HOT ZONE FORENSICS

"From the forensic perspective, the criminal release of a hazardous substance, whether it be for financial gain, revenge, or an act of terrorism, is differentiated only by its motive."

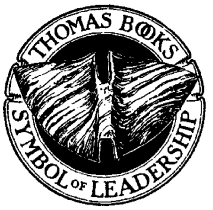
Steven C. Drielak

HOT ZONE FORENSICS

Chemical, Biological, and Radiological Evidence Collection

By

STEVEN C. DRIELAK



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This book is dedicated to Jo.

PREFACE

It may seem a little odd, but I feel compelled to tell the readers of this text what this book is *not* about. It is not a book about HazMat, nor is it a book about the emergency response to a WMD incident. This book is about the forensic evidence collection protocols that will be conducted in a place very unfamiliar to most criminal investigators. This place is called the *hot zone.* I have watched a slow evolution in law enforcement during the past 20 years. Two decades ago, local law enforcement wanted little or nothing to do with investigations involving hazardous chemicals, biological materials, and radioactive isotopes. I can assure the readers that many such criminal cases existed and many of these were either poorly investigated by local law enforcement authorities or not investigated at all. In many parts of the country these criminal investigations were left to well meaning and dedicated civil enforcement personnel who quickly found themselves immersed in a criminal justice system that they found to be demanding, overwhelming, and quite to their surprise, adversarial. In the middle 1990s a new public safety issue arose, surrounding the possible use of a weapon of mass destruction by both foreign and domestic terrorists. The issue became a proverbial soapbox for many politicians and a burgeoning story for the mass media. The threat surrounding the use of a weapon of mass destruction offered agonizing death, mass casualties, and guaranteed film footage for the 11 o'clock news. This new threat frightened the citizenry of this country. One of the many political responses to this fear was the massive allocation of funds to increase our domestic preparedness. These vast sums of money have been spent by federal, state, and local emergency response agencies to better prepare themselves to meet this new threat. Law enforcement became active in these new programs and became one of the many groups newly labeled as "emergency responders." However, local law enforcement's traditional role in responding to criminal activity has always gone beyond simply helping the victims and restoring order. Once law enforcement agencies had received their initial WMD response training, many began to ask the obvious questions. Those questions involved their roles as criminal investigators. Many asked,

"Now that we have all of this training and equipment, what do we do after the victims have been removed from the crime scene?" In most instances, the answer to this question has been to let the federal authorities handle the evidence collection and follow-up investigation involving the use or threatened use of a weapon of mass destruction. Federal law enforcement agencies, such as the FBI and EPA, have outstanding hot zone forensic programs and capabilities. They also possess the statutory authority and responsibility to conduct these investigations. However, the potential for a multiple target attack with weapons of mass destruction is real. Should a simultaneous multiple target attack occur across the United States, the hot zone forensic resources of these agencies may become quickly overwhelmed. This point was clearly illustrated in the anthrax attacks, which occurred in 2001. The anthrax attacks and outbreaks in the fall of 2001 inundated local law enforcement with tens of thousands of calls involving suspicious powders and substances. Many of these cases were responded to, and handled by, local law enforcement agencies. These responses included the collection of potentially hazardous forensic evidence. Although the vast majority of these cases were considered "false alarms," the drain on local, state, and federal investigative law enforcement resources could clearly be seen. The reality of this situation proved that local law enforcement must be prepared to conduct the initial investigation at a crime scene involving a chemical, biological, or radiological weapon.

The detonation of a chemical, biological, or radiological weapon may require the immediate and proper collection of the victims contaminated clothing. It may also require the immediate collection of airborne forensic evidence. When facing the possibility of multiple target attacks and a severe drain on federal law enforcement resources, local law enforcement personnel may be faced with an evidentiary dilemma. If the evidence collection process is delayed, that evidence may be lost or destroyed. If the evidence is collected improperly, there may be severe consequences during the criminal trial process. There is no doubt that crime scene evidence, regardless of the severity of the crime, must be collected promptly and properly. Law enforcement must also realize that many of these cases may be prosecuted as capital crimes with an individual or individuals facing a possible death sentence. These types of prosecutions will require more than simple witness testimony. There will be a demand for properly collected chemical, biological, and radiological forensic evidence. There will also be a challenge to the validity and integrity of that evidence. The technical difficulty of the subject matter will not diminish the high standards established by our courts. In the past, our criminal justice system has made it perfectly clear that it will not accept delayed responses and inadequate training as an excuse for poor police work. Today, cases involving chemical, biological, and radiological weapons are unique; tomorrow they may be commonplace. It is clear that local, state,

and federal law enforcement officers must be trained and equipped to fulfill their role as criminal investigators in cases involving weapons of mass destruction.

