Consulting with customers during severe weather events.

Major program areas of the Atmospheric Technologies Group are described in the following brochures:

- Advanced Atmospheric Modeling
- Atmospheric Technologies Center
- Climatology
- Hydrology and Surface Water Modeling
- Meteorological Measurements
- Remote Sensing Application
- The People of ATG
- Weather Information and Display (WIND) System
- Tall Tower Meteorological System