

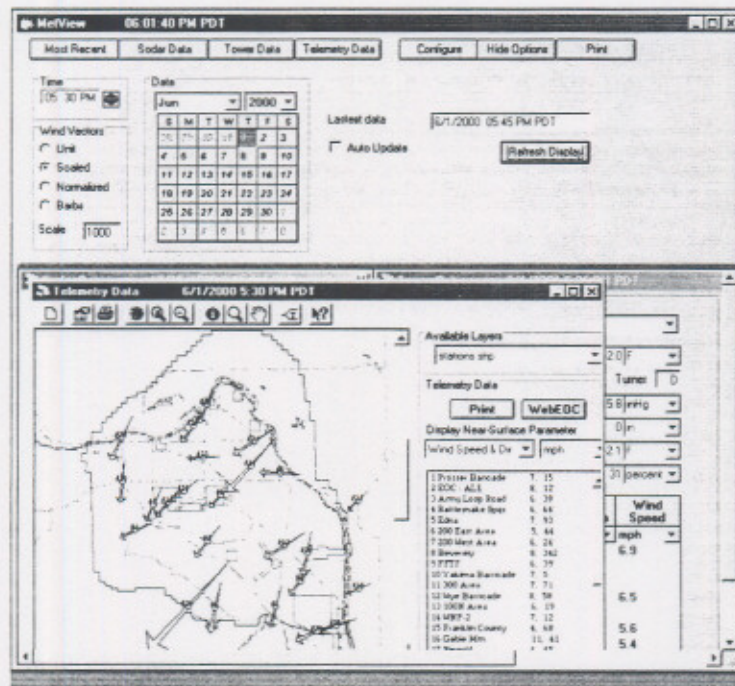
MetView and APGEMS: New Systems for Meteorological Data Display, Atmospheric Dispersion Modeling, and Dose Assessment

Presented by Clifford S. Glantz
Pacific Northwest National Laboratory

Abstract

Pacific Northwest National Laboratory has developed two new PC-based tools, *MetView* and *APGEMS*, for use in emergency response centers. *MetView* is an easy-to-use computer program for accessing, displaying, and analyzing meteorological data from local monitoring networks. *APGEMS* is an easy-to-use atmospheric dispersion and dose assessment model for emergency planning, preparedness, and response applications. These products are now the primary meteorological and impact assessment tools at the Emergency Operation Center (EOC) at the U.S. Department of Energy's Hanford Site.

MetView provides both graphical and numerical displays of meteorological data from the Hanford meteorological monitoring network. The system can automatically display data from near-surface monitoring locations (including meteorologist observations), instrumented towers, and sodars.

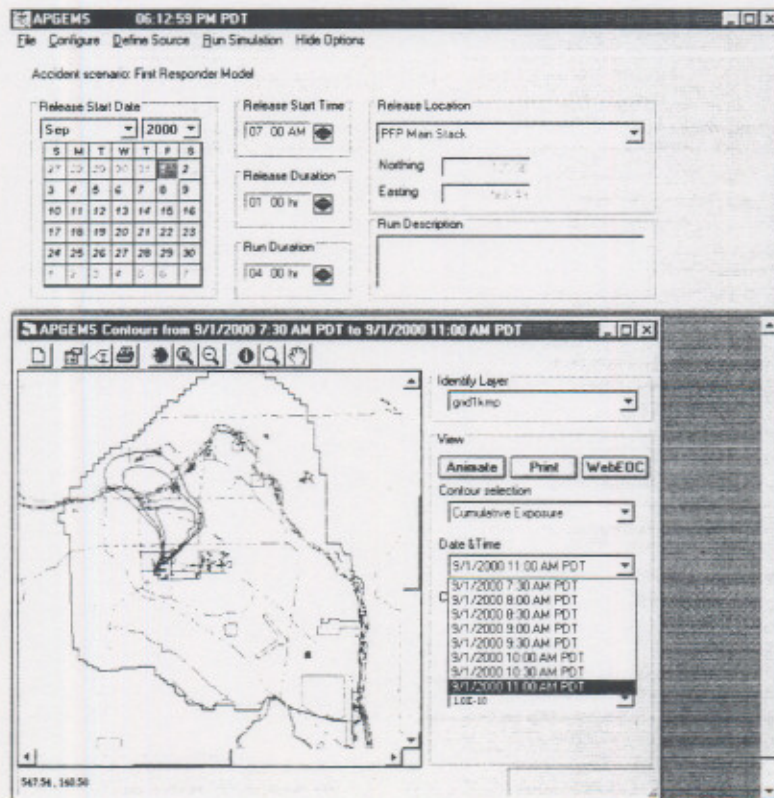


At the Hanford Site's EOC, *MetView* aids in the access, visualization, and interpretation of real-time meteorological data. Historical data can also be accessed and displayed. The *MetView* first-responder procedure allows non-technical staff to rapidly generate meteorological products and disseminate key information. After first-responder information products are produced, the EOC's technical staff can use the program to

conduct more sophisticated analyses. This may include examining the vertical variation in winds, assessing recent changes in atmospheric conditions, evaluating atmospheric mixing rates, and forecasting changes in meteorological conditions. *MetView* is also used operationally for routine weather forecasting and other research applications.

The Air Pollutant Graphical Environmental Monitoring System (*APGEMS*) employs a Gaussian puff formulation to mathematically describe the concentration distribution of the released materials as they move in the mean wind field. It can be used for areas with relatively uniform terrain or complex terrain environments. Source-to-receptor transport distances can range from as little as one hundred meters to a few hundred kilometers. *APGEMS* uses a three-dimensional diagnostic wind model to compute the vertical and horizontal spatial variation in winds at each time step in the simulation. The wind field is determined by applying a mass-conserving interpolation technique to the surface- and upper-air observations supplied to the model. The model accounts for flow channeling, blocking by major terrain features, and drainage flows. The model treats wet and dry deposition, radioactive decay, and first-order chemical transformations of the released material. *APGEMS* is a direct descendant of *PGEMS* (a system used at PG&E's Diablo Canyon facility).

The *APGEMS* graphical user interface allows the rapid initialization of model simulations and the production of an impressive array of graphical output products. *APGEMS* generates screen, hardcopy, and Internet-shareable output products. The interface with the Internet allows information to be rapidly shared with emergency response personnel within the EOC and at other control centers.



APGEMS can be run in three different modes: the Standard, Exercise, and Exercise Generation modes. The Standard mode is used during an actual emergency or drills that involve real-time data. The Exercise mode is used during drills that involve "canned" meteorological data. The Exercise Generation mode is used to create the comprehensive exercise data packages (including field team monitoring readings) that are used by exercise controllers to run a training event.

Both *MetView* and *APGEMS* had a successful baptism under fire in late June when a range fire burned over 190,000 acres on and near the Hanford Site. The systems were used to help safely and effectively deploy firefighters, monitoring teams, and other emergency response personnel. With the completion of a final set of upgrades to the system and the users guides, *MetView* and *APGEMS* are now available for widespread use on the Hanford Site (including at the Energy Northwest facility). These systems can easily be modified to support applications at facilities in other regions.