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Chapter 1

INTRODUCTION

Weapons of mass destruction (WMD) and toxic warfare weapons represent a new challenge to law enforcement. The weapons that were once restricted to laboratories, test sites, and battlefields are now being utilized by terrorists in order to further their political and/or religious doctrines. Traditionally, chemical agents, biological agents, radiological materials, and special nuclear materials have all been prime choices when designing a terror weapon. Terrorists have already used many of the materials on a limited basis and have achieved varying levels of success. However, their rate of use may be in direct proportion to the materials' accessibility and cost of manufacturing. For these reasons, the future terrorist weapon of choice may be the toxic weapon. Toxic weapons incorporate inexpensive, relatively easy-to-acquire chemicals and industrial wastes. These items are readily found in our cities and towns and can take the form of raw chemicals, chemical wastes, industrial wastes, biological wastes, and radiological waste. In contrast to the more traditional weapons of mass destruction, these weapons require no manufacturing facilities. In fact, these substances need not even be shaped into anything resembling a traditional weapon in order to be effective.[1] Several of these toxic chemicals are listed in Schedule 3 Chemicals under the Chemical Weapons Convention (see Appendix 1). These are similar to Schedule 1 Chemicals in that they may have been stockpiled or used as weapons, but are different in that they are generally produced in large quantities and used in general industry. However, these Schedule 3 Chemicals make up only a fraction of the available hazardous materials that have the potential for weaponization. There are over 1,000 chemicals classified as hazardous substances by the United States government.[2] Large quantities of these chemicals and substances are transported and stored within our communities every day. In addition, the U.S. government requires manufacturers and some end users of these materials to file Risk Management Plans and Offsite Consequence Analysis (OCA) information that details the "worst-

case scenario" consequences should these materials be released into the local community.[3] These plans can be viewed as blueprints for terrorists' attacks. They provide the names of the hazardous chemicals, their physical properties, their storage locations, the quantities available, potential targets, and population estimates. OCA information is available at 50 federal reading rooms throughout the United States. At these federal reading rooms, members of the public are able to read, although not remove or mechanically reproduce, a paper copy of OCA information for up to *10 facilities per calendar month* located anywhere in the country. In addition, any person can view OCA information for facilities located in the jurisdiction of the Local Emergency Planning Committee (LEPC) where the person lives or works. The only restriction to this access is that an individual wishing to review this information must produce a photo identification issued by a federal, state, or local government agency (e.g., driver's license or passport).[4] This system will allow a single individual to review 120 facilities in a calendar year simply by producing a driver's license. The U.S. Senate has reported that a phony driver's license, with a photograph, can be purchased in Los Angeles for $150.00.[5] The potential for the misuse of this information and the feasibility of utilizing a toxic weapon based upon OCA information are just some of the many challenges facing law enforcement today.

The use of WMD and toxic weapons as instruments of crime and terror have forced upon mainstream law enforcement a new and challenging evidence-gathering discipline. This new discipline is commonly referred to as *Hot Zone Forensics.* State and local law enforcement agencies have attempted to meet this challenge with varying degrees of success. Local law enforcement failures in this area can be traced back to limited training and a lack of commitment and foresight. As with most new challenges, many lessons can be learned from the past. One only has to look back to the incident in Bhopal, India to understand the consequences of law enforcement's ineffectiveness in these types of cases.

In the late evening hours of December 23, 1984, a critical chemical reaction occurred in the Union Carbide facility in the city of Bhopal, India. Several hundred gallons of water from a simple rubber hose were purposely introduced into an isolated storage tank containing methyl isocyanate (MIC). Methyl isocyanate is a volatile, colorless liquid that reacts violently with water. It is used in making pesticides, polyurethane foams, and plastics. The introduction of water into the methyl isocyanate caused its temperature to rise over 100°C, leading to an exothermic reaction and subsequent increase in pressure. The violent reaction between the water and the methyl isocyanate produced a deadly gas that was released through a safety valve into the atmosphere. Within a few hours, approximately 40 tons of this poisonous material were released. It spread downwind over an area of 8 kilometers and

