

Illinois Distributes Portable Radiation Detectors for First Responders

With funding from the U.S. Department of Homeland Security (DHS), law enforcement officers and other first responders across Illinois are being provided with portable devices to alert them to the presence of potentially hazardous radioactive materials.

The detectors, which are the size of a pager, were developed with the collaboration of the Illinois Terrorism Task Force (ITTF), the Illinois Law Enforcement Alarm System (ILEAS), the Mutual Aid Box Alarm System (MABAS), the Illinois Emergency Management Agency (IEMA), the Illinois State Police (ISP) and nuclear scientists at the Argonne National Laboratory. The program was funded through DHS State Homeland Security and Chemical Buffer Zone Protection grants.

ILEAS is a mutual aid consortium of all law enforcement agencies in Illinois. Ron Ellis, field training manager for ILEAS, said Illinois is the first state to provide specialized training and deploy radiation detectors to public safety agencies in large numbers. The Illinois program is statewide rather than city based. Specialized training was developed in-house rather than being provided by federal contractors, and is delivered by state personnel and designees.

“Radiation detection traditionally has been for hazmat personnel. Now we are putting it in beat cops hands,” says Tom Seif, a health physicist and Preventive Radiological/Nuclear Detection program manager with the IEMA Division of Nuclear Safety.

Following a 1½-year pilot program, ILEAS purchased 6,200 of the detectors to distribute to police and fire departments across the state, beginning in 2010. Following the devastating 2011 earthquake and tsunami that crippled nuclear reactors in Japan, due to the critical life-saving need for detectors there, the state provided 2,000 to the Japanese government to aid first responders.

Use of the devices by Illinois agencies is voluntary. The program has proved popular, and most of the devices have either been deployed or are spoken for, according to Seif. The majority of the devices went to local and

state police and special local law enforcement SWAT teams; about 500 were distributed to fire departments.

“We had a limited number of detectors, so distribution was on a first-come, first-served basis,” Seif says. “Due to the scope of the effort, the inventory has always been less than the potential target audience. We recognize the need for more financial support as we expand the program, and are pursuing all possible avenues from our local, state and federal partners with the ultimate goal of having radiation detectors available to all first responders in Illinois.”

The detectors can be mounted in a squad car with a holster and charger, and can be removed by an officer and carried on a duty belt.

A key component of the program is the potential interdiction of terrorist activities associated with radiological dispersal devices, or dirty bombs. In developing the program, the Illinois partners worked with the DHS Domestic Nuclear Detection Office (DNDO).

“We are gratified by Illinois’ focus on this vital homeland security mission,” says Tom Bourne, assistant director at DNDO. “We rely on the commitment of our state and local partners for the ultimate success of our layered defense and detection architecture.”

Radioactive materials can be used in a variety of medical, commercial and industrial activities. An accident or fire could result in the release of dangerous levels of radiation. The pilot program allowed the state to determine the sensitivity setting necessary to detect radiation sources of interest, while avoiding “false” alarms caused by items that may contain naturally occurring radioactive materials.

Users can set the devices to various degrees of sensitivity. The device can provide various alarm sequences to get an officer’s attention, including audible, vibrating and flashing light alarms.

The program includes a “reach-back” system of experts armed with advanced detectors to provide

support, if necessary, in the event an officer locates radioactive materials. If the source and extent of the radiation is in question, a second level of responders with more sophisticated equipment can be dispatched to assist. Fire department hazmat units with radio isotope identification devices and ISP commercial vehicle enforcement officers can be called to the scene to help identify the radiation source and the specific type of radio isotope (medical, industrial, military). A third tier of support is IEMA nuclear safety specialists, who have more sophisticated equipment and can trigger federal support if needed.

“We’re not going to leave them hanging out there; we share the burden, and we share the call 24/7,” Seif says.

Ellis said the detectors, made by Polimaster, are rugged and water resistant. Each detector cost \$679, less than half the regular cost because the agency bought in bulk. If purchasing an individual detector, the cost would be in the neighborhood of \$1,500, according to Seif.

The impetus for the Illinois program began nearly a decade ago when IEMA was asked to recommend radiation detectors for law enforcement officers in the field. Research indicated that the technology on the market at the time would not be suitable, so manufacturers were asked to submit proposals for a personal radiation detector.

“Nine different manufacturers submitted 13 different instruments,” Seif says. “We selected four of them and had the vendors build us units, which then underwent about a year’s worth of evaluation by Argonne National Laboratory and a few police and fire units to select a device to go forward with in a pilot program.”



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Officers in departments receiving the devices must take an online, self-paced tutorial before the devices are issued. Once the detectors are issued to an agency, IEMA provides hands-on training with officers to ensure they know how to use the device and interpret the alarms. IEMA also provides training for the agency point of contact that covers troubleshooting and ensuring the device is working properly.

In addition to alerting to a dangerous situation, Seif points out that the devices can help avoid unnecessary evacuations and road closings. In one instance, a pickup truck rolled over on an Illinois interstate highway on-ramp. The officer’s detector alarmed. The truck contained a moisture density gauge with radiation stickers on it, which in the past would have automatically caused police to shutdown the on-ramp and affect the flow of interstate traffic. Gauges containing radioactive sources are used for determining the density of asphalt, soil, aggregate (usually gravel or crushed rock), and concrete as well as the moisture content of the soil or aggregate.

Alarm levels on the detectors are set at specific levels. The initial alarm is low in order to give early indication of a source of radiation to the officer. The second alarm is set at 2 mR/hr (milli REM per hour), a regulatory limit. Licensees authorized to use radioactive materials or registrants using X-ray equipment must conduct operations so that the dose to members of the public in any unrestricted area does not exceed 2 mR in any one hour. The officer noted that radiation readings on the on-ramp were well below that level. The shipping container for the gauge showed no indication of breached integrity, so there was no potential for a ruptured source and resultant contamination on the roadway, allowing for the continued use of the on-ramp to the interstate.

“With the detectors, we don’t need to close a road and agitate the public unnecessarily,” Seif says.

For more information on the Illinois Preventive Radiological/Nuclear Detection program, contact Ron Ellis of the Illinois Law Enforcement Alarm System at ron.ellis@illinois.gov or (217) 871-6010, or Tom Seif of the Illinois Emergency Management Agency at tom.seif@illinois.gov or (217) 557-1883. For information on the DHS Domestic Nuclear Detection Office, contact Thomas Bourne, assistant director of the DNDO Operations Support Directorate, at thomas.b.bourne@dhs.gov.

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