Defense Threat Reduction Agency
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Advanced Systems and Concepts Office

FINAL REPORT

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MANNED GAMING AND SIMULATION RELATING TO TERRORISM AND WEAPONS OF MASS DESTRUCTION: *A REVIEW OF THE LITERATURE*

Date: 17 April 2004

The WMD Terrorism Research Project
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Manned Gaming & Simulation Relating to Terrorism & Weapons of Mass Destruction: A Review of the Literature (MIIS/CNS)

- In an effort to survey existing terrorist behavior modeling, DTRA-ASCO and the Monterey Institute for International Studies' Center for Nonproliferation Studies prepared a literature review on this topic, which was completed in August 2002. This search/review helped provide the context and knowledge of current efforts in this area from a variety of sources.
- Completion Date: April 2004

Center for Nonproliferation Studies
Monterey Institute of International Studies

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BACKGROUND: The Defense Threat Reduction Agency (DTRA) was founded in 1998 to integrate and focus the capabilities of the Department of Defense (DoD) that address the weapons of mass destruction (WMD) threat. To assist the Agency in its primary mission, the Advanced Systems and Concepts Office (ASCO) develops and maintains an evolving analytical vision of necessary and sufficient capabilities to protect United States (U.S.) and Allied forces and citizens from WMD attack. ASCO is also charged by DoD and by the U.S. Government generally to identify gaps in these capabilities and initiate programs to fill them. It also provides support to the Threat Reduction Advisory Committee (TRAC), and its Panels, with timely, high quality research.

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Section 1: Introduction

A) *Background*

In the past decade, both the public and policy-makers have become increasingly aware of the threat of a terrorist attack utilizing weapons of mass destruction (WMD). This concern further intensified following the attacks on September 11, 2001 and the subsequent mailing of letters laced with *Bacillus anthracis* spores. The primacy of understanding and preparing for the WMD terrorism threat is now apparent to all. One of the key means by which to understand any threat is to examine empirical evidence of past attacks. Although, a robust historical record of conventional terrorist attacks and growing databases of incidents involving sub-national actors and chemical, biological, radiological or nuclear (CBRN) weapons[1] have become available for public and government consumption, the sample size of catastrophic-scale incidents of WMD terrorism is essentially zero.[2]

While much can be learned from existing data sets, the fortunate absence of previous large-scale WMD terrorist attacks demands a greater reliance on alternative approaches to analyzing and preparing for the threat. One of the few bases upon which to examine the most feared WMD terrorism threats – attacks resulting in massive numbers of fatalities due to the use of an efficient CBRN weapon[3] – is to simulate those attacks using various media and environments. A major category of simulation is computational simulation and modeling employing a variety of software-based tools such as agent-based or rule-based techniques.[4] Another type of simulation is achieved by using human beings to recreate (to varying levels of granularity) the circumstances and decision-making process both prior to and in the aftermath of a WMD terrorist event.

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[1] One such database is the Monterey WMD Terrorism Database, see http://cns.miis.edu/db/wmdt_demo/index.htm .

[2] The closest examples of mass-casualty WMD terrorism incidents are the poisoning of German soldiers in the Stalag 17 POW camp after World War II by the Avenging Israel's Blood group and the 1995 use of sarin on the Tokyo subway by the Japanese Aum Shinrikyo cult. However, in the former case, the number of casualties is unclear, and in the latter the delivery method used was fairly crude and resulted in only 12 fatalities, making neither case unequivocally a large-scale WMD incident.

[3] Some sources now include large-scale conventional explosives or even cyberwarfare within the definition of WMD (for example, Title 18, U.S. Code 2332a defines a weapon of mass destruction to include any explosives, incendiary charges, missiles, and mines in addition to chemical, biological, radiological and nuclear agents). However, the authors of this report maintain that CBRN materials can differ substantively from these other forms of warfare and will restrict this paper to the context of CBRN weapons.

[4] To this end, the Center for Nonproliferation Studies has produced an extensive literature review of computational modeling efforts pertaining to simulating terrorist behavior. See *LITERATURE REVIEW OF EXISTING TERRORIST BEHAVIOR MODELING*: Final Report to the Defense Threat Reduction Agency, (14th August 2002).

It is within this context that the Advanced Systems and Concepts Office of the Defense Threat Reduction Agency (DTRA/ASCO) commissioned the WMD Terrorism Research Project at the Center for Nonproliferation Studies (CNS) to undertake a literature review of manned gaming and simulations of terrorist threats that involve WMD.[5] The review was conducted mainly on the basis of open-source literature, but also includes some sources categorized 'For Official Use Only'. No classified sources were consulted in compiling this report.

B) *Project Goal*

The primary goal of this project was to collect as much of the open source literature on manned gaming and simulations of terrorism involving WMD as possible, organize these data, and present them in an accessible format. In the course of the project, project investigators supplemented these goals by abstracting and analyzing certain aspects of these manned simulations.

C) *Project Duration*

The project commenced in April 2003 and was completed in March 2004. However, the total time devoted to the project was six months, as a delay of four months resulted while investigators awaited the transfer of the Nunn-Lugar-Domenici After Action Reports (AARs) from the Department of Homeland Security.

D) *Structure of Final Report*

This report consists of seven sections and four appendices:

1) Introduction
2) Methodology
3) Web Resources
4) Role-playing Games (+ list of accompanying documents)
5) Terrorist Organization Simulations (+list of accompanying documents)
6) WMD Terrorism Response Exercises
    A. List of exercises
    B. Review of literature on exercises

[5] The following instructions were supplied by DTRA/ASCO: "Like the very useful literature search compiled by MIIS/CNS on computer modeling and simulation that pertains to terrorism, DTRA/ASCO needs a literature search on manned games and simulations (sometimes called role-playing games) that have been already done in the past that pertain to terrorist threats that involve WMD."

C. Correspondence and interviews (+list of accompanying documents)
D. Reference exercise
E. Media reports of response exercises (excluding AARs) (+list of accompanying documents)
F. Domestic Preparedness Program After Action Report (AAR) Review

7) Best Practices for a WMD Terrorism Exercise
8) Conclusion

Appendix A – List of electronic resources accompanying final report
Appendix B – Contact Personnel
Appendix C – After Action Report Reviews
Appendix D – Additional Exercise Reviews

Section 2: Methodology

This literature review was conducted over a period of six months by a team consisting of two lead investigators, a research associate, and eight graduate research assistants. The lead investigators are members of the WMD Terrorism Project at CNS.

The investigation was carried out in four phases:

Phase I: Information Identification and Collection [April 2003 – January 2004]
Phase II: Data Calibration and Organization [June 2003 – August 2003; December 2003 – February 2004]
Phase III: Analysis and Overview [January 2004 – March 2004]
Phase IV: Writing and Compiling Final Report [February – March 2004]

Phase I: Information Identification and Collection

Phase I of the project involved the collection of the following types of information:

a) Examples of specific manned simulations of WMD terrorism.
b) Literature discussing how to conduct manned simulations of terrorism, especially involving WMD.
c) Reports and overviews on the utility of manned simulations in the WMD terrorism context.

Collection Process

Researchers initially utilized a variety of open-source research tools to canvas the World Wide Web. Search terms were all initially used for general open-source searches on the internet using standard search engines. Search terms used included:

WMD attack simulation
WMD exercise
WMD training
WMD response
WMD terrorism response
terrorism exercises
exercise simulations
terrorist attack simulation
simulations
exercises
manned exercises
manned terrorism exercises
manned WMD terrorism exercises

The most relevant of these search terms were retained, others were modified, and the revised set of search terms was then used to search specific web pages, databases, and other open sources (e.g. the General Accounting Office reports site, Jane's International resources, the ANSER website, and Memorial Institute for the Prevention of Terrorism online library). The search terms with the most relevant hits *('WMD exercise', 'WMD training', 'WMD response', 'WMD terrorism response', 'terrorism exercises', 'exercise simulations')* were used as inputs for database resources such as Lexis-Nexis, Proquest, and Firstsearch, as well as CNS' own Profiler repository. All of these databases were consistently monitored from April 2003 until January 2004.

The research team made use of the following types of data sources:

Government websites (Federal, State, and Local agencies, including emergency preparedness entities)
Government databases (National Technical Information Service, Defense Technical Information Center)
Corporate websites
Homeland security-related journals
Security and Defense-related publications (such as Jane's International publications and various industry newsletters)
Personal interviews
News articles

The initial research efforts yielded relatively sparse documentation and literature related to the field of inquiry. Of these, literature on specific simulations was limited primarily to large, federally-sponsored response oriented exercises such as Dark Winter and TOPOFF. This was understandable given the sensitivity of, and concomitant restricted access to, the information and documents sought.

The research effort was subsequently focused on three areas:

1. Contacting and networking with individuals involved in countering WMD terrorism, especially those in the field of WMD terrorism response exercises. In this regard, DTRA/ASCO provided an authorization letter in order to facilitate cooperation.
2. Monitoring news databases, newsletters, journals, magazines, and newspapers for information on WMD terrorism preparedness and simulations.

3. Researching organizations and networks of organizations that were involved in conducting WMD terrorism simulations, exercises, and response training identified through the aforementioned research efforts.[6]

Information gleaned from this second tier of collection provided us with numerous additional contacts and organizational links. It was at this stage of the process that the research team became aware of the collection of After Action Reports (AARs) assembled by the Office of Domestic Preparedness (now under the Department of Homeland Security). As part of the Nunn-Lugar-Domenici Domestic Preparedness Program (NLD-DPP), 120 of America's largest cities were given training and equipment to prepare for and respond to terrorism involving WMD. The AARs were mandatory self-evaluations submitted by these cities following the chemical and biological terrorism response exercises conducted as part of the Program. After a delay of several months, the research team was able to gain access to these reports for review and analysis[7].

Contacts

As a result of sustained networking within the law enforcement and public health communities, the WMD Terrorism Research Project was able to generate a contact list of over 100 individuals and organizations. A portion of these contacts were also made through other CBWNP-related projects, associated travel, and presentations by research team members. However, delays in response to the research team's inquiries and occasional failure to cooperate altogether (despite explicit authorization and urgings from DTRA/ASCO), greatly hindered the collection of a wealth of information and the process of information exchange. Unfortunately, in addition to the many organizations and individuals who proved to be uncooperative and did not fulfill promises to provide information, only a few individuals responded to information inquiries. As a result, only the information provided by 85 individuals and organizations is included in the final report. The letters, emails, interview forms, and supporting documents used throughout this process have been provided (See Section 6C).

Most of the individuals the team succeeded in contacting had prior experience and involvement in WMD terrorism response exercises or simulations, but possessed limited literature that they could share, other than functional documents such as exercise designs, exercise announcements, and Power

[6] In addition, a general announcement regarding the project was transmitted through law enforcement and public health working groups to which the team received a minimal response: the Bay Area Terrorism Working Group (Daniel Butler) and the Interstate Chemical Terrorism Conference (Sharon Lee).

[7] The team would like to thank Mike Forgy at the Department of Homeland Security for making these reports available, as well as Jeffrey Milstein (DTRA/ASCO) for facilitating their transfer.

Point presentations. This was partly due to the fact that the exercise plans, reports, and related information consisted mainly of internal documents that were not produced for consumption by any other entity. Although some of this information did not pertain directly to the topic of the review, certain materials acquired were found to be useful and were thus included in the final report. However, the research team was only able to conduct interviews with a small number of individuals who were directly involved in the WMD terrorism exercise process.

Organizations

Our extensive Web research unearthed a plethora of organizations involved in the general field of manned simulations. Organizations directly involved in training, simulating, gaming, designing, equipping, implementing, reviewing, and administering simulations were all explored. Only those organizations with activities relevant to the literature review (i.e. those involved in simulating WMD terrorism) were selected for further review. Information derived from those organizations has been appropriately recorded and included as electronic attachments to this report.

Phase II: Data Calibration and Organization

Once the relevant data and literature were collected, the research team faced the task of organizing the disparate forms of data in a logical manner. The topic of manned games and simulations pertaining to terrorist threats that involve WMD covers a broad range of activities; these include simulations in which participants gather in a central location, playing the roles of terrorists, and exploring the decision-making processes following WMD attacks, to full-scale exercises in which first responders and command personnel respond to a simulated WMD terrorism event. This parallels the different chronological stages of a terrorist attack, from strategic and tactical planning through the executing of the attack itself, to the crisis and consequence management phases of the response to the attack, which can be represented along a continuum, as shown in Figure 1.

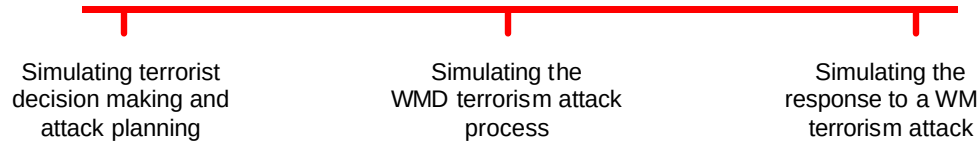

Figure 1: The WMD Terrorism Simulation Continuum

Most simulations span a section of the above continuum, i.e. they simulate one or more of the aspects above (sometimes dealing only partially with

certain aspects), with the remainder of the activities assumed as simulation inputs or outputs. Hence, it does not lend much clarity to categorize the continuum into discrete typologies. Instead, the report will categorize simulations loosely according to their purpose and function, as follows:

i) Simulations designed for entertainment purposes (so-called Roleplaying Games)
ii) Simulations conducted by government agencies or subcontractors examining terrorist organizations.
iii) WMD terrorism response exercises conducted by federal, state, local, and private organizations, including literature on WMD terrorism exercises.