killed over 3,800 of the city's residents. In addition, there were approximately 11,000 injuries associated with this release. A subsequent investigation[6] indicated that, in an act of sabotage, an unknown individual unscrewed a local pressure indicator on the methyl isocyanate tank and then connected a water hose. Unfortunately, these conclusions were based primarily on the hearsay statements of plant employees. There appears to be a complete lack of any forensic investigation by law enforcement personnel. There is no evidence of crime scene photographs or sketches depicting the hose and removed pressure indicator that would assist in the corroboration of the witnesses' statements. In addition, there is no indication that chemical evidence samples had been collected by law enforcement personnel. In fact, the actual analysis of the remaining tank bottoms was not concluded until several months later. Indian law enforcement authorities did not conduct this analysis and subsequent scientific investigation. It was actually conducted by Union Carbide. Union Carbide's scientific investigation determined that an unknown person, with an unknown motive, purposely removed the MIC tank #610 pressure gauge, connected a water line and proceeded to add 2,500 pounds of water into the tank.

The incident in Bhopal had a huge impact upon the government of the United States and spawned the creation of numerous laws and regulations. Congress authorized the Environmental Protection Agency (EPA) to promulgate the Risk Management Program Rule[7] for protection of the public and authorized the Occupational Safety and Health Administration (OSHA) to promulgate the Process Safety Management Standard[8] to protect workers. In 1986, the Emergency Planning and Community Right to Know Act was established. These programs required local emergency response plans and the proper training of response personnel. In addition, this incident was the catalyst for the establishment of the U.S. Chemical Safety and Hazard Investigation Board.[9] Perhaps the most striking characteristic of the incident in Bhopal is its graphic representation of the potential for the use of industrial chemicals as toxic weapons.

Today, fire, police, and emergency medical first responders are well trained to handle large-scale incidents such as this. Unfortunately, as was the case in Bhopal, little training and few resources have been dedicated to the criminal investigation of these types of incidents. *A criminal release of a hazardous substance, whether it be for financial gain, revenge, or an act of terrorism is differentiated only by its motive.* Each act requires the same thorough forensic crime scene examination. Evidence must be collected using protocols and methodologies that will assist in moving the investigation forward and, at the same time, meet the requirements of our criminal justice system. However, much of this evidence will be located in hostile environments that will pose both a danger and a challenge to investigative law enforcement personnel.

It is imperative that investigative law enforcement personnel realize that cases involving the use of a WMD or toxic weapon may result in capital murder charges. The ensuing trial(s) will gain national attention, oppressive media scrutiny and, in all likelihood, bring forward the best defense attorneys in the country. The practical implications of this will be a complete and thorough examination of the chemical, biological, and radiological evidence collection techniques utilized by law enforcement. In this type of criminal trial, documentation will be secondary to actual witness testimony. Unfortunately, there is a perception by many in the law enforcement/WMD arena that laboratory reports and supporting sampling documentation can stand on their own in a criminal trial proceeding. Nothing could be further from reality. Many laboratories have numerous individuals involved in the analytical process. The simple introduction of a gc/ms laboratory report at trial may require the testimony of every single person in that analytical chain. This may include the person who received the samples into the laboratory, the individual who prepared the sample (dilution), the individual who prepared and ran the standards (calibration), the individual who ran the sample, the individual who interpreted the data, as well as the individual who issued the final laboratory report. In addition, members of the sample team will be called upon to testify as to equipment preparation protocols, quality controls, cross-contamination and outside contamination controls, sampling protocols, and protocols for the chain of custody. Each member of the sample team will be required to defend each and every action that was taken during the sampling event. In addition, their formal sample training and qualifications will be examined and, in all likelihood, challenged. This type of scrupulous and adversarial judicial review will have two immediate effects. First, sampling and analytical concerns similar to those raised in the 1998 Sudan (EMPTA) sampling event will be fully and publicly addressed.[10] Secondly, the local, state, and federal law enforcement agencies will be forced to create stringent sampling protocols for this type of *criminal* evidence collection.

The standard to which chemical, biological, and radiological evidence will be held will be the criminal standard. This standard or measure of proof is commonly described as "beyond a reasonable doubt." Unfortunately, many of the sampling protocols in existence today have been designed to meet a regulatory, compliance monitoring, or scientific standard. While these sampling protocols may be acceptable within these environments, they may prove to be woefully inadequate within any adversarial-based judicial system.

This issue can be clearly seen in the *Recommended Operating Procedures for Sampling and Analysis in the Verification of Chemical Disarmament.* This document serves as the basis for the sampling protocols utilized by international