

February 2002

ARM Facilities Newsletter

ANL/ER/NL-02-02



SGP CART Site Affected by Ice Storm

Beginning on January 29, 2002, a major winter storm passed through the Plains states, leaving snow and ice in its path. Northern locales received snow, but most of the SGP CART site received a coating of thick, damaging ice.

The intense storm system moved out of the Rocky Mountains, pulling in moisture from the Gulf of Mexico. A cold, shallow air mass already over Oklahoma and Kansas set up a temperature inversion in the atmosphere, with warmer air temperatures aloft than at ground level. As the warm, moist air from the Gulf of Mexico was pulled up into the area by the storm, it was forced up and over the dense, cold air at the surface.

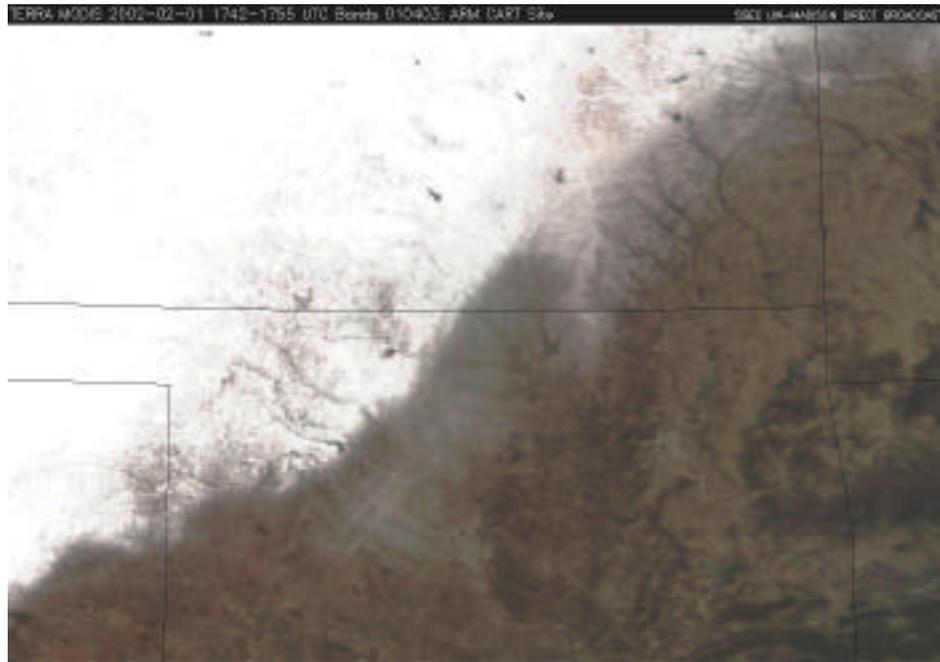


Figure 1. A close-up satellite view of the SGP CART site after the January 29-31, 2002, ice storm. The ground is covered by snow in the northwest regions. The light gray band visible over the CART site is the ice-covered landscape. (Photo used with permission of the Space Science and Engineering Center, University of Wisconsin-Madison.)

ARM Facilities Newsletter is published by Argonne National Laboratory, a multiprogram laboratory operated by The University of Chicago under contract W-31-109-Eng-38 with the U.S. Department of Energy.

Technical Contact: James C. Liljegren

Editor: Donna J. Holdridge

This inversion produced precipitation that melted into rain as it passed through the elevated warm layer. Because the cold air



Figure 2. Ice accumulation on an eddy correlation test system at the central facility in Lamont, Oklahoma.

at the surface was shallow, the rain that fell did not freeze before it hit the ground. Instead, the precipitation froze when it hit surfaces at or below the freezing point. Areas north of the SGP CART site received snow because the cold air mass at the surface was much thicker there, and the warm layer aloft was thinner. In the area between the snow and freezing rain, a wintry mix of snow, sleet, and freezing rain prevailed.

This storm is proving to be one of the most costly in the 100-year history of Oklahoma Gas & Electric (OG&E), according to Paul Renfrow, OGE Energy Director of Public Affairs. The bill to repair and replace the damage is expected to top \$100 million, 80% of which is for capital expenses. OG&E estimates that the ice damage covered approximately 15,000 square miles and affected at least 195,000 customers. The heavy ice accumulated quickly, bringing down 250 miles of transmission lines and thousands of utility poles across the hardest hit areas of western and north central Oklahoma. A week after the storm, 17,000 customers were still without power. Many

utility service trucks and crews were brought in from Texas and other locations to help with repairs and restoration of electrical service.

The SGP CART site was also affected by the storm. The central facility near Lamont, Oklahoma, was closed for several days after the storm hit. Power was lost, placing computers and other expensive, temperature-sensitive equipment at risk. The central facility staff worked painstakingly to ensure that all equipment was turned off and would not automatically restart in freezing temperatures when power was restored. The staff also safeguarded other instruments that contained cooling water by draining the liquid so that it wouldn't freeze and damage the equipment. Dry nitrogen gas purges were installed to prevent condensation from forming on instrument optics.

The SGP CART effort proved its worth and kept damage to only one confirmed report at the central facility (for the Raman lidar). Some of the extended facilities are reporting broken propellers on wind speed sensors because of ice buildup. After a week without power, a 65-kVA diesel-powered generator was



Figure 3. An ice-covered pasture at the SGP central facility.



Figure 4. An emergency generator (left) installed at the central facility to restore power to the computer systems located there.

installed at the central facility on February 6. Heat was restored first in the equipment trailers. Computer equipment and plumbing were allowed to come up to temperature slowly (overnight). On February 7 data collection for both the

SGP and North Slope of Alaska was resumed, as were weather balloon launches. Permanent power was restored to the site early on the morning of February 11, and all instruments on the site returned to operation shortly thereafter.

President Bush has declared 45 counties in Oklahoma and 35 counties in Kansas eligible for disaster aid. The Federal Emergency Management Agency (FEMA) is coordinating the federal relief, which includes assistance for individuals harmed by the storm. Residents could be eligible for up to \$20,000 in compensation for damaged or destroyed property and cleanup costs not covered by insurance. To apply for assistance, call FEMA at 1-800-621-FEMA (3362) or 1-800-462-7585 (TTY; for hearing and speech impaired). These numbers will be available seven days a week until further notice.