Airmen construct In-place Patient Decontamination Capability

U.S. Army (Phillip H. Jones)

Decontamination Operations in a Mass Casualty Scenario

At 10 a.m. on May 10, 2007, in the northeast corner of metropolitan Indianapolis, near the suburb of Lawrence, a terrorist group smuggled in and detonated a nuclear device. The local, state, and Federal governments were presented with many complex challenges as a result of this catastrophic event. Among the most challenging tasks was the need to quickly and completely decontaminate large numbers of the population. . . .

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Thus begins the scenario for exercise Ardent Sentry 2007 (AS07). Why was such an exercise needed? Indeed, the Department of Defense (DOD) is capable of providing decontamination in support of civil authorities. However, effective employment of DOD decontamination capabilities requires a full understanding of the special circumstances of a homeland event and the doctrinal differences between battlefield decontamination operations and defense support to civil authorities (DSCA).

This article, sponsored by the Joint Requirements Office for Chemical, Biological, Radiological, and Nuclear Defense (JRO CBRND), focuses on two perspectives of the DOD decontamination mission for planning considerations: the differences between decontamination conducted in a DSCA environment and that done by DOD units in their traditional wartime role. The article also examines additional considerations on mass decontamination tasks due to the DSCA environment; the challenges associated with decontamination in a DSCA environment; the impact of DSCA on decontamination tasks; and some specific observations about managing the civilian population, controlling runoff, and dealing with personal effects. It further highlights the need for better understanding by DOD planners and units regarding the unique challenges of supporting civilian authorities with decontamination.

Background

Exercise Ardent Sentry 2007 was designated by the Chairman of the Joint Chiefs of Staff, sponsored by U.S. Northern Command (USNORTHCOM), and supported by U.S. Joint Forces Command. Based on Department of Homeland Security (DHS) National Planning Scenario #1 (Nuclear Detonation—10-Kiloton Improvised Nuclear Device),

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AS07 primarily focused on exercising the USNORTHCOM ability to execute DOD chemical, biological, radiological, nuclear, and high-yield explosive (CBRNE) response plans at the operational level. For the first time, AS07 included a separate but simultaneous field training exercise designed to allow selected DOD units to train with civilian counterparts.

Since 2004, the JRO CBRND has been providing CBRN and consequence management subject matter experts to support the combatant commands' and their subordinates' training and exercise programs. The office has also partnered with several non-DOD government agencies to enhance their knowledge of DSCA procedures.

In the months leading up to AS07, the JRO CBRND provided USNORTHCOM and USJFCOM with technical assistance in developing the effects of the nuclear detonation for the exercise and observed battle staff operating procedures at selected command and control locations. Exercise development included collaborating with exercise planners from the Indiana Department of Homeland Security to build the documents and scenario inputs needed to drive the DOD response to the Federal requests for assistance. Participants recognized during the planning process and exercise execution that further discussion of the above two perspectives of DOD decontamination would benefit the CBRNE response community and emergency responders in general.

The exercise was conducted May 10–17, 2007. The simulated nuclear detonation was a no-notice terrorist event in the northeast corner of metropolitan Indianapolis. The scenario used scripted weather, census data from 2000, and computer modeling. It was determined that the 10-kiloton surface burst created casualties estimated at 15,000 dead and 21,000 injured. The injured included those affected by the blast, thermal radiation, prompt radiation, and subsequent radioactive fallout.

The detonation and subsequent effects resulted in the declaration of an incident of national significance, the appointment of a principal Federal official by DHS, and a subsequent Presidential disaster declaration. Per the National Response Plan (NRP), which was in effect at the time of the exercise but has since been replaced by the National Response Framework, DHS and Federal Emergency Management Agency (FEMA) Region V established a joint field office (JFO) at Camp Atterbury, 43 miles south of Indianapolis. The defense coordinating officer and defense coordinating element from FEMA Region V joined the JFO as part of the coordinating staff. Joint Task Force–Civil Support was deployed to Camp Atterbury to provide command and control over all DOD forces deployed (real world and notionally) to support the local, state, and Federal response. Elements of the DOD CBRNE Consequence Management Response Force were also deployed to conduct operations in concert with first responders from Marion County, Indiana, the Indiana Department of Homeland Security, elements from the Indiana National Guard CBRNE Enhanced Response Force Package, and civil support teams. This field training exercise was conducted at the Muscatatuck Urban Training Center, 25 miles southeast of Camp Atterbury.

