

Department of Defense  
U.S. Army Edgewood Chemical  
Biological Center

# Enzyme-Based Decontamination Technology for Organophosphorus Nerve Agents and Pesticides



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With an increasing need to respond quickly and efficiently to real-world threats such as a deliberate chemical warfare agent attack or accidental release of toxic industrial chemicals, the U.S. Army Edgewood Chemical Biological Center (ECBC) developed a patented technology to neutralize organophosphorus chemical agents and pesticides.

This enzyme-based technology simplifies and improves the process of decontaminating a class of highly toxic chemicals, including nerve agents. Other decontamination methods use corrosive chemicals that are more costly, less efficient, and generate a substantial amount of residual waste. The ECBC technology is nontoxic,

as firefighting foams and sprays, and aircraft deicing solutions. In an incident where highly toxic chemicals are released, the enzymes quickly neutralize the chemicals before they can contaminate a wider area.

While initially intended for decontaminating equipment, facilities and large areas, the enzymes could potentially be used in shower systems for decontaminating personnel and casualties.

Having invented this enzyme-based decontamination technology, ECBC needed a commercialization partner to license and enhance the manufacturing process to drive down the unit cost of the material—an important requirement for broad adoption of the tech-

nology. Genencor International, Inc., the leading manufacturer of industrial and specialty enzymes in the United States, was contacted to explore the possibility of licensing and manufacturing the technology. Genencor agreed to license the technology and use its state-of-the-art fermentation plants for the manufacturing process.

noncorrosive, and environmentally safe. It can be applied using existing water-based application systems such

Genencor met its production milestone and is now successfully producing the licensed enzymatic decontamination technology under the trademark DEFENZ™. This product is being purchased by companies that produce and sell firefighting foams and sprays and other matrices. These companies, in turn, are formulating the enzymes into products for purchase by fire departments, HAZMAT groups, and others in the first responder community. The first commercial decontaminant that incorporates the enzymes (All-Clear™) was introduced into the market by Kidde Fire Fighting, Inc., in August 2005.

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