

**Benefits** ARAC is supported directly by subscribers who are concerned about both nuclear and non-nuclear releases. ARAC's subscribers include the following agencies:

1. **DOE.** Several DOE sites are tied directly to the ARAC system: Savannah River, Rocky Flats, Mound Laboratory, LLNL, and Sandia National Laboratories Livermore (SNLL).
2. **Department of Defense (DOD).** DOD was scheduled to have about 50 sites tied into ARAC by 1984.
3. **Federal Aviation Administration (FAA).** The FAA found ARAC to be very responsive in providing input for the development of air traffic advisories subsequent to foreign atmospheric nuclear tests.
4. **Federal Emergency Management Administration (FEMA).** FEMA provided support for New York and California and the commercial nuclear power plants at Rancho Seco and Indian Point to tie into ARAC. ARAC will be used to provide calculations of estimated dispersion for use in emergency planning.
5. **Environmental Protection Agency (EPA).** ARAC provided EPA with an independent (versus power company) source of information during the controlled krypton release at Three Mile Island (TMI) in July 1980.
6. **Nuclear Emergency Search Team (NEST).** DOE's NEST relies on ARAC for assessments associated with nuclear extortion threats.

ARAC provides analyzed information in circumstances where the paucity of data could lead decision makers to overrespond, resulting in an unnecessarily expensive emergency evacuation, or underrespond, leading to a compromise of public health and safety. To date almost all of the ARAC applications either indicated no threat to public health and safety, thereby avoiding unnecessary evacuations, or were used in managing the release to minimize overall risk.

An example of a major benefit of the use of ARAC was at the TMI nuclear power plant. Even though TMI was not tied into ARAC, DOE put the system into service. ARAC was operational during the first few days of the accident and provided dispersion calculations to the DOE Emergency Operations Center, the DOE emergency-response site commander, and Nuclear Regulatory Commission (NRC) representatives. The ARAC calculations indicated that an evacuation of the population around TMI was not necessary. This evaluation was consistent with other calculations and recommendations; and, therefore, no general evacuation was ordered. ARAC also supplied the FAA with dose calculations for the Harrisburg airport, which allowed officials to avoid closing the airport. In addition, ARAC was employed to help manage the controlled release of radioactive krypton in July 1980 by tracking the release and advising EPA regarding the best ground sites for portable monitors and routes to be flown by sampling aircraft. Good agreement was found between the model calculations and the observations. Fewer monitoring stations were required because of ARAC's use. ARAC was also used in a postaccident detailed analysis of population dose around TMI for the President's Commission on the accident.

Less tangible but very important benefits have been reported by DOE site users. Specifically, ARAC has been of great benefit in assuring local, state, and Federal officials responsible for protecting public health that they have an adequate capability to respond to accidental releases. Some of the DOE users have conducted public tours of their ARAC site facilities, receiving press and television coverage.

**Fallout Forecasting** Fallout forecasting is a system for collecting data on nuclear detonations, alerting users of nuclear events, and providing forecasts of the atmospheric spread of the radioactive debris. The National Oceanic and Atmospheric Administration

(NOAA) is responsible for providing the forecasts to users. To formulate these forecasts, NOAA uses meteorological input primarily from the Air Force and DOE.

The detonation of a foreign nuclear device during peacetime triggers a coordinated Federal response to ensure maintenance of public health and safety. Through a multiagency memorandum of understanding, the following responsibilities have been established:

1. NOAA collects data from the Air Force and DOE to develop the official fallout forecast; this serves as the basis for all public announcements on the movement of airborne radioactivity and areas of potential rain-out of nuclear debris.
2. The Air Force provides classified data to NOAA on nuclear debris samples, including the location, time, altitude, and concentration of airborne samples.
3. DOE gathers information on the nature of the nuclear detonation (such as location, time, yield, and height) and reports this information to NOAA for input to the fallout forecast. DOE also provides NOAA with advisories released by its ARAC center at Livermore, California. Data collected from radiation measurements at DOE facilities are made available to user agencies.

**History** OHER has sponsored fallout research at the NOAA Air Research Laboratory since 1952. The fallout forecasting system was developed in response to general public concern about the potential hazards of foreign nuclear detonations. It was a natural outgrowth of the Laboratory's research in atmospheric transport and dispersion, which became the focal point of the forecasting when the interagency fallout response team was formally established in 1976. Since that time the fallout forecasting element of the research program has cost approximately \$300,000. OHER currently provides funding as necessary to maintain its operational status.