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Decontamination in DSCA Environments

In a terrorist use of weapons of mass destruction (WMD) scenario, DOD is ready to assist the local, state, and Federal response efforts. DOD fulfills its DSCA mission by responding to requests for Federal assistance in accordance with the NRP and DOD policy and guidance. The NRP provides the coordinating framework for support under the Robert T. Stafford Disaster Relief and Emergency Assistance Act[1] and the Economy Act.[2] Within the NRP, DOD is a support agency to all 15 emergency support functions and a cooperating agency to the majority of NRP support and incident annexes. Pursuant to the above, when requested and in concert with other Federal agencies, DOD supports the primary agency by providing the manpower and equipment necessary to meet the needs of the responding local and state officials.[3]

In a large-scale catastrophic event, where local, state, and regional capabilities are overwhelmed, the Federal Government, with DHS as the lead agency, assists local and state efforts in mitigating effects. To accomplish this, DHS may request support from Title 10 DOD forces, activated Reserves, and possibly federalized National Guard. Orchestrating DOD capabilities in collaboration with other existing capabilities is the function of the JFO.

In the AS07 scenario, DOD decontamination capabilities were used (notionally) either to augment or provide relief in place for decontamination operations initially started by local first responders and National Guard units in state Active duty or Title 32 status. This highlights the need for DOD decontamination units to learn and understand how civilian first responders approach expedient mass decontamination operations.

The pre-9/11 focus on responding to and remediating hazardous material spills demonstrated a capable and thorough decontamination process. These procedures and systems, however, were equipment- and manpower-intensive and had various but limited throughput capacities (usually 50–100 people per hour). By comparison, the current decontamination throughput capabilities of DOD units, such as the Marine Corps Chemical/Biological Incident Response Force and Army Chemical Decontamination units, vary between 250 and 400 troops per hour.[4]

Recognizing the need to decontaminate much greater numbers, civilian first responders developed methods using currently available equipment. Two of the more common approaches are the Emergency Decontamination Corridor System (EDCS) and Ladder Pipe Decontamination System (LDS). Both have been documented in publications by the U.S. Army Soldier and Biological Chemical Command[5] (SBCCOM) and the Chemical, Biological, Radiological, and Nuclear Defense Information Analysis Center (CBRNIAC).

In January 2007, SBCCOM published *Guidelines for Mass Casualty Decontamination during a Terrorist Chemical Agent Incident*. Although the guidelines review these capabilities in respect to a chemical event, they offer several principles of decontamination that also apply to a nuclear detonation scenario:

- expect a 5:1 ratio of unaffected to affected casualties
- decontaminate as soon as possible
- disrobing is decontamination: top to bottom, more is better
- water flushing generally is the best mass decontamination method
- after known exposure to a liquid agent, first responders must self-decontaminate as soon as possible to avoid serious effects.

Drawing on the innovation of various fire departments, section 4.4 of the SBCCOM guideline also provides excellent schematics, photographs, and procedures for mass decontamination via the EDCS and LDS and commonly used first responder equipment.

Similarly, CBRNIAC cites two products: the *Emergency Decontamination Corridor and Ladder Pipe Decontamination Systems* (CR–04–12), published in May 2004, and *Best Practices and Guidelines for Mass Personnel Decontamination* (SOAR–04–11), published in June 2003. CR–04–12 is a laminated card that provides site layout diagrams for each system and quick reminders on the advantages and disadvantages of each.

Similar to the SBCCOM publication, SOAR 03–10 focuses on responding to and decontaminating victims due to chemical or biological incidents. Its sections on general decontamination principles, setups, and managing incident sites are useful for a nuclear scenario as well. These systems primarily use equipment common to fire departments (including those at DOD installations), but not to DOD decontamination units.

This disparity in capability within DOD is to be expected as installation fire department personnel are trained and equipped much like their civilian counterparts and routinely collaborate with them through mutual assistance/aid compacts (as directed through DOD instructions/guidelines). DOD decontamination units, on the other hand, are equipped and trained for the warfighting mission. These facts highlight the need for all elements of the possible DOD response community to become familiar with the equipment and procedures of civilian expedient mass decontamination to fulfill their expected supporting roles according to the NRP.

Impact of DSCA

While developing the scenario in conjunction with representatives from the Indiana Department of Homeland Security Training Division and City of Indianapolis Department of Public Safety, it was learned that decontamination efforts in the DSCA environment require special considerations by military CBRN planners in the following areas:

- determining who needs to be decontaminated
- multisite operations
- integration of decontamination operations with other plans
- disposition of runoff
- disposition of personal effects
- accountability
- crowd control.

The CBRNE expert needs to be keenly aware of the full context in which DOD decontamination capabilities will be employed in a DSCA environment. Incorporating the above considerations into the staff preplanning and command guidelines will strengthen the execution of mass decontamination operations.

Other information sources of best practices to amplify and support these considerations include the DHS Lessons Learned Information Sharing Web site (www.LLIS.gov), which contains an archive of best practices from all jurisdictions of interest to the response community at large. One such citation, "Radiological Dispersal Device Incident Response Planning: Decontamination," provides insights into the topical discussions presented here.

Determining Decontamination. In the AS07 scenario, modeling estimated that a total of 21,000 citizens were within the area defined as the evacuation zone due to the fallout created by the nuclear detonation. Some of these citizens would be evacuated immediately, while those further downwind might shelter in place and be evacuated later.

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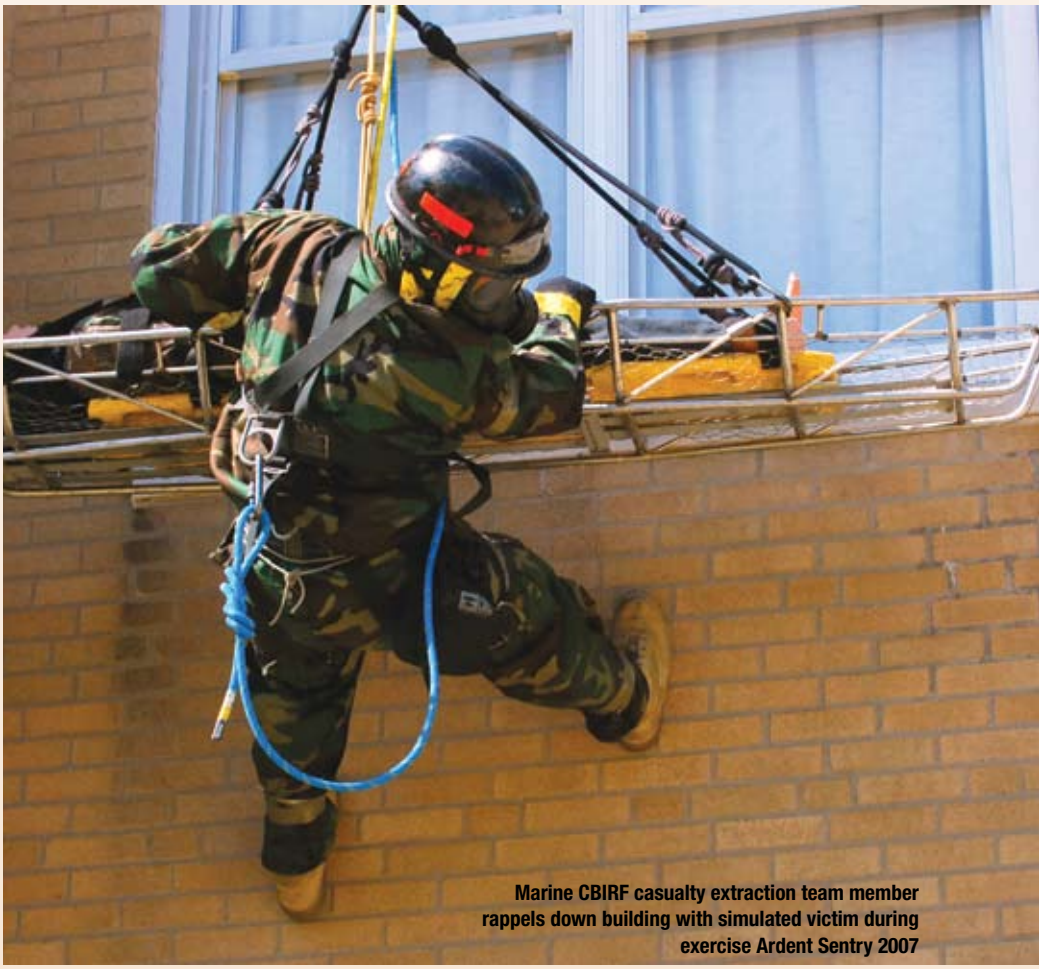
It is reasonable to assume that not everyone within the evacuation zone would be contaminated. Identifying those who are "clean" would greatly reduce the resources needed and expended. This prescreening process is likely to be complicated by several factors in a no-notice event. For example, many victims or potential victims would have self-evacuated, creating the issue of how to communicate to them, locate them, treat them, and deal with any cross



U.S. Air Force (Julius Delos Reyes)

Marine CBIRF casualty extraction team member rappels down building with simulated victim during exercise Ardent Sentry 2007

▲ *Download as computer wallpaper at ndupress.ndu.edu*

contamination precipitated by their evacuation. Additionally, first responders, some of whom would be victims themselves or become victims due to exposure, would arrive late and be uncoordinated due to communications being degraded by electromagnetic pulse and system overloading.

Multisite Operations. To respond to the magnitude of need, several mass decontamination sites probably would be established around the plume perimeter. While DOD is not the primary agency responsible for coordinating the operations of the multiple sites, having military leaders prepared to provide support and/or relief to any operation or even take over full operation of a particular site would improve and maintain the efficiency of the process. Knowledge of the locations, access routes, and capabilities on each site would expedite the response to requests for support by civil authorities.