Organizing and Reviewing the Nunn-Lugar-Domenici Program After Action Reports

With respect to the AARs, organization and initial analysis of the reports occurred simultaneously. The research team created a database using the commercially available Microsoft Access software package. The database contains fields for details of each exercise, summaries of the scenario, lessons learned, recommendations, and reviewer comments. The research team then reviewed each of the 270 reports received (which ranged in length from 25-75 pages each) and populated the database with abstracts and commentary for each report. The database and evaluation guidelines for reviewing the AARs are included as a companion to the report and in Appendix C.

Phase III: Analysis

By the very nature of a literature review, the analysis component is secondary to collection of data and information. Nonetheless, the research team believed that in certain areas, preliminary substantive analysis of the general utility of simulations and exercises would prove useful. Therefore, each section, and especially the section on WMD terrorism preparedness exercises, was analyzed in terms of the contribution of the particular type of manned simulation to countering the WMD terrorism threat. It must be stressed, however, that these observations are only intended to highlight possible avenues of further research.

Phase IV: Final Report Compilation and Writing

Researchers compiled the final report during March-February 2004, and synthesized their analysis in a conclusion.

Section 3: Web Resources

* The following table provides resources that researchers may find useful when analyzing manned simulations, including online lists of hyperlinks, organizational websites, past simulations, and training programs.

Type	Name of Organization/Content	Notes	Website
Links	CBIAC	Homeland Security Sites	http://www.cbiac.apgea.army.mil/resources/directory/dom_prepar.html
Links	Center for Biological Defense	Links	http://www.bt.usf.edu/links.html
Links	Centers for Disease Control and Prevention, Department of Health and Human Services	CDC Links	http://www.bt.cdc.gov/links.asp
Links	Counter- Terrorism Training Coordination Working Group	National Organizations and Departments	http://www.counterterrorismtraining.gov/
Links	Defense Modeling and Simulation Office		http://www.msiac.dmso.mil/wmd/links.asp
Links	Disaster Center	Resources for WMD preparedness	http://www.disastercenter.com/terror.htm
Links	Federal Bureau Of Investigation	FBI WMD training links	http://www.fbi.gov/hq/td/academy/ctwork12.htm
Links	John's Hopkins Bloomberg School of Public Health		http://www.hopkins-biodefense.org/pages/resources/resources.html
Links	New Mexico Weapons of Mass Destruction Preparedness		http://www.wmd-nm.org/mods/modlinks/index.asp?command=viewLinks&cmdarg=33
Links	Nonproliferation and National Security Institute		http://www.nnsi.doe.gov/E/GenInfo/TrainingLinks.asp
Links	Radio-Television News Directors Association and Foundation		http://www.rtnda.org/resources/bioterror.shtml
Links	U.S. Army Soldier and Biological Chemical Command (SBCCOM)	US Army Pine Bluff Arsenal Links	http://www.sbccom.army.mil/about/rl.htm
Links	Science International Applications Corporation (SAIC)		http://www.saic.com/natsec/homeland-security/response-training.html
Links	The Counter-Terrorism Page	Categorized links	http://www.terrorism.net/index.php?menu=1
Links	The Terrorism Research Center	List of organizations from Terrorism Research Center	http://www.terrorism.com/chembio/chembio.shtml
Links	US Department of Justice, Office of Justice Programs		http://www.counterterrorismtraining.gov/
Links	US Department of Justice, Office of Justice Programs	Technical assistance for WMD preparedness training	http://www.ojp.usdoj.gov/terrorism/technical_assistance.htm
Links	WMDFirstResponders.com	WMD First Responders Contact List	http://www.wmdfirstresponders.com/Membership.htm

Organization	ANSER Institute for Homeland Security		http://www.homelandsecurity.org/
Organization	Biohazard News	Magazine on WMD preparedness	http://www.biohazardnews.net/index.htm
Organization	Boston Fire Department		http://www.cityofboston.gov/bfd/divisions/emd.htm
Organization	BTG-Center for National Response		http://www.btg.com/what_we_do/index.htm
Organization	California Emergency Medical Services Authority		http://www.emsa.cahwnet.gov/
Organization	Center for Civilian Bio-Defense Studies		http://www.hopkins-biodefense.org/
Organization	Center for Disease Control: Emergency Response		http://www.bt.cdc.gov/
Organization	Center for Domestic Preparedness		http://www.ojp.usdoj.gov/odp
Organization	Center for National Response		http://www.wvmemorialtunnel.com/
Organization	Center for Strategic and International Studies		http://www.csis.org/isp/homeland.htm
Organization	Centers for Disease Control and Prevention, Department of Health and Human Services		http://www.cdc.gov/mmwr/preview/mmwrhtml/rr4904a1.htm
Organization	Dept. of Health and Human Services		http://ndms.dhhs.gov/
Organization	Domestic Preparedness		http://www.domesticpreparedness.com/
Organization	Emergency Preparedness Incident Command Simulation		http://epics.astcorp.com/epics5_casestdy.htm
Organization	FEMA National Response Partners		http://www.fema.gov/onp/npp.shtm
Organization	High Impact Training Solutions	Emergency preparedness training	http://www.hits.astcorp.com/
Organization	ICF Consulting		http://www.icfconsulting.com/Markets/Emergency_Management/
Organization	Innovative Technology Applications		http://www.itapages.com/default.htm
Organization	International Association of Emergency Managers		http://www.iaem.com/
Organization	ITT Industries: Advanced Engineering and Sciences		http://www.aes.itt.com/wmd.htm
Organization	Johns Hopkins Bloomberg School of Public Health		http://www.hopkins-biodefense.org
Organization	Metropolitan Firefighters and Emergency Medical Services Program		http://www.mfb.org.au
Organization	National Domestic Preparedness Consortium		http://www.emrtc.nmt.edu/events/ndpc/
Organization	New Mexico Weapons of Mass Destruction Preparedness		http://www.wmd-nm.org/mods/modtraining/index.asp
Organization	Nonproliferation and National Security Institute		http://www.nnsi.doe.gov/
Organization	Oklahoma City National Memorial Institute for		http://www.mipt.org/

	the Prevention of Terrorism		
Organization	Department of Defense (DOD)		http://www.defenselink.mil/news/Jul2003/n07252003_200307251.html
Organization	Radiation Emergency Assistance Center		http://www.orau.gov/reacts/default.htm
Organization	SAFE Foundation	Conducted exercises in the past but no longer.	http://www.safefoundation.org/homeland/homeland_background.html
Organization	South Dakota Division of Emergency Management		http://www.state.sd.us/military/sddem/demwmd/wmd.htm
Organization	Texas Dept. of Public Safety		http://www.demwmd.net/documents/DEMOrient.pdf
Organization	The Modeling and Simulation Information Analysis Center	Links page	http://www.msiac.dmso.mil/wmd/links.asp
Organization	UA Army Medical Research Institute of Chemical Defense		http://ccc.apgea.army.mil/
Organization	US Army Pine Bluff Arsenal		http://www.pba.army.mil
Organization	Vermont Department of Public Safety		http://www.dps.state.vt.us/vem/vem_links.htm
Organization	Weapons of Mass Destruction Preparedness		http://www.wmd-nm.org/index.asp
Past Simulation	Dark Winter	John's Hopkins Biodefense	http://www.hopkins-biodefense.org/DARK%20WINTER.pdf
Past Simulation	Silent Vector		http://www.mipt.org/pdf/silentvectorbrief.pdf
Past Simulation	Sooner Spring		http://www.mipt.org/pdf/soonerspringfinalreport.pdf
Past Simulation	TOPOFF		http://www.journals.uchicago.edu/CID/journal/issues/v32n3/001347/001347.html
Training Programs	BCP International	Tabletop exercises/Private Security Company	http://www.coreprocesses.com/EMPS.htm
Training Programs	Centers for Disease Control and Prevention, Department of Health and Human Services	Preparedness planning guides	http://www.bt.cdc.gov/planning/index.asp
Training Programs	Counter-Terrorism Training Coordination Working Group	Counter-Terrorism Training and Resources for Law Enforcement	http://www.counterterrorismtraining.gov/
Training Programs	Emergency Operations Training		http://www.nnsi.doe.gov/E/OER/index.asp
Training Programs	Executive Protection Systems	WMD preparedness training programs	http://www.executiveprotectionsystems.com/Training.htm
Training Programs	Federal Emergency Management Agency (FEMA	Training Information	http://training.fema.gov/EMIWeb/
Training Programs	Federal Emergency Management Agency (FEMA)	State Training	http://www.fema.gov/fema/statedr.shtm
Training	Johns Hopkins Bloomberg School of Public	Resources for WMD preparedness	http://www.hopkins-

Programs	Health		biodefense.org/pages/resources/resources.html
Training Programs	National Terrorism Preparedness Institute		http://terrorism.spjc.edu/
Training Programs	New Mexico - Weapons of Mass Destruction preparedness		http://www.wmd-nm.org/mods/modlinks/index.asp?command=viewLinks&cmdarg=33
Training Programs	Department of Energy, Nonproliferation and National Security Institute	Training links	http://www.nnsi.doe.gov/E/GenInfo/TrainingLinks.asp
Training Programs	Science Applications International Corporation (SAIC		http://www.saic.com/natsec/homeland-security/response-training.html
Training Programs	U.S. Department of Justice, Office of Justice Programs	Technical assistance for WMD preparedness training	http://www.ojp.usdoj.gov/terrorism/technical_assistance.htm
Training Programs	Uniformed Services University of the Health Sciences	WMD preparedness training programs	http://www.usuhs.mil/ccr/wmd_training_progams_homepage.htm
Training Programs	US Army and Soldier Biological Chemical Command	Compendium of WMD response training courses	http://dp.sbccom.army.mil/fr/compendium/index.html
Training Programs	WMD Taskforce/PSC		http://www.wmdtaskforce.com/services/training.html

Section 4: Roleplaying Games for Entertainment Purposes

A) *Introduction*

This aspect of gaming consists of participants who, as a pastime, play the roles of well-defined imaginary characters according to a set of rules and basic scenarios. The most primitive versions of this type of roleplaying were the original Dungeons & Dragons games of the mid 1970s; however, these games have evolved significantly in the past 30 years to the point where they may have some utility for simulating the threat of WMD terrorism. This report includes a brief survey of the applicable literature, accompanied by a preliminary assessment.

Roleplaying games (RPGs) have traditionally been set in fictional realities, especially worlds based upon the genres of fantasy, horror, and science fiction. However, there are several games set in our present-day reality (or a fictional reality sufficiently similar to our own to allow for relevantly experiential gameplay).

Even though the variety of RPGs played today is extensive[8] the basic process remains similar in most cases. RPGs generally consist of a small group of players (usually 3-6 persons) and a "games master" (or storyteller). The games master is responsible for creating scenarios, managing the gameplay, and portraying all non-player characters. The precise nature of the rules, including the degree to which events depend on chance (usually determined using specialized sets of dice), the set of procedures governing such actions as combat, and the generation of character traits, vary from game to game. However, the same rule-system often forms the basic framework of several different games, usually all produced by the same company. In these cases, only the settings, characters, and stories differ, while the gaming process is identical across a range of games.[9]

B) *Examples*

While project investigators were unable to locate any RPGs specifically dealing with terrorism involving WMD, there are several games available on

[8] According to RPG Index, an internet database of roleplaying games, there are currently 1,550 RPGs available (see http://www.rpg-index.com)

[9] LARP (or Live Action Roleplaying) is similar to the tabletop RPGs, although players interact more actively (using costumes, props etc.) and the rules are usually less technical and allow for greater physical interaction. The difference between tabletop RPGs and LARP is akin to the difference between storytelling and live theater.

the market that are set in the present day and include terrorist/counterterrorist character and event simulations. These could be fairly easily adapted to include WMD scenarios.

1) *Blood & Guts: The War on Terror*

Blood and Guts: The War on Terror is an expansion sourcebook for *Blood and Guts: Modern Military*, which uses the d20 Modern system. The sourcebook includes military and special operations prestige classes, vehicles, and equipment, 9 new terror and anti-terror classes, new feats, advanced training, and elite units. Also included is background information on over 25 modern terror groups and gaming statistics for 19 stock "allies and adversaries" characters.

A demonstration version of this game can be obtained from:
http://www.rpgobjects.com/dlm/download.php?id=20

2) *Real Life Roleplaying: Afghanistan*

Produced by Holistic Design, *Real Life Roleplaying: Afghanistan* uses the d20 system and provides rules, background, equipment, settings and scenarios that give players a chance to roleplay in the war against terrorism. The advertisement reads: "Now you and your friends can organize Northern Alliance operatives, track down terrorists, outwit the al Qaeda and wipe the floor with Osama!"

3) *Millenium's End*

The following is excerpted from an online description of Millenium's End:

"Millennium's End v2.0 is the second edition of the critically-acclaimed technothriller roleplaying game. With a unique and compelling background and an innovative rules system, it offers a lot that can't be found in any other game. Millennium's End v2.0 is set against a near-future background a lot like our own world--if a few shades darker. The rulebook contains over eighty-five pages of campaign, adventure, and equipment information. It is neither a military/post-holocaust RPG nor a spy game. While there's no shortage of action, and characters may be involved in para-military or special operations, the many adventures published so far have focused on investigation, corporate espionage, and anti-terrorism work. Adventures stress thoughtful play and an element of the unexpected--*The Gamer* observed that "characters should end up using their brains much more than they do their guns," while *The Scroll* commented that

"things are not as they seem, and clearly they never are in this game." Adventures stress double-cross and the unexpected, but characters aren't spies, and the setting is definitely post-cold-war. The game system is like nothing you've ever seen. Every aspect of the Millennium's End system is unique and innovative. To begin with, Millennium's End's hybrid character-generation system gives players control over character creation while retaining a randomizing effect. Game play is skill-oriented, using percentile rolls and a two-tiered skill system that maximizes flexibility. The non-ablative (no hit-point) damage system rates wound severity on a one-to-twenty-five scale, giving real-world effects like blood loss, stun, and impairment (how a wound affects the character's ability to act)--all from a single table.

But people comment the most on the combat system. It uses two sheets of transparent overlays and "Body Maps" (diagrams of people, animals, or objects as seen from the attacker's point of view) for hit determination. The overlay indicates whether a given attack hit the point at which it was aimed, hit some other part of the target, or missed completely--all with a single roll of the dice. Players have complete control, specifying the aim point (there are no called-shot modifiers or hit-location tables). The whole thing is easy to use, flexible, and realistic, playing faster than any other "realistic" system, and most non-realistic ones, too. And players love it. *The Gamer* said it has a "neat feel." The *White Wolf* reviewer said "I know people who would buy the book just for [the overlays]." *The Scroll* commented that it "gets a lot done with little rolling of dice." Millennium's End is and will continue to be a well-supported game line. Almost a dozen supplements are available now, with many more in the pipeline. Sourcebooks, adventure material, miniatures and accessories are all out and on the way."

More information about Millenium's End can be found at: http://www.kracik.com/me/cee/#overview .

C) *The Intersection Between Manned and Computational Gaming*

One development in RPGs has been the use of computers to simulate a virtual environment and some of the characters and events in a game. However, human players still make and then input their decisions into the scenario, with the computational aspects mostly serving as aids by which to visualize events, interact and perform calculations. In this sense, these systems can be viewed as hybrid manned-computational games.

One noteworthy aspect of this intersection is Massively Multiplayer Online Games (MMOGs). Although technically outside the category of traditional RPGs, it has been suggested that MMOGs can play a role in simulating terrorism. The article below, published in the *Washington Post* (December 6, 2002) discusses the potential utility of these games for counterterrorism:

> **"Outgaming Osama"** By David Ignatius
> Friday, December 6, 2002; Page A45
>
> Can online gaming help defeat Osama bin Laden? That's not as silly a proposition as it may sound.
>
> A Pentagon-sponsored group called the Highlands Forum met this week to discuss what are known as "Massively Multiplayer Online Games." These games, which can allow several million people to play, are among the hottest new trends in the Internet world, and they may have some fascinating uses in fighting terrorist networks.

The cutting edge for these multiplayer games is South Korea, which probably has the world's deepest penetration of high-speed (or "broadband") Internet connections. According to online gaming expert J.C. Herz, more than 2 million people a month play South Korea's most popular online game, Lineage, with as many as 180,000 of them signed in on some nights.

Lineage is a Korean variant of the sort of Dungeons and Dragons combat that's so popular in computer gaming. It's a role-playing game, set in medieval Europe, in which the followers of an evil king's stepson help him try to regain his rightful place on the throne. The followers are known as the "Blood Pledges," and they try to capture castles -- which then allows them to levy taxes, buy more weapons and continue their assault against the usurper.

Explains Herz: "Competing Blood Pledges, large gangs of players that can number in the hundreds, lay siege to each other's castles for hours at a time, on fat broadband connections that allow the battles to play out in smooth resolution, in their full glory." Much of this gaming is done in Korea's 26,000 game parlors, known as "baangs."

Lineage isn't popular with Americans, notes Herz, "partly because it's a game where not everyone can be the boss." Koreans like a "tightly defined clan hierarchy," she observes, whereas in American role-playing games, it often seems that "everyone is the Lone Ranger."

Among the popular American equivalents to Lineage are Everquest and Ultima Online. Everquest, a massively multiplayer online world created by Sony, can host 350,000 players, with more than 100,000 playing simultaneously. Sony charges each player $10 a month to join this online world, where the games can last for months.

Next year a massive online game called Star Wars Galaxies is scheduled to be released by Verant and LucasArts. It could attract more than a million subscribers and have 300,000 simultaneous users, according to Herz. It might take months for players to traverse hyperspace, she says, and they will have to create "a full-fledged economic and political system."

Herz explains that "as a design and engineering challenge, in sheer scale and complexity Star Wars Galaxies rivals the construction of a space station."

What makes these massive online games fascinating -- in addition to their "human anthill" quality -- is that they may provide new insights into what's known as "network-centric warfare."

Defense intellectuals such as Linton Wells II, a deputy assistant secretary of defense who is responsible for command, control, communications and intelligence, believe that the Pentagon must realign itself for "network-centric" operations. In their view, adversaries such as bin Laden's al Qaeda group are really networks -- highly dispersed units that have the same loose but robust structure as the nodes of a computer network.

The intellectual groundwork for this "netwar" analysis was laid out in a paper published on the Internet in October 2001 by two Rand Corp. analysts, David Ronfeldt and John Arquilla. "It takes networks to fight networks," they argued. But it has been difficult to imagine what these anti-network networks might look like.

That's why the massive online games are so intriguing. The ability to connect many hundreds of thousands of people simultaneously opens the possibility for sharing information, tasking both combatants and civilian rescue workers, and "pulsing" adversaries with diffuse but well-coordinated counterattacks.

Herz, who is the author of a recent book titled "Joystick Nation," notes that computer games have the same roots as military simulations. The difference is that computer gaming took off -- with many thousands of programmers helping refine the software -- especially after the Internet made communication and file sharing easy. PC gaming also developed its own intricate social structure -

- through chat rooms, Web sites, rankings and other means of instant communication among the user network.

The civilian PC war games are now much more complex and sophisticated than their Pentagon predecessors -- and, at the very least, online gaming could help make military games more realistic.

But the challenging idea is that the online gaming world could provide models for much more advanced ways of responding to threats. It could create real-time networks for a kind of command and control that has never been attempted. The peer-to-peer connections of the online world could also break down some of the time-wasting and bureaucratic hierarchies that continue to obstruct military planning and operations.

Bin Laden and his allies certainly aren't playing a game. But it's just possible that online gaming could provide some fresh insights into combating and ultimately containing this terrorist threat.

D) *The Relevance of RPGs for Simulating WMD Terrorism*

The following characteristics of RPGs may enable them to make a valuable contribution to simulating terrorism in general and WMD terrorism in particular:

a) Good gamers are used to mentally immersing themselves in the game they are playing and adopting the outlook of their characters, even though these may be far removed from their actual outlook and motivations. This aspect would assist in overcoming the "mirror effect" that so often plagues the red team in adversarial simulations.
b) Many games require an extensive technical understanding (for instance, of weapon properties such as weight, range, rate of fire, stopping power)[10]. Gamers quickly become familiar with a wide range of technical specifications, which they incorporate into their games.
c) Experienced players have usually played a multitude of games using several different rule systems and so become adept at quickly assimilating new constraints and processes into their gaming.
d) Players become skilled at innovation – finding novel opportunities for action and exploiting weaknesses – while continuing to operate within the motivational and technical constraints of character and game. This would prove useful in simulating the asymmetric attacks of terrorists.
e) Certain games are played by thousands of people and develop a great detail of ancillary material that lends realism and depth to simulations. Examples include literature expounding upon the world portrayed in the game, online discussions refining and debating various aspects of the game or system, and the development of new character types as time progresses.

[10] While some technical aspects are purely fictional (e.g. spell-casting in a fantasy setting), many are drawn from military technical manuals and provide good approximations to the performance of current hardware.

f) RPGs are often played in 'sessions' with the same group of gamers retaining the same character and storyline from session to session, until their characters either die or the long-term objective of the "campaign" is reached. The ability to retain the same characters and setting for extended periods of time allow for a degree of familiarity with character, range of action, and long-term strategy that are rarely found in more limited simulations.

Certain characteristics of RPGs may in turn limit their utility:

a) RPGs are inherently oriented towards entertainment. Players are not used to playing in an environment that may have serious consequences in the real world. While most gamers take their gameplay extremely seriously, the added stress of knowing that the results of their games could affect counterterrorist policies may inhibit gameplay. Furthermore, it is not known how players would react to observation and evaluation of their gameplay, which could potentially stifle their creativity and make players more self-conscious.
b) Although many gamers are familiar with basic military technology, most can be expected to lack any in-depth knowledge of either terrorism or WMD. The extent to which this would negatively impact realistic simulations would have to be taken into account.

E) *Recommendations*

The authors recommend that some consideration be given to including experienced gamers in simulations of WMD terrorism scenarios. This could conceivably take a variety of forms, from including one or more gamers on the Red Team during WMD terrorism simulations, to maintaining an entire red team made up of experienced gamers. Essential to this process would be selecting the optimum group of gamers that would combine imagination, creativity, sincerity and the capability to deal with the technical aspects of WMD terrorism.

Section 5: Wargaming the WMD Terrorism Threat

A) *Introduction*

This section of the report lists manned simulations that are generally oriented more towards simulating terrorist attack planning and implementation than response efforts. The primary difference between these simulations and those discussed in the previous section is that such simulations are intended to model the actual threat and inform policy, rather than being conducted for the purposes of entertainment. These simulations are often referred to as wargaming or 'red-teaming' since the Blue Team, portraying the 'home' institutions (in the present case usually sections of the United States government and/or military) is confronted with the Red Team, representing the adversary (in the current context a terrorist group or individual).

These simulations can cover all levels of conflict operations, from the strategic to the tactical, and can consist of varying types of simulation, ranging from table-top simulations to field exercises. When examining the threat of WMD terrorism, however, most simulations appear to be strategically focused and conducted as table-top exercises.

One large obstacle the research team experienced in collecting information on this type of exercise is that - for obvious security reasons - the vast majority of such simulations are not recorded in open sources. Several military, law enforcement and some private organizations conduct relevant manned simulations, and have done so for several years, but the descriptions and results of most such simulations are either classified or at least intentionally kept out of the public domain. Owing to the open-source nature of this survey, the research team was therefore able to access only a small percentage of this type of simulation relating to the WMD terrorism threat. Therefore, in order to provide as comprehensive a reference as possible, the report also lists various organizations and resources associated with this type of manned gaming, which can be contacted for further information on individual simulations.

B) *Wargame Examples*

The following table provides a preliminary listing of wargames that are relevant to terrorist attacks using WMD.

Name of Simulation	Date	Location	Sponsoring Organization	Exercise Summary	Add. Resources	Contact
TERROREX 04	1/7/04-1/9/04	Las Vegas, NV	Government Emerging Technologies Alliance: partnerships for Homeland Security	Live Action Role Play (LARP) using technologies presented at conference	http://www.getaevents.org/pastevents.shtml	Tel: (301) 596 - 0770
WMD03: Playing the enemy[11]	9/25/03-9/26/03	Alexandria, VA	Jane's Conferences	Examines terrorist motivations for WMD use to identify new vulnerabilities	http://www.janes.com/defence/conference/wmd2003/overview.shtml	Alexa Thomas Tel: (703) 236-2463
Training to Combat Terrorism: Mirror Image Program	7/20/03-7/25/03	Moyock, NC	Terrorism Research Center	Places participants in training camps and immerses them in simulated training environment	http://www.terrorism.com	Walter Purdy Tel: (703) 801-2297
TOP Model Workshop	1/8/03 (and other dates)	Arlington, VA	DTRA/ASCO, Threat Anticipation Project	Brought together subject matter experts with an in-depth knowledge of specific aspects of terrorist organizations; each played a functional role in al-Qa`ida strategic decision-making.		Larry Sanders Tel: (703) 767-5715 E-mail: larry.sanders@dtra.mil
Policy Development Role Playing Exercise	1/30/02	Washington, DC	CICTE/OAS (Inter-American Committee Against Terrorism)	Examined courses of action in terror situation	http://www.cicte.oas.org/mission.htm	Mr. Joaquín Ferrao (202) 647-9914
Homeland Security Spring Symposium, 2000	3/14/00-3/16/00	Fort Leonard Wood, MO	United States Army Maneuver Support Center (MANSCEN)	Symposium held in lieu of wargame to consider the role of the US Army in homeland security in light of WMD	United States Army Maneuver Support Center, *Memorandum from the Homeland Security Office (MANSCEN) to the Commander, USA Training and Doctrine Command, Subject: Homeland Security Army After Next Game Results* (27 July 2000)	

[11] This event was more of a seminar than an actual simulation, but addressed the core concerns of how to simulate WMD Terrorism.