Integrating Operations. Decontamination operations must be integrated into the whole mitigation/recovery process. Successful decontamination operations include planning initial medical triage and follow-on medical care, as well as providing subsequent transport, clothing, food, and shelter to all those who process through prescreening.

From a medical standpoint, establishing ambulatory and nonambulatory decontamination lines is just one aspect of the process. Consideration needs to be given to how close to the decontamination area triage facilities and transportation staging areas should be established so wind shifts do not threaten operations. Provision of food and water needs to be planned for those awaiting transportation, as do trash collection and the consolidation and disposal of contaminated clothing and personal effects. Coordination with ESF 8 (Public Health and Medical Services) and the American Red Cross on pickup/transport is recommended in order to prevent overcrowding at the decontamination site.

Runoff. The need to process large numbers through the decontamination line makes containment of the runoff a challenge. Conventional hazardous material decontamination operations contain runoff to prevent contamination of the environment. Runoff issues revolve around the type of contaminant as well as remediation coordination with the proper environmental agencies. A hard surface with the proper grade to reduce cross contamination is essential to containing the runoff. EDCS and LDS operate as high volume/low pressure systems and generate significant amounts of runoff.

Proper location selection and configuration are crucial to enabling continuous decontamination operations, as well as to reducing the amount of postdecontamination remediation that needs to occur. In the DSCA environment, CBRNE staff officers must consider environmental impacts when planning and executing decontamination operations. Numerous Federal and state laws may impact the decisions of CBRNE planners. *First Responders' Liability to Mass Decontamination Runoff*, published by the Environmental Protection Agency in July 2000, provides an excellent synopsis of the issue and has links to more detailed information.[6]

Personal Effects. The need to decontaminate large numbers of people creates the need to deal with volumes of personal effects that will require final disposition as victims process through the decontamination line. Jurisdictional decisions referencing the disposition of personal effects will need to be addressed within JFO planning. What is to be done with licenses, credit cards, and other personal identity items will need to be determined as prescribed by local protocols. Additional protocols must be in place for the screening/disposition of vehicles.

Accountability. In every event, ascertaining the disposition of all affected people is a major concern. A nuclear detonation scenario of this magnitude would most certainly be a worst-case scenario, particularly due to the large numbers of displaced residents seeking decontamination. Complicating the need to track people through evacuation, decontamination, transport, and followup medical care is the fact that they may have also been stripped of any identification. In the initial chaos of a no-notice event, such protocols may not have been in place in the rush to meet other priorities. In any case, typical DOD decontamination procedures do not address this task but may be expected to support it in a DSCA response.

Crowd Control. Keeping large groups orderly is essential for effective mass decontamination operations. Local law enforcement would vector victims to the various mass decontamination sites established upwind of the blast and outside the projected plume path. Communicating to the victims the necessity to move through the decontamination processes in an efficient manner would be a challenge. While Title 10 forces are prevented from performing law enforcement duties in accordance with the Posse Comitatus Act, the planning and operation of a mass decontamination station must address the need for crowd control and coordination for support from civilian law enforcement.

The procedures and capabilities to conduct mass decontamination have undergone dramatic changes in recent years. Although the Department of Defense is not the lead agency responsible for coordinating the overall decontamination effort in a catastrophic scenario such as a nuclear detonation, it will most likely be called upon to establish its own mass decontamination sites or to augment operations that were previously established by local/state first responders.

This creates the need to understand the operational employment concepts and equipment that may be used by civilian first responders such as the Emergency Decontamination Corridor System and Ladder Pipe Decontamination System. Additionally, practicing the task of actually having to decontaminate thousands of people is not often done; therefore, periodic review of mass decontamination plans with special consideration of the aforementioned areas allows planners to incorporate new policies, procedures, and equipment. We train not just to train; we train because we are reminded that someday, we may have to execute this scenario for real. **JFQ**

NOTES

[1] Public Law 93–288, Title 42, U.S. Code, Section 5121, et seq.

[2] Title 31, U.S. Code, Section 1535.

[3] U.S. Northern Command Revised Contingency Plan 2501 for Defense Support of Civil Authorities, dated April 11, 2006, describes the manner in which DOD forces provide that support.

[4] Data gleaned from Chemical/Biological Incident Response Force organizational brief and statements made by CBRNE Consequence Management Response Force personnel at the commanders' conference hosted by Joint Task Force–Civil Support, Fort Monroe, Virginia, August 28–30, 2007.

[5] In 2003, the U.S. Army Soldier and Biological Chemical Command was renamed the Natick Soldier Research Development and Engineering Center under U.S. Army Research and Development Command.

[6] Available at <www.epa.gov/OEM/docs/chem/onepage.pdf>.