Name of Simulation	Date	Location	Sponsoring Organization	Exercise Summary	Add. Resources	Contact
Spring Wargame 1998	1998	Unspecified	TRADOC	Military wargame including the possibility of covert WMD attacks within the United States	*Army After Next 1998 Spring Wargame, Reference Book Volume I and II,* TRADOC (April 1998)	
Domestic Counterterrorism Workshop	4/01/97	Unspecified	TRADOC	Interagency workshop considering U.S. vulnerabilities to new forms of terrorism and asymmetric warfare	*Army After Next 1997 Summer Wargame, Domestic Counterterrorism Workshop Briefing Book,* Science Applications International Corporation (June 1997)	
Winter Wargame 1997	1997	Unspecified	TRADOC	Did not specifically deal with WMD terrorism, but issue of covert attacks arose during gameplay	Walter L. Perry and Marc Dean Millot, *Issues from the 1997 Army After Next Winter Wargame*, Santa Monica, CA. RAND MR-988-A (1998)	Walter Perry (703) 413-1100 x5228
Summer Wargame 1997	1997	Unspecified	TRADOC	Military wargame including a component in which large-scale terrorist operations were threatened within the United States	*Army After Next 1997 Summer Wargame, Domestic Counterterrorism Team Notebook,* Doctrine Directorate, TRADOC (September 1997)	

C) *Organizations*

The following table lists several of the primary organizations involved in manned simulations of terrorism.

Name of Organization	Parent Organization	Location	Contact	Brief description of activities
Air Force Red Team Program	Air Force Directorate of Electronics and Special Programs			Assesses concepts and technology Air Force wide
Defense Adaptive Red Team Activity	Office of the Secretary of Defense	Washington, DC	www.acq.osd.mil/dsb/redteam.pdf	Provides an array of red teaming services to various military agencies
Defense Advanced Research Projects Agency (DARPA)	DOD	Arlington, VA	DARPA General Information: (703) 526-6630	Wargaming the Asymmetric Environment: Prediction and Emulation via data mining and modeling
Devil's Advocate	TRADOC	Fort Monroe, VA.	www.acq.osd.mil/dsb/redteam.pdf	
Global OPFOR	Jane's Consultancy	Woodbridge, VA	Mark Mateski	Red teaming using more comprehensive method and accurate perspectives
Marine Corps Warfighting Lab Wargaming Division	USMC	Quantico, VA	Wargaming_info@mcwl.quantico.usmc.mil	Conducting two terrorism-related projects: Project Fast Train and Project O'Bannon
Red Teaming Experience	Missile Defense Agency	Washington, DC	www.acq.osd.mil/dsb/redteam.pdf	Includes the Countermeasures Hands-On Program
U.S. Air Force OPFOR Training	Joint National Training Capability (JNTC)	Nellis Air Force Base	http://www.jwfc.jfcom.mil/about/fact_jntc.htm	
U.S. Army OPFOR Training	National Training Center and the Joint Readiness Training Center	Ft. Irwin, CA	Civilian information: (760) 380-3369 http://www.irwin.army.mil/default.htm	
U.S. Army Red Franchise Organization	TRADOC	Fort Monroe, VA.	http://www.tradoc.army.mil/pao/Web_specials/Transformation/OnPointblackbook.pdf	Products include threat portrayals to support wargames and experiments concept development
U.S. Navy OPFOR Training	Joint National Training Capability (JNTC)	Fallon and Key West, FL	http://www.jwfc.jfcom.mil/about/fact_jntc.htm	
U.S. Navy Subsurface Ballistic Nuclear Security Program	U.S. Navy			
USJFCOM Red Teams	Joint Forces Command	Norfolk, VA	http://www.jwfc.jfcom.mil/about/fact_jntc.htm	Used for Joint Concept Development

D) *Additional Resources*

Researchers judged the following materials to be useful in the domain of manned wargaming.

Resource Name	Author	Source Location	Brief Description
Counter Terrorism Simulation: A New Breed of Federation[12]	Roger Smith, Titan Systems Corp.		Covers Multi-Domain Terrorism Federation Object Model Concept
Gaming Terrorism	J. Scott Armstrong, Wharton School, University of Pennsylvania	http://www.jscottarmstrong.com	Conflict decision-making in actual situations using role playing
Domestic Counterterrorism Workshop	4/01/97	Unspecified	TRADOC
Protecting the Homeland: Insights from Army Wargames	Richard Brennan	http://www.rand.org/publications/MR/MR1490/MR1490.pdf	A review of TRADOC-sponsored exercises that included covert actions[13] against the US Homeland (including WMD)
Red Teaming Terrorism Part 1	Mark Mateski	http://www.redteamjournal.com/methods/redTeamingTerrorismPt1.htm	Article discussing the value and methodologies of red teaming terrorism
Red Teaming the Terrorist Threat to Preempt the Next Waves of Catastrophic Terrorism	Joshua Sinai	www.dtic.mil/ndia/2003solic/sinai.pdf	Describes new approaches to wargaming against WMD terrorism.
The Role and Status of DoD Red Teaming Activities (2003)	Defense Science Board	www.acq.osd.mil/dsb/redteam.pdf	Recent overview of military red teaming activities

E) *'Hybrid' Models – Combining Manned and Computational Simulation*

Certain wargaming models combine elements of both computational and manned gaming.

Resource Name	Producer	Location	Contact	Brief Description
CRISIS XXI	Hexagon Interactive	Los Angeles, CA	(323) 512-5579	Predictive tool emphasizing threats posed by terrorists capable of deploying WMD; Phase I is a boardgame, Phase II includes development of a functional computer simulation

[12] Although the majority of the discussion concerns computational simulation, many of these insights are also applicable to manned gaming.

[13] These simulations usually involved the agents of an opposing state and so not all the insights derived from these exercises may be relevant in the context of terrorism. However, many of the tactical and strategic considerations are similar in cases of covert state attacks and terrorist attacks using WMD.

Resource Name	Producer	Location	Contact	Brief Description
"Full Spectrum Warrior" tactical simulation and forthcoming counterterrorism simulation	Institute for Creative Technologies	Marina del Rey, CA	(310) 574-5700	Infantry/Squad counter-terrorism tactics simulation
Secur/*T*ree Software	Amenaza Technologies	Calgary, Alberta, Canada	(403) 263-7737	Attack modeling using decision trees

F) *Remarks*

Although possessing inherent limitations,[14] this type of manned simulation is clearly an integral part of preparing for and preventing WMD terrorism. As stated in a September 2003 Defense Science Board study, "Red teaming can both complement and inform intelligence collection and analysis. Aggressive red teams challenge emerging operational concepts in order to discover weaknesses before real adversaries do."[15]

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[14] Richard Brennan, Protecting the Homeland: Insights from Army Wargames. RAND (2002), http://www.rand.org/publications/MR/MR1490/MR1490.pdf, p. vii "It is important to note that seminars and wargames are not especially well suited to developing specific organizational or operational solutions to problems. Rather, the utility of these analytical tools lies in their ability to raise issues and explore potential responses or solutions that can then be studied with more rigor." Also see rest of report.

[15] Preamble to Defense Science Board, The Role and Status of DoD Red Teaming Activities (2003). preamble

Section 6: WMD Terrorism Response Exercises

A) *List of Exercises*

The following table lists the WMD Terrorism Response Exercises collected by the research team. More detail on each exercise can be found in Appendices C and D, as well as the electronic databases, which are companion deliverables to this final report.

Table Key:

- Only exercises that in some way involve a chemical, biological, radiological, or nuclear agent are included in this table.
- Types of Exercise:
  - **Tabletop** – Involves senior staff in decision making capacities to discuss and work through a simulated situation to assess plans, policies, and procedures. Usually occurs in an informal setting at a slower pace than real-time.[16]
  - **Functiona**l – Designed to test and evaluate purely functional aspects of a situation such as emergency response, law enforcement, and public health or activities within a function. The exercise mainly takes place at the level of direction and control nodes, with the actual movement of personnel and equipment being simulated.[17]
  - **Full scale** – Involves testing operations plans during a simulated event by actually mobilizing relevant personnel and resources as would be done in an actual situation. Largest, costliest and most complex exercise type.[18]
  - **Field** – Usually associated with full-scale exercises.[19]
  - **Drill** – A coordinated, supervised activity employed to test a single specific operation or function in a single agency such as testing new equipment or policies (performed in isolation).[20]

[16] U.S. Department of Homeland Security, Office for domestic Preparedness, Homeland Security Exercise and Evaluation Program, Volume 1: Overview and Doctrine (March 2003), p. 19.
[17] Ibid. p. 21.
[18] Ibid. p. 21.
[19] Owing to the lack of precision in media reports and the different use of terminology in foreign countries, it is often difficult to discern exactly what is meant by various descriptive terms. The table captures those terms used in the reports collected. It seems that in most cases 'Field' is used to refer to 'Full Scale' or perhaps 'Functional' exercises as described above.
[20] U.S. Department of Homeland Security, Office for domestic Preparedness, Homeland Security Exercise and Evaluation Program, Volume 1: Overview and Doctrine (March 2003), p. 21.

Country	Location	Date	Lead Agency	Type	Agent(s)
USA	Seattle, WA Chicago, IL	5/12/2003	DHS	Full Scale	Biological and Radiological (plague/Chicago, dirty bomb/Seattle)
USA	Andrews Air Force Base Washington, DC	06/22-23/2001	John Hopkins Center for Civilian BioDefense Studies	Tabletop	Biological (smallpox)
USA	Andrews Air Force Base Washington, DC	10/07-08/2002	Center for Strategic and International Studies, ANSER	Tabletop	WMD
USA	Portsmouth, NH Denver, CO Washington, DC	05/2000	DOJ	Tabletop	Biological (plague)
USA	Oklahoma	04/12/2002	MIPT	Tabletop	Biological (smallpox)
USA	Prince George's County, MD	05/2000	FBI, DOE, FEMA	Tabletop	Radiological
USA	Rural Oklahoma	Spring 2003	US Army and EPA	Field	Biological
USA	Pier 53, Guam Honolulu, HI	01/2003	Guam, 93rd WMD Civil Support Team	Field, Tabletop	Biological
Australia	Sydney	12/19/2002	State Crisis Center	Tabletop	Chemical, Biological
Australia	Sydney	12/19/2002	Police	Unspecified	Unspecified CBRN
United Kingdom	London Underground, L ondon	03/23/2003	Scotland Yard GT operation command	Tabletop, Field	Radiological (dirty bomb) Biological (smallpox)
United Kingdom	Edinburgh, Scotland	05/30-06/01 2003	British Home Office	Unspecified	Unspecified CBRN
United Kingdom	Harrogate, North Yorkshire	03/03/2003	British Home Office	Field	Radiological
USA	Western Michigan University Kalamazoo, MI	02/18/2003	51st Weapons of Mass Destruction/Civil Support Team	Unspecified	Biological (smallpox)
Australia	Perth	03/18/2003	Unspecified	Tabletop, Field	Unspecified CBRN

Country	Location	Date	Lead Agency	Type	Agent(s)
USA	Houston, TX	04/16/2003	Houston Local Emergency Planning Committee	Tabletop	Explosives and WMD simulated
Greece	Athens International Airport, Athens	11/2002	2004 Olympics Security	Unspecified	Unspecified CBRN
USA	TF Green Airport Warwick, RI	06/2002	Rhode Island Emergency Management Council/Agency	Unspecified	Chemical (nerve agent)
USA	Jefferson Parish, New Orleans, LA	01/16/2003	DOJ	Tabletop	Unspecified CBRN
Japan	Western Tokyo	12/05-06/2002	Ministry of Health, Labor and Welfare	Unspecified	Unspecified CBRN
USA	San Jose, CA	11/1998	FBI and DOD	Unspecified	Unspecified CBRN
USA	Cincinnati, OH	04/2000	DOD, Pentagon	Tabletop	Unspecified CBRN
Canada	Montreal, QB	06/2000	Royal Canadian Mounted Police	Unspecified	Unspecified CBRN
USA	Minneapolis/ St. Paul, MN	05/1999	DOJ	Unspecified	Chemical (sarin)
USA	Columbus, OH	12/03/1998	Columbus Fire Division	Unspecified	Chemical (nerve agent)
USA	Aurora, CO	10/2001	Unspecified	Field	Chemical (sarin)
USA	St. Petersburg, FL	01/13/2002	Veterans Affairs Medical Center at Bay Pines	Tabletop	Gas
USA	McAlester, OK	04/2002	McAlester Health Department	Unspecified	Biological (pneumonic plague)
Israel	Ben Gurion Airport Lod (12 miles from Tel Aviv), Israel	03/10/2003	Home Front Command	Unspecified	Chemical (sarin)
USA	Logan International Airport, Boston, MA	11/07/2002	Massachusetts National Guard 1st Civil Support Team	Unspecified	Radiological
International	Noginsk, Russia	09/25/2002	NATO	Unspecified	Unspecified CBRN
USA	Carlisle Barracks, PA	03/2002	Army War College	Unspecified	Unspecified CBRN
China	Guangzhou City, Guandong	07/08/2002	Guangdong Province People's Armed Police Corps	Field	Chemical

Country	Location	Date	Lead Agency	Type	Agent(s)
France	Canjurs, Southwestern France	10/26-29/2002	Swedish Defense Research Institute, Emergency Management Board	Field	Radiological
Australia	Newport, Melbourne	06/2002	Unspecified	Unspecified	Unspecified CBRN
Russia	Kambarka, Udmurtia autonomous republic	02/2002	Emergency Situations Ministry	Unspecified	Unspecified CBRN
Ukraine	Lviv	12/2002	19th Separate WMD protection battalion of the Western Operation Command	Field	Unspecified CBRN
Russia	Kalinin Nuclear Power Plant, Tver Region	8/15/2002	Ministry of Atomic Energy	Unspecified	Unspecified CBRN
Australia	Middle Head Military Base, Sydney	05/27/2003	Unspecified	Field, Tabletop	WMD involvement uncertain
Russia	VEKTOR State Scientific Center , Novosibirsk Region	05/2003	Federal Security Service Directorate for the Novosibirsk region.	Field	Biological (virus)
USA	Kershaw County, SC	06/03/2003	Local Emergency Preparedness Committee	Unspecified	Chemical (sarin)
USA	Baltimore, MD	11/2002	Unspecified	Tabletop	Radiological
Denmark	Unspecified	2003	Danish Emergency Management Agency	Unspecified	Unspecified CBRN
USA	Boston, MA	06/17/2003	Massachusetts Emergency Management Agency, City of Boston	Full Scale	Chemical
USA	Louisiana	06/2003	Louisiana Department of Health and Hospitals, Calcasieru Office of Emergency Preparedness	Field	Unspecified CBRN
USA	Clark County, NV	08/18-28/2003	DOD, US Northern Command (NORTHCOM)	Live simulation	Unspecified CBRN

Country	Location	Date	Lead Agency	Type	Agent(s)
USA	San Francisco Int'l Airport San Francisco, CA	09/16/1998	San Francisco International Airport	Unspecified	Chemical
USA	Washington, DC	07/25/2003	DOD	Field	Chemical
USA	Las Vegas, NV	08/17/2003	National Guard, 91st WMD Civil Support Team	Tabletop, Field	Biological (plague, ricin)
USA	New York City, NY	05/19/2003	NYC Office of Emergency Management	Field, Functional	Chemical, Biological, Radiological
France	Invalides Metro Station, Paris	10/22/2003	Committee for Civil Defense	Field	Chemical (sarin)
USA	Cincinnati, OH	05/20/2000	Nunn–Lugar–Domenici (DPP)	Field	Chemical
USA	Coronado, CA	09/25/2003	Naval Air Station North Island first responders	Unspecified	Chemical
USA	New York City, NY (Staten Island)	10/15/2003	NYC Fire Department	Drill	Biological
USA	Fresno, CA	10/14/2003	Kinder Morgan Energy Partners	Tabletop	Gas Leak
Greece	Athens	09/24/2003	Olympic organizers (Greek security and rescue agencies)	Unspecified	Chemical, Biological
USA	Coon Rapids Shopping Center, Anoka County, MN	09/21/2003	Coon Rapids Police Department	Field	Biological
Canada	Vancouver, BC	09/08-10/2003	Health Canada	Unspecified	Biological (smallpox)
USA	Virginia	10/19/2003	Virginia Department of Health	Large scale drill	Biological
USA	Baltimore, MD	11/16/2003	Baltimore City Fire Department	Field (large scale)	Chemical
Australia	Lucas Heights nuclear reactor, Sydney	10/28/2003	Incident Response Regiment (IRR)	Simulation	Nuclear
USA	Ventura County, CA	Unspecified	Center for Asymmetric Warfare	Unspecified	Chemical, Biological, Radiological, Nuclear

Country	Location	Date	Lead Agency	Type	Agent(s)
United Kingdom	London	11/01/2003	British Reserve Forces (Territorial Army - Civil Contingencies React. Forc	Drill	Chemical
USA	Fairfax County, VA	10/25/2003	VA health department for Emergency Preparedness and Response	Drill	Biological
USA	York County, ME	20/28/2003	York County Emergency Management Agency	Training simulation	Chemical, Biological
USA	Denver, CO	02/22/2003	City of Denver	Drill	Chemical
USA	Alameda County, CA	10/16/2003	Emergency Operations Center	Field	Chemical, Biological
USA	Graham County, AZ	10/18/2003	Graham County Health Department	Simulation	Biological
USA	New Jersey	11/15/2003	Office for Domestic Preparedness	Full Scale	Chemical, Radiological
USA	Hibbing, MN	10/25/2003	Unspecified	Unspecified	Biological
USA	Milwaukee, WI	09/13/2003	FBI sponsored	Drill	Chemical, Biological
Australia	Dutton Park train station Dutton Park, Australia	10/01/2003	Unspecified	Drill	Chemical
United Kingdom	London Underground - Waterloo & City lines, Bank Station London	10/082003	Unspecified	Field	Chemical
China	Northern Region, Inner Mongolia	Unspecified	Shanghai Cooperation Organization	Field	Chemical
China	Hong Kong	07/20 - 09/20/2003	Unspecified	Full scale	Chemical, Biological
USA	Los Angeles, CA	08/02-03/2003	Unspecified	Field	Chemical, Biological
USA	Bismarck, ND	09/24-25/2003	State Emergency Operations Center; Department of Emergency Management	Field	Chemical

Country	Location	Date	Lead Agency	Type	Agent(s)
USA	Indian Point Nuclear Plant Buchanan, NY	07/26 - 08/01/2003	Nuclear Regulatory Commission	Drill	Nuclear
Internatio nal	off the coast of Australia	09/12-14/2003	Proliferation Security Initiative (all 12 PSI countries)	Drill	WMD
USA/Can ada	Sweetgrass, MT	10/25/2003	DHS	Drill	Chemical
USA	Dane County, WI	10/04/2003	Dane County Emergency Management Dept	Field	Chemical
USA	multiple cities	11/2003	DHS	Drill	Biological (anthrax)
USA	Mariposa Port of Entry compound, AZ	11/2003	DHS	Drill	Chemical (toxic gas)
USA	Tallahassee, FL	08/24-27/2003	Unspecified	Tabletop, Full Scale	Biological
USA	Louisville, KY	11/04-06/2003	EPA (EPA Region 4 Emergency Response and Removal Branch)	Drill	Chemical, Biological, Radiological, Nuclear
USA	Breslin Center, Michigan State University East Lansing, MI	Unspecified	Unspecified	Drill	Biological
USA	SUNY Fredonia campus Fredonia, NY	08/17/2003	Chautauqua County Emergency Service	Field	Chemical
USA	Rio Rancho, AZ	07/30/2002	Unspecified	Unspecified	Biological
USA	Niceville, FL	02/04-05/2003	Unspecified	Field	WMD
USA	Gadsden County, FL	11/26/2002	Unspecified	Field	WMD
Japan	Tokyo	12/01/2003	Tokyo metropolitan government	Field	Biological (smallpox)
Japan	Kawasaki	11/25/2003	Central and local government officials	Field, Drill	Chemical
USA	Shawnee County, KS	09/2001	Shawnee County Emergency Management	Unspecified	Chemical, Biological

Country	Location	Date	Lead Agency	Type	Agent(s)
USA	Fremont, CA	07/10/2002	Nunn-Lugar-Domenici DPP	Field	Chemical
USA	Fremont, CA	08/15/2001	Unspecified	Tabletop	Biological
Internatio nal	various locations, international	Unspecified	Ministry of Health - United Kingdom	Simulation (Tabletop)	WMD
USA	Port Newark, NJ	11/2003	Port Authority of New York and New Jersey	Drill- Field	WMD
USA		01/10/2003	ANSER	Tabletop	Biological
USA	various locations	07/2002	Unspecified	Tabletop	Biological (Foot and Mouth Disease)
USA	Bowdoin Square, Boston, MA	02/27/2000	Unspecified	Field	Chemical
USA	New London, CT	06/1996	FBI New Haven Field Office	Field	Biological (Rabies),Radiological (dirty bomb)
Greece	Southern Attica	02/03/2004	Unspecified	Field	Chemical, Biological, Radiological, Nuclear
USA	Las Vegas, NV	Ongoing	U.S. Marines-Chemical and Biological Incident Response Force	Field	Chemical, Biological
USA	New York	11/2003	Local ER, state and federal authorities	Field	Chemical
USA	Anoka County, MN	09/2003	Unspecified	Unspecified	Unspecified CBRN
USA	Akron/Summit County, OH	11/01/2001	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	Akron, OH	06/16/2000	U.S. Army Soldier and Biological Chemical Command (SBCCOM), Nunn-Lugar-Domenici DPP	Tabletop	Chemical
USA	Albuquerque/Berna lillo County, NM	09/21/1999	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	Albuquerque/Berna lillo County, NM	11/17/1999	Nunn-Lugar-Domenici DPP	Field	Chemical
USA	Lexington/Fayette County, KY	05/22/2001	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	Lexington/Fayette County, KY	06/30/2000	Nunn-Lugar-Domenici DPP	Tabletop	Chemical

Country	Location	Date	Lead Agency	Type	Agent(s)
USA	Lexington/Fayette County, KY	04/18/2002	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	Albuquerque/Bernalillo County, NM	11/04/1998	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Chemical
USA	Lincoln/Lancaster County, NE	03/08/2002	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	Spokane, WA	05/12/2000	Nunn-Lugar-Domenici DPP	Tabletop	Chemical
USA	Lincoln, NE	01/28/2000	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Chemical
USA	Lincoln/Lancaster County, NE	05/31/2002	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	Little Rock, AR	07/25/2001	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	Little Rock, AR	05/26/2000	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Chemical
USA	Little Rock, AR	06/12/2002	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	Long Beach, CA	03/07/2000	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Biological
USA	Long Beach, CA	01/29/1999	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Chemical
USA	Long Beach, CA	04/26/2000	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	Amarillo, TX	06/05/2002	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	Anaheim, CA	08/09/2000	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	Anaheim/Orange County, CA	09/28/2000	Nunn-Lugar-Domenici DPP	Field	Chemical
USA	Anaheim, CA	10/01/1999	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Chemical
USA	Anchorage, AK	12/09/1998	Nunn-Lugar-Domenici DPP	Tabletop	Biological

Country	Location	Date	Lead Agency	Type	Agent(s)
USA	Anchorage, AK	08/10/2000	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	Anchorage, AK	05/18/1998	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Chemical
USA	Los Angeles County Operational Area, CA	07/07/1999	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	Los Angeles County Operational Area, CA	11/07/1997	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Chemical
USA	Arlington, TX	05/11/2000	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Biological
USA	Arlington, TX	07/14/2000	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	Arlington, TX	11/05/1999	Nunn-Lugar Domenici DPP	Tabletop	Chemical
USA	Spokane, WA	04/17/2002	Nunn-Lugar Domenici DPP	Tabletop	Biological
USA	San Bernardino, CA	unknown	Nunn-Lugar-Domenici DPP	Tabletop	Chemical
USA	Jefferson County Louisville, KY	03/15/2000	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Biological
USA	Jefferson County Louisville, KY	06/18/1999	Nunn-Lugar-Domenici DPP	Tabletop	Chemical
USA	Jefferson County Louisville, KY	05/16/2000	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	San Diego, CA	09/22/2000	Nunn-Lugar-Domenici DPP U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Biological
USA	San Diego, CA	08/24/2000	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	Arlington, VA	11/29/2001	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	Arlington, VA	05/08/2002	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	Arlington, VA	03/17/2000	Nunn-Lugar-Domenici DPP	Tabletop	Chemical

Country	Location	Date	Lead Agency	Type	Agent(s)
USA	Aurora, CO	06/06/2002	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	Austin, TX	06/21/1999	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	Austin, TX	09/16/2000	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	San Diego, CA	04/24/1998	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Chemical
USA	Lubbock, TX	09/28/2001	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	Lubbock County, TX	03/27/2002	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	Lubbock, TX	08/25/2000	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Chemical
USA	Madison/Dane County, WI	10/01/2001	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	Madison/Dane County, WI	05/16/2002	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	Madison/Dane County, WI	04/14/2000	Nunn-Lugar-Domenici DPP	Tabletop	Chemical
USA	Miami/Dade County, FL	03/28/2000	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Biological
USA	Miami/Dade County, FL	04/29/1999	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	Miami/Dade County, FL	03/13/1998	Nunn-Lugar-Domenici DPP	Tabletop	Chemical
USA	Mobile, AL	05/20/2000	Nunn-Lugar-Domenici DPP	Tabletop	Chemical
USA	Mobile, AL	01/29/2002	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	Mobile, AL	12/12/2001	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	Montgomery, AL	12/06/2001	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	Montgomery, AL	08/25/2000	Nunn-Lugar-Domenici DPP	Tabletop	Chemical
USA	Nashville, TN	09/06/2000	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	Nashville, TN	09/28/2000	Nunn-Lugar-Domenici DPP	Full Scale	Chemical

Country	Location	Date	Lead Agency	Type	Agent(s)
USA	Nashville, TN	10/02/1998	Nunn-Lugar-Domenici DPP	Tabletop	Chemical
USA	Oakland, CA	05/07/1999	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Chemical
USA	Oakland, CA	08/25/2000	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Biological
USA	San Francisco, CA	07/08/1999	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	Atlanta, GA	08/31/2000	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Biological
USA	Atlanta, GA	11/19/1999	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	Atlanta, GA	03/27/1998	Nunn-Lugar-Domenici DPP	Tabletop	Chemical
USA	Aurora, CO	10/10/2001	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	Aurora, CO	04/07/2000	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Chemical
USA	Austin, TX	12/04/1998	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Chemical
USA	Bakersfield/Kern County, CA	08/16/2001	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	Bakersfield/Kern County, CA	06/23/2000	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Chemical
USA	Baltimore, MD	06/29/1999	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	Baltimore, MD	10/28/1998	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	Baltimore, MD	03/13/1998	Nunn-Lugar-Domenici DPP	Tabletop	Chemical
USA	Baton Rouge, LA	01/23/2002	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	Baton Rouge, LA	02/04/2000	Nunn-Lugar-Domenici DDP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Chemical

Country	Location	Date	Lead Agency	Type	Agent(s)
USA	Baton Rouge, LA	05/15/2000	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	Charlotte, NC	08/31/1999	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	Birmingham, AL	04/20/2000	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Biological
USA	Charlotte, SC	10/16/1998	Nunn–Lugar-Domenici DPP	Tabletop	Chemical
USA	Philadelphia/ Philadelphia County, PA	06/08/1999	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	Philadelphia/ Philadelphia County, PA	09/04/1997	Nunn-Lugar-Domenici DPP	Tabletop	Chemical
USA	Phoenix/Maricopa County, AZ	08/05/1999	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	Phoenix/Maricopa County, AZ	04/21/1998	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Chemical
USA	Phoenix/Maricopa County, AZ	10/31/1998	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	Pittsburgh/ Alleghany County, PA	02/24/2000	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Biological
USA	Pittsburgh/ Alleghany County, PA	02/12/1999	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Chemical
USA	Pittsburgh/ Alleghany County, PA	09/09/2000	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	Charlotte, SC	09/02/1999	Nunn–Lugar–Domenici DPP	Full Scale	Chemical
USA	Chicago, IL	07/28/1998	Nunn–Lugar–Domenici DPP	Tabletop	Biological
USA	Chicago, IL	09/26/1997	Nunn–Lugar–Domenici DPP	Tabletop	Chemical
USA	Chicago, IL	06/08/2000	Nunn–Lugar–Domenici DPP	Full Scale	Chemical
USA	Cincinnati, OH	03/16/2000	Nunn–Lugar–Domenici DPP	Tabletop	Biological

Country	Location	Date	Lead Agency	Type	Agent(s)
USA	San Francisco, CA	11/13/1998	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	Cincinnati, OH	05/14/1999	Nunn-Lugar–Domenici DPP	Tabletop	Chemical
USA	San Francisco, CA	04/03/1998	Nunn-Lugar-Domenici DPP, U.S. Army Chemical and Biological Defense Command (SBCCOM)	Tabletop	Chemical
USA	Shreveport, LA	06/11/2001	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	Oklahoma City, OK	12/15/1999	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Biological
USA	Oklahoma City, OK	06/14/2000	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Full Scale	Chemical
USA	Oklahoma City, OK	12/18/1998	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Chemical
USA	Omaha, NE	02/26/1999	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Chemical
USA	Orlando, FL	11/20/2002	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	Orlando, FL	09/05/2002	Nunn-Lugar-Domenici DPP	Tabletop	Chemical
USA	St. Paul, MN	07/23/1999	Nunn-Lugar-Domenici DPP	Tabletop	Chemical
USA	Stockton, CA	03/24/2000	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Chemical
USA	Tampa, FL	10/20/1999	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	Syracuse/ Onondaga County, NY	09/29/2000	Nunn-Lugar-Domenici DPP	Tabletop	Chemical
USA	Syracuse/ Onondaga County, NY	11/27/2001	Nunn-Lugar-Domenici DPP	Full Scale	Biological

Country	Location	Date	Lead Agency	Type	Agent(s)
USA	Stockton/San Joaquin County, CA	04/10/2002	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	Tacoma, WA	09/15/2000	Nunn-Lugar-Domenici DPP	Tabletop	Chemical
USA	Tampa, FL	05/21/1999	Nunn-Lugar-Domenici DPP	Tabletop	Chemical
USA	Tampa, FL	12/02/1999	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	Yonkers/ Westchester County, New York	05/19/2000	Nunn-Lugar-Domenici DPP	Tabletop	Chemical
USA	Yonkers/ Westchester County, New York	05/15/2002	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	Yonkers/ Westchester County, New York	01/14/2002	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	Toledo/Lucas County, OH	06/22/2000	Nunn-Lugar-Domenici DDP	Full Scale	Chemical
USA	Toledo/ Lucas County, OH	09/24/1999	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Chemical
USA	Toledo/Lucas County, OH	04/11/2004	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Biological
USA	Tulsa, OK	08/03/2000	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	Tulsa, OK	09/20/2000	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Biological
USA	Tulsa, OK	04/23/1999	Nunn-Lugar-Domenici DPP; U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Chemical
USA	Shreveport, LA	06/09/2000	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Chemical

Country	Location	Date	Lead Agency	Type	Agent(s)
USA	Seattle, WA	02/27/1998	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Chemical
USA	Santa Ana, CA	03/12/1999	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Chemical
USA	Santa Ana, CA	04/27/2000	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	Santa Ana, CA	02/12/2000	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Biological
USA	Seattle, WA	11/19/1998	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	Seattle, WA	07/23/1999	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	El Paso, TX	08/20/1999	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	El Paso, TX	10/29/1999	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	El Paso, TX	10/30/1998	Nunn-Lugar-Domenici DPP	Tabletop	Chemical
USA	Freemont, CA	08/15/2001	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	Freemont, CA	06/09/2000	U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Chemical
USA	Fresno, CA	03/22/2000	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Biological
USA	Fresno, CA	05/24/2000	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	Fresno, CA	10/01/1999	Nunn-Lugar-Domenici DPP	Tabletop	Chemical
USA	Tucson, AZ	10/09/1998	Nunn-Lugar-Domenici DPP	Tabletop	Chemical
USA	Tucson, AZ	05/06/1999	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	Tucson, AZ	10/28/1999	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	Dallas, TX	09/16/1999	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	Dallas, TX	02/24/1998	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Chemical

Country	Location	Date	Lead Agency	Type	Agent(s)
USA	Dallas, TX	09/14/1999	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	Dayton, OH	02/22/2002	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	Dayton, OH	08/17/2001	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	Dayton, OH	09/22/2000	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Chemical
USA	Denver, CO	06/09/1999	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	Denver, CO	07/10/1999	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	Des Moines, IA	06/27/2001	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	Fort Wayne, IN	06/08/2002	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	Fort Wayne, IN	11/06/2001	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	Fort Wayne, IN	09/01/2000	Nunn-Lugar-Domenici DPP	Tabletop	Chemical
USA	Fort Worth, TX	04/30/1999	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Chemical
USA	Fort Worth, TX	06/20/2002	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Biological
USA	Fort Worth, TX	09/14/2000	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Full Scale	Chemical
USA	Washington, DC	03/10/1999	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	Washington, DC	01/09/1998	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Chemical
USA	Washington DC	09/22/1998	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	Wichita, KS	05/22/2000	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	Wichita, KS	06/15/2000	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	Denver, CO	Unspecified	Nunn-Lugar-Domenici DPP	Tabletop	Chemical
USA	Richmond, VA	06/12/2001	Nunn-Lugar-Domenici DPP	Tabletop	Biological

Country	Location	Date	Lead Agency	Type	Agent(s)
USA	Des Moines, IA	02/18/2002	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Chemical
USA	Des Moines, IA	04/16/2002	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	Providence, RI	09/29/1999	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	Providence, RI	07/07/1999	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	Providence, RI	08/28/1998	Nunn-Lugar-Domenici DPP	Tabletop	Chemical
USA	Richmond, VA	05/05/2000	Nunn-Lugar-Domenici DPP	Tabletop	Chemical
USA	Detroit, MI	06/22/1999	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	Detroit, MI	08/13/1998	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	Detroit, MI	09/19/1997	Nunn-Lugar-Domenici DPP	Tabletop	Chemical
USA	Yonkers/Westchester County, NY	01/17/2002	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	Yonkers, NY	05/15/2002	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	Yonkers, NY	05/19/2000	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Chemical
USA	Riverside, CA	03/03/2000	Nunn-Lugar-Domenici DPP	Tabletop	Chemical
USA	Rochester, NY	12/03/1999	Nunn-Lugar-Domenici DPP	Tabletop	Chemical
USA	San Jose, CA	10/03/1998	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	San Jose, CA	N/A	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	San Jose, CA	01/30/1998	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Chemical
USA	Birmingham, AL	06/21/2000	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	Birmingham, AL	05/28/1999	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Chemical
USA	Boston, MA	03/11/1999	Nunn-Lugar-Domenici DPP	Tabletop	Biological

Country	Location	Date	Lead Agency	Type	Agent(s)
USA	Boston, MA	11/12/1997	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Chemical
USA	Buffalo, NY	08/12/1999	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	Buffalo, NY	08/10/1999	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	Buffalo, NY	01/15/1999	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Chemical
USA	Cincinnati, OH	05/20/2000	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	Raleigh, NC	08/18/2000	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	Raleigh, NC	07/12/2000	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	Raleigh, NC	04/23/1999	Nunn-Lugar-Domenici DPP	Tabletop	Chemical
USA	Sacramento, CA	11/09/1999	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	Cleveland, OH	06/13/2000	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Biological
USA	Cleveland, OH	08/22/2000	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	Cleveland, OH	01/15/1999	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Chemical
USA	Colorado Springs, CO	07/24/2000	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Biological
USA	Colorado Springs, CO	09/20/2000	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	Colorado Springs, CO	01/08/1999	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Chemical
USA	Columbus, GA	10/17/2001	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	Columbus, GA	03/19/2000	Nunn-Lugar-Domenici DPP	Full Scale	Chemical

Country	Location	Date	Lead Agency	Type	Agent(s)
USA	Columbus, GA	05/26/2000	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Chemical
USA	Corpus Christi, TX	05/09/2002	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	Corpus Christi, TX	11/19/1999	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Chemical
USA	Wichita, KS	08/27/1999	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Chemical
USA	Portland, OR	03/30/1999	Nunn-Lugar-Domenici DPP	Tabletop	Chemical
USA	Portland, OR	09/23/1999	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	Sacramento, CA	05/24/2000	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	Sacramento, CA	11/06/1998	Nunn-Lugar-Domenici DPP,U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Chemical
USA	Salt Lake City, UT	04/20/2000	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	Salt Lake City, UT	09/24/1999	Nunn-Lugar-Domenici DPP	Tabletop	Chemical
USA	Salt Lake City, UT	06/28/2000	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	San Antonio, TX	03/02/1999	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	San Antonio, TX	10/06/1999	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	San Antonio, TX	12/05/1997	Nunn-Lugar-Domenici DPP	Tabletop	Chemical
USA	Newark, NJ	04/04/2000	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	Newark, NJ	06/07/2000	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	Newark, NJ	02/26/1999	Nunn-Lugar-Domenici DPP	Tabletop	Chemical
USA	Portland, OR	03/30/1999	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	Chesapeake, Newport News, Norfolk, and Virginia Beach, VA	09/09/1999	U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Full Scale	Chemical

Country	Location	Date	Lead Agency	Type	Agent(s)
USA	Memphis/Shelby County, TN	10/08/1999	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	Memphis/Shelby County, TN	10/05/1999	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	Memphis/Shelby County, TN	01/16/1998	Nunn-Lugar-Domenici DPP	Tabletop	Chemical
USA	Mesa, AZ	09/20/2000	Nunn-Lugar-Domenici DPP; U.S. Army Soldier and Biological Chemical Command	Tabletop	Biological
USA	Mesa, AZ	03/22/2000	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	Mesa, AZ	09/24/1999	Nunn-Lugar-Domenici DPP; U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Chemical
USA	Milwaukee, WI	08/20/1999	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	Milwaukee, WI	08/18/1999	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	Milwaukee, WI	07/24/1998	Nunn-Lugar-Domenici DPP; U.S. Army Chemical and Biological Defense Command	Tabletop	Chemical
USA	New York, NY	03/25/1998	Unspecified	Tabletop	Biological
USA	Jacksonville/Duval County, FL	04/10/1998	CBDCOM, Nunn-Lugar-Domenici DPP	Tabletop	Chemical
USA	Jackson, MS	06/16/2000	Nunn-Lugar-Domenici DPP; U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Chemical
USA	Jacksonville/Duval County, FL	06/23/1999	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	Jacksonville International Airport Jacksonville, FL	10/21/1998	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	Kansas City, MO	01/27/1998	Nunn-Lugar-Domenici DPP, U.S. Army Chemical and Biological Defense Command (CBDCOM)	Tabletop	Chemical
USA	Jackson/Hinds County, MS	10/05/2001	Nunn-Lugar-Domenici DPP	Tabletop	Biological

Country	Location	Date	Lead Agency	Type	Agent(s)
USA	Kansas City, MO	09/16/1999	Nunn-Lugar-Domenici DPP	Full Scale	Biological
USA	Las Vegas/Clark County, NV	05/05/2000	U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Chemical
USA	Kansas City, MO	06/02/2004	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	Jersey City/Hudson County, NJ	02/11/2000	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Chemical
USA	Jersey City/ Hudson County, NJ	04/23/2002	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	Las Vegas, NV	03/21/2002	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	Hialeah, FL	08/02/2001	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	Hialeah, FL	07/21/2000	Nunn–Lugar–Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Chemical
USA	Garland, TX	08/04/2000	Nunn–Lugar–Domenici DPP	Tabletop	Chemical
USA	Garland, TX	03/05/2002	Nunn–Lugar–Domenici DPP	Tabletop	Biological
USA	Grand Rapids, MI	09/15/2000	Nunn–Lugar–Domenici DPP	Tabletop	Chemical
USA	Grand Rapids, MI	07/24/2001	Nunn–Lugar–Domenici DPP	Tabletop	Biological
USA	Houston, TX	02/24/2000	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Biological
USA	Houston, TX	01/20/2000	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	Houston, TX	03/20/1998	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Chemical
USA	Huntington Beach, CA	09/18/2002	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	Huntington Beach, CA	05/23/2001	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	Huntington Beach, CA	03/10/2000	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Chemical

Country	Location	Date	Lead Agency	Type	Agent(s)
USA	St. Louis, MO	10/22/1999	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	St. Louis, MO	10/20/1999	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Full Scale	Chemical
USA	St. Louis, MO	09/25/1998	Nunn-Lugar-Domenici DPP	Tabletop	Chemical
USA	New Orleans, LA	07/27/1999	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	New Orleans, LA	06/16/1999	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	New Orleans, LA	07/24/1998	Nunn-Lugar-Domenici DPP	Tabletop	Chemical
USA	St. Petersburg, FL	02/20/2002	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	Greensboro, NC	11/14/2001	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	Greensboro, NC	04/24/2002	Nunn-Lugar-Domenici DPP	Full Scale	Chemical
USA	Greensboro, NC	09/01/2000	Nunn-Lugar-Domenici DPP	Tabletop	Chemical
USA	Indianapolis, IN	02/13/1998	Nunn-Lugar-Domenici DPP	Tabletop	Chemical
USA	Indianapolis, IN	10/08/1998	Nunn-Lugar-Domenici DPP	Tabletop	Biological
USA	Chesapeake, Newport News, Norfolk, and Virginia Beach, VA	11/10/1998	U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Chemical
USA	Honolulu, HI	05/26/1999	U.S. Army Chemical and Biological Defense Command (CBDCOM)	Tabletop	Biological
USA	Honolulu, HI	02/06/1998	U.S. Army Chemical and Biological Defense Command (CBDCOM)	Tabletop	Chemical
USA	Honolulu, HI	05/28/1999	U.S. Army Chemical and Biological Defense Command (CBDCOM)	Full Scale	Chemical
USA	St. Petersburg, FL	04/28/2000	U.S. Army Chemical and Biological Defense Command (CBDCOM)	Tabletop	Chemical
USA	Glendale, CA	03/10/2000	Nunn-Lugar-Domenici DPP, U.S. Army Soldier and Biological Chemical Command (SBCCOM)	Tabletop	Chemical
USA	Los Angeles, CA	02/1999	Unspecified	Unspecified	Chemical (sarin)

Country	Location	Date	Lead Agency	Type	Agent(s)
USA	Philadephia, PA	Unspecified	US Army Soldier and Biological Chemical Command (SBCCOM)	Unspecified	Chemical (sarin)
USA	Rapid City, SD	06/2002	Unspecified	Unspecified	Unspecified CBRN
USA	Pierre, SD	07/2002	SD Homeland Security and Division of Emergency management	Tabletop	Biological (smallpox)

B) *Review of Literature on Exercises*

This section includes abstracts of open-source documents pertinent to WMD preparedness exercises. Documents are divided into four categories: (i) Reviews and assessments of government exercises, (ii) Private sector exercises and assessments, (iii) Documents used in exercises, and (iv) Supporting and related documents.

B.1 Reviews and Assessments of Government Exercises

TOPOFF 1

Designed by the Department of Justice, Office of Emergency Preparedness, the TOPOFF exercise involved multiple national and state level agencies in a no-notice, full scale exercise. The design scenario took place in May 2000, and simulated WMD terrorist events in three separate cities: a chemical weapon scenario in Portsmouth, NH, radiological scenario in the Washington, DC metro area, and a biological weapon scenario in Denver, CO. As the name implies, the exercise included top-level officials from the U.S. government.

Title: **The Role of Communities in Bioterrorism Response and Recovery**
Author: **Illinois Department of Public Health, Bioterrorism Leadership Team**
Source: **Illinois Department of Public Health, Bioterrorism Leadership Team**
File Name: ***4 Topoff2.pdf***

This PowerPoint presentation provides a review of the federally run exercise TOPOFF, conducted in May 2000. The reviewers focused on the biological terrorism aspect of the exercise which took place in Denver, CO. The response effort to the resulting public health crisis was the primary focus. In essence, the goal of the presentation was to educate the Illinois Department of Public Health on the lessons learned from this exercise in order to guide and complement their response and recovery efforts.

Title: **A Plague on Your City: Observations from TOPOFF**
Author: **O'Toole, Tara, Rita Grossman, Thomas Inglesby, MD.**
Source: **Biodefense Quarterly, September 2000. Vol.2, Number 2**
File Name: ***4 Topoff1_Otoole.pdf***

The authors of this journal article, which was re-published in a number of other specialized sources, are considered to be among the foremost experts in the field of public health management and civilian biodefense. In this article, the authors identified public health and medical issues and observations arising from TOPOFF 1, although the article focused on the biological weapons incident in Denver, CO. The goal of the review was to pinpoint lessons learned from the medical community during the bioterrorism exercise. Each component of the article was derived from interviews with 11 of the officials, from both government and private sectors, who participated in the exercise. This method of information-gathering allowed the authors to offer a more critical overview of the exercise, as well as constructive critique of the lessons learned.

Title: **TOPOFF, A Plague Exercise**
Source: **Biohazard News**
File Name: ***4 Topoff1.doc***

Biohazard News is a free publication that provides information related to bioterrorism in order to keep civilians better informed. The article on TOPOFF is a brief overview of the exercise and summary of observations. The article was compiled drawing on information about the exercise from other peer reviewed articles that are included in this report.

Title: **Lessons Learned From a Full-Scale Bioterrorism Exercise.**
Author: **Hoffman, Richard. E. and Jane E. Norton.**
Source: **Emerging Infectious Diseases. Vol.6.No.6 November-December 2000**
File Name: ***4 Topoff_Colorado.pdf***

This article was authored by senior members of the Colorado Department of Public Health and Environment that participated in TOPOFF 1. Firsthand experience with the exercise gives the authors valuable insight on how the exercise could be improved. Analysis of the exercise included lessons learned and recommendations for changes that could and should be made in order increase crisis management capacity. Recommendations were made for local, state, and federal level authorities and agencies. This article was short in length relative to other peer-reviewed pieces on the exercise; however, the observations and analysis are rich, and are presented in a straightforward manner.

TOPOFF 2

TOPOFF 2 was a combination natural disaster/terrorism simulation, designed to overwhelm responders and local, state and federal agencies. An internet attack slowed the communication infrastructure, while a Radiological Dispersal Device exploded in Seattle. Concurrently, an unknown illness was spreading through Chicago. The next day, a terrorist hostage situation resulted in the bombing of a bus in Oklahoma. The next day, a Washington state ferry was taken over by unknown persons. TOPOFF 2 was meant to examine and determine what changes had been implemented following TOPOFF 1, and sought to improve on response activities.

Title: **TOPOFF 2: Practice Makes Perfect.**
Author: **Baranek, Sherry.**
Source: **Continuity Insights Magazine**
File Name: ***1 Topoff_continuity.pdf***

Continuity Magazine is a business magazine that published this article in its healthcare focus section. This article gives a general overview of TOPOFF2, and also provides a case study of a participating hospital. The hospital, Rush-Copley Medical Center in Aurora, Illinois, is a 150 bed hospital serving the suburbs of Chicago. The case study gave details of the hospital's participation in the exercise and the benefits derived thereof. Information concerning the hospital's response to the sudden influx of patients, in addition to normal activities, was described through interviews with senior staff at the hospital. Interestingly, the hospital was able to overcome the usual shortcomings faced by medical facilities, such as securing the facility, absence of regular staff, and managing sudden large influxes of patients.

Such publications are useful information-sharing tools, specifically concerning response procedures and exercise benefits for individual entities. Individual accounts of exercises such as this are not usually included in After Action Reports.

Title: **Top Officials (TOPOFF) Exercise Series: TOPOFF 2. After Action Report.**
Author: **Office of the Press Secretary**
Source: **Department of Homeland Security. December 19, 2003**
File Name: ***1 Topoff2_DHS.pdf***

The Department of Homeland Security (DHS) released this After Action Report in December 2003. The report provides an overview of the exercise along with summary findings, and a participating agencies list. The authors concentrated on seven areas: Alerts and Alerting; Declarations and Proclamations of Disaster and Emergency; the Federal Official Role; Data Collection and Coordination; the Strategic National Stockpile; Hospital Play in the Illinois Venue; and Balancing the Safety of First Responders and the Rescue of Victims. The case study highlighted that this exercise was the first time that officials raised the HSAS Threat Condition to Red - either in simulation or reality. Local agencies were placed on heightened threat alert conditions due to the Red designation. DHS determined that the heightened response protocols needed to be further developed and publicized, as the threat condition affected the rest of the play. The report also noted that communications between agencies and individuals were strained; one of the most significant challenges of the exercise was resource allocation and information sharing.

Title: **TOPOFF Exercise Offer Lessons for Preparedness.**
Author: **May, Susan.**
Source: **Northwest Public Heath. Fall/Winter 2003**
File Name: ***1 Topoff2_May.pdf***

Northwest Public Health Magazine printed this article in its bi-annual publication. The article is based on a report by the Washington State Department of Health. The review highlights lessons from the exercise and offers select recommendations. The author, a radiation health physicist and divisional planner with the Division of Environmental Health, pointed to the communications aspect of the exercise as the most beneficial. TOPOFF 2 helped determine that the region had effective basic plans and that participants were able to improve inter-agency communication during the project. However, initial communication between local and federal agencies was poor and communication on protocols between the two scarce. After-action recovery plans were lacking and further preparedness for post-response phases is needed.

Title: **CSIS Analyst Comment on TOPOFF 2 and CSIS Conducted 2001, 2002 Wargames on Bioterrorism.**
Source: **Center for Strategic and International Security**
File Name: ***1 Topoff2_CSIS.pdf***

The Center for Strategic and International Studies provided comments from its analysts on the benefits and importance of TOPOFF 2, immediately following the exercise. Evaluators were able to gain further knowledge of the gaps in security facing the US in its emergency response planning. The simulation allowed responders a real-time scenario in which to evaluate, and then revise, their response structures.

Dark Winter

On June 22-23 2001, the Center for Strategic and International Studies, Johns Hopkins Center for Civilian Biodefense Studies, the Analytic Services (ANSER), and the Oklahoma National Memorial Institute for the Prevention of Terrorism held a senior-level, full-scale exercise simulation of a smallpox attack on the US. The exercise was created to examine the difficulties that senior officials would face if such an attack were to occur. During the attack, tensions in Asia are rising, an al-Qa`ida operative has been arrested, and Iraq-Kuwait tensions are high. The 12 participants emulated National Security Council officials, and the simulation was based on two assumptions: 3,000 people were infected with smallpox in the initial attack and the transfer rate is a 1:10 ratio. There are only 15.4 million vaccine doses available in the US stockpile.

Title: **Final Script – Dark Winter Exercise**
Author: **Center for Strategic and International Studies, Johns Hopkins Center for Civilian Biodefense Studies, the Analytic Services (ANSER) and the Oklahoma National Memorial Institute for the Prevention of Terrorism**
Source: **Johns Hopkins Center for Civilian BioDefense Studies**
File Name: ***2 DarkWinter_script.pdf***

This document contains the information provided to the participants of the Dark Winter exercise and some of the information that served as "live feeds" for the unfolding events of the exercise. This included expert information, memos, timelines, and descriptions of the escalating health crisis. Remarks, discussions, and decisions made during the exercise are not included.

Title: **Shining Light on "Dark Winter."**
Author: **O'Toole, Tara, Michael Mair and Thomas Inglesby**
Source: **Confronting Biological Weapons: Clinical Infectious Diseases 2002; 34:972-83.**
File Name: ***2 DarkWinter II_Otoole.pdf***

The Center for Civilian Biodefense Studies at Johns Hopkins University published this review of Dark Winter in its Clinical Infectious Diseases publication. The article outlines the exercise's design, planning assumptions, scenario, execution, and lessons learned. Dark Winter is a scientifically plausible scenario, especially with regard to the small dosage of vaccine needed, the percentage of the public vaccinated, and the disease transmission rate. The three policy options given the NSC concerning vaccination were subsequently discussed and implemented based on participant concerns about a growing epidemic. The lessons from the exercise exemplify that leaders are often unfamiliar with the requirements necessary for effective response following a biological attack, the options that are available to them, and the consequences of different policy actions. Most information is therefore dependent on public health officials. US health care is ill-equipped for a mass infection situation, as the vaccines that could slow an outbreak are unreliable and do not exist in sufficient quantities.

Title: **The Dark Winter of Biological Terrorism**
Author: **Roman, Peter.**
Source: **Orbis Magazine Summer 2002. p.469-82**
File Name: ***2 DarkWinter III.htm***

Orbis Magazine published this narrative of Dark Winter a year after the exercise took place. The authors approached the exercise by identifying concerns that should be immediately addressed, and examining strategic factors that differentiate biological terrorism from other domestic threats. Deterrence approaches must take into account the likelihood of denial by domestic participants that a terrorist event is actually occurring. Other deterrent factors should focus on terrorists being rational actors, and policies that focus on biological weapons should be able to handle the most lethal agents that terrorists have the ability to acquire. Detection, identification, and attribution elements in the US deterrent posture were found to be lacking. There were difficulties in identifying the outbreak as a terrorist attack, and thus response time was slowed. Furthermore, more research is necessary to understand the behavior of infected persons, as the act of seeking treatment directly correlates to the spread of any attack. The government needs to realize its constraints, and to understand the limited efficacy of vaccines and response efforts.

Title: **Dark Winter – Bioterrorism Simulation Exercise**
Author: **Andersen, Phil and David Heyman**
Source: **CSIS**
File Name: ***2 Dark Winter_CSIS.pdf***

This web document is a brief overview of the Dark Winter exercise, by the Center for Strategic and International Studies. Written for a public audience, it provides contact information and a brief summary for those who are seeking further information on CSIS's International Security Project.

Sooner Spring

From April 12-13, 2002, the State of Oklahoma ran a series of exercises named Sooner Spring. These exercises included a tabletop and a four-city full-scale exercise (in Lawton, McAlester, Oklahoma City, and Tulsa), and were meant to measure Oklahoma's ability to respond to bioterrorism. The table-top included a terrorist smallpox attack within Tulsa. The full-scale exercises in each city varied: a smallpox attack in Tulsa, pneumonic plague in McAlester, a botulism outbreak in Lawton, and a pharmaceutical crisis-drill in Oklahoma City. All observers measured the effectiveness of bioterrorism planning on the local, state and federal levels, while determining what has been accomplished and what remains to be done for future emergency planning.

Title: **Sooner Spring. Final Report: Validating Oklahoma Bioterrorism Planning. April 12, 2002.**
Author: **Office of the Governor**
Source: **State of Oklahoma**
File Name: ***5 Soonerspring.pdf***

Sooner Spring was intentionally designed to be broad in scope, "a mile wide and an inch deep," in order to get a snapshot of the state's preparedness for meeting the threat of bioterrorism. The exercise entailed gubernatorial-level decision making, communication during a crisis, local level emergency response, and public health functions. The exercise was sponsored by the Oklahoma Memorial Institute for the Prevention of Terrorism (MIPT) and developed by L-3 Communications Analytic Corporation. Five sub-exercises were conducted under the Sooner Spring banner:

- Executive Tabletop: This section of the exercise was created due to a need to assess bioterrorism response planning and to prepare those in state leadership roles to deal with this threat. The exercise involved a smallpox outbreak in Tulsa. The 'open' discussion focused on critical decisions Oklahoma state officials would need to make in order to limit the effects and consequences of a bioterror attack.
- Tulsa: The Tulsa healthcare community received training in identifying and managing a smallpox outbreak.
- McAlester: This was an exercise that involved the entire community of McAlester, including the general population, to test the receipt and dissemination of medication following an outbreak of pneumonic plague.
- Oklahoma City: Officials practiced receipt, storage, and repackaging for shipment of medications received from the National Pharmaceutical Stockpile (NPS) within the state. Surveillance, identification, and communication functions were also assessed in this exercise.
- Lawton: Officials tested emergency communications and infection control following an outbreak of botulism in this part of the exercise.

These exercises were also designed for officials to practice their real world roles. Details of the exercise design for each component were included in this report. This report was comprehensive and included details relevant to understanding outcomes of the exercise.

Title:	**Sooner Spring: Botulism Outbreak Investigation in Lawton, Oklahoma. Email and document.**
Author:	**Dr. Laurence Burnsed, MPH. Epidemiologist**
Source:	**Oklahoma State Department of Health.**
File Name:	**Only hardcopy of document available.**

This communication and the attached document were sent by the epidemiologist assigned to create the botulism outbreak scenario in Lawton, who also acted as moderator for the table-top exercise. In addition to the comments received from Dr. Burnsed, we received the primary document used to stimulate discussion among the participants.

The exercise practiced basic methods of conducting an outbreak investigation, assuming an intentional release of the disease was not known. The main objective of the exercise was to identify roles of various state and local officials in charge of a large-scale outbreak investigation. The scenario involved an outbreak of botulism from botulinum toxin released through locally produced bottled water. The exercise contained three components:

- Review of steps following an outbreak investigation.
- Mock scenario testing challenges of detection, source identification, and prevention of wider infection.
- Assessing success and limitations of organization, coordination, and collaboration.

The objectives of this sub-exercise were:

- Establish adequacy of state and local resources for conducting epidemiological investigations

- Test communication system.
- Evaluate time it takes to reach contacts and collect, analyze, and share data.
- Establish responsibilities of state and local health divisions.

The document included the simulation agenda and was sectioned according to the different components of the exercise. Each part includes questions and answers that were important for participants to address. The information contained in the document was detailed and was meant to be an internal document.

Silent Vector

In October 2002, the Center for Strategic and International Studies and the ANSER Institute for Homeland Security oversaw a tabletop exercise at the Andrews Air Force Base. The exercise was a simulation of an emergency meeting of the National Security Council at Camp David. The meeting asked participants to consider a terrorist threat against the energy infrastructure on the East Coast, without knowledge of particular targets or mode of attack. Intelligence was vague, with a high probability of attack within a few days.

Title: **Silent Vector: Issues of Concern and Policy Recommendations.**
Author: **Anderson, Philip. Amanda Dory, John Hamre, Robert McMullin, Steven Netishen, and Cynthia Pettitt**.
Source: **Center for Strategic and International Studies.**
File Name: ***3 Silent Vector 3.pdf***

This publication is an extremely useful document that integrates aspects of an After Action Report with further research and analysis of the issues identified in the exercise to make policy recommendations.

Title: **What We Learned from Silent Vector.**
Author: **Burkholder-Allen, Kelly and Paul Rega.**
Source: **Center for Terrorism Preparedness, University of Findlay**
File Name: ***3 Silent Vector 2.ppt***

A PowerPoint presentation developed by the Center for Terrorism Preparedness at the University of Findlay, which provides an overview of the exercise as well as observations made by the authors. Substantive information is included with analytical talking points.

Title: **Silent Vector.**
Source: **Anser Institute for Homeland Security**
File Name: ***3 Silent Vector 1.pdf***

This document is a PowerPoint presentation that provides a general overview of the exercise.

"Bio 98-1"

Title: **Biological Warfare War Game "Bio 98-1"**
Author: **Wargaming Division**
Source: **Marine Corps Warfighting Laboratory (MCWL)**

File Name: ***Bio98Rpt.pdf***

The Marine Corps Warfighting Lab (MCWL) conducted a day long urban warfare exercise that involved responding to a biological weapon dispersal on September 19, 1998, in Charleston, South Carolina. Objectives ranged from determining how to control such an event from sea or a distance to how well the Chemical Biological Incident Response Force (CBIRF) worked in an urban setting. The core objective of the exercise was to determine what role CBIRF's would play when assisting local responders with a terrorist incident involving a weapon of mass destruction. The CBIRF is a division of marines with special training for responding to military and domestic terrorist situations involving chemical or biological weapons.

This document was a summary assessment of the exercise that promotes awareness among state and local emergency preparedness planners with regard to the federal resources available to them in responding to a WMD incident, as well as the processes by which they can be accessed. It also gives them an idea of how specialized response forces would deal with an incident they may encounter. The scenario involved an escalating situation which exercised the chain of command's initiation of the response process. Considering the potential response delays that may be incurred by bureaucratic protocols, exercises such as this are important in realistically assessing capacity for timely reaction.

"Bio 99-1"

Title: **Biological Warfare War Game "Bio 99-1"**
Author: **Wargaming Division**
Source: **Marine Corps Warfighting Laboratory (MCWL)**
File Name: ***Bio99Rpt.pdf***

The Marine Corps Warfighting Laboratory (MCWL) conducted a seminar game in 20 January, 1999. The game was structured in a Red Team/Blue Team interactive format to assess a new approach to force protection in a biologically hostile environment. Battelle sought to develop rapidly acting medical protection for various biological warfare agents. This Federal Drug Administration licensed product was to be administered by a non-invasive technique and was to provide protection to the victim for six to twenty four hours from a single application. The report provided a summary of the findings of the exercise from scientific, clinical, and operational perspectives.

This document has been included due to the technique involved in testing the force protection technique introduced by Battelle. The role playing format used to test a medical process is unique, and provides a useful example of how response procedures and equipment can be assessed. Key to this format is the hostile environment; this element of realism makes the exercise more robust.

Miscellaneous Reports

Title: **Wargaming Homeland Security and Army Reserve Component Issues**
Author: **Pasquarett, Michael.**
Source: **Center for Strategic Leadership, May 2003. Vol. 03-03**
File Name: ***Wargaming_homelandsecurity.pdf***

The Northern Command (NORTHCOM) was established by the Department of Defense (DOD) in order to consolidate homeland defense and civil support resources of active and reserve forces. As a result, the same units which have overseas commitments may be asked to protect infrastructure and respond to domestic crises. This paper presents issues of conflicting priorities, current missions, and structures in NORTHCOM's homeland security mission, identified through two senior service Army War College war games. These exercises, the U.S. Army War College's Strategic Crisis Exercise (SCE) and the Joint Land, Aerospace and Sea Simulation (JLASS) Exercise, were student war games that focused on educational objectives. However, many of the lessons learned "provide a basis for future modeling and evaluation that will lead to greater reserve component efficiencies and enhanced homeland security effectiveness." The War College SCE involved 12 overseas incidents and four domestic disasters including an earthquake, a series of attacks by domestic and foreign terrorists, a major attack in a Southern port, and a terrorist chemical incident in Canada. The JLASS exercise also involved terrorist attacks in the United States. The major themes in this paper's recommendations were (1) the integration of homeland security plans, policies, roles, and procedures involving the DOD into high-level war games, and (2) the exercise of changes made in force structure. Despite the lack of detail in this paper, it provides information on high-level war games that is otherwise unavailable in the public domain.

Title: **Chemical Weapon Functional Exercise – Cincinnati: Observations and Lessons Learned from a "Typical Medium-Sized" City's Response to Simulated Terrorism Utilizing Weapons of Mass Destruction**
Author: **Dr. Dennis Fitzgerald, Dr. Mathew Sztajnkrycer, Dr. Todd Crocco**
Source: **Public Health Reports**
File Name: ***54 Cincinnati.pdf***

This report, authored by three medical doctors, examines the Nunn-Lugar-Domenici Act-sponsored WMD exercise in Cincinnati and draws lessons about the pre-hospital phase of responding to WMD terrorism.

The exercise, which simulated a nerve agent released at a party for city employees and their families, involved 21 participating local agencies in a real-time, free-play exercise, as well as 85 volunteer victims. The report draws lessons from participants' performance in crowd control, decontamination, triage, on-scene medical treatment, and transport of victims. Among the important findings were difficulties with crowd control, coping with the modesty concerns of victims being decontaminated, the need for first responders to train while wearing PPE, early notification to hospitals of the event's nature, and limited availability of medical supplies.

Title: **Exercise "Baseline:" Training for Terrorism**
Author: **Rohen, Gary J**
Source: **FBI Law Enforcement Bulletin**
File Name: ***104 Baseline.htm***

This article from the *FBI Law Enforcement Bulletin* summarizes a functional exercise for responding to terrorists armed with WMD, which involved 16 local, state, and federal agencies. It was the first test of the Joint Operations Center model developed by the FBI. This model is intended to accommodate ICS implementation, crisis management response by the FBI, and consequence management by FEMA. The chief findings of the exercise were the need for better inter-agency and inter-jurisdictional coordination; a lack of PPE; a lack of

training in PPE use, decontamination, and medical requirements of WMD attacks; problems of inter-agency information flow; concerns with addressing the media; and matters of prosecution, including evidence preservation.

The hypothetical scenario entailed a group of American domestic terrorists instigating a HazMat crisis at the New London submarine base in Connecticut by derailing a train. The terrorists used the incident as a distraction to take hostages and threaten to release a biological agent, unless the Federal government met its demands. In designing the exercise, the FBI designed an agent (aerosolized rabies) and dispersal device of which such a group might plausibly be capable of producing.

This exercise provided an element absent from those performed under the Nunn-Lugar-Domenici Act: the threat of a biological attack by a group making demands. Though such behavior is unlikely to be present in terrorist groups currently of greatest concern (i.e., al-Qa'ida and other Islamists), it remains plausible. Training to cope with this sort of negotiation-based situation can be accommodated in tandem with responder field exercises, and should perhaps be considered for more use.

Title: **Interagency Exercise**
Author: **Dunderdale, Robert**
Source: **Boston Fire Department**
File Name: ***45 Boston.htm***

This review, composed by a local fire department, pertains to a full-scale exercise that took place in Boston, MA. The exercise simulated a chemical attack on an Amtrak commuter train. The review includes detailed narrative of the exercise and observations. While helpful to planners of any exercise, this document is most geared to fire department audiences.

B.2 Private Sector Exercises and Assessments

Title: **The Advisory Panel to Assess Domestic Response Capabilities for Terrorism Involving Weapons of Mass Destruction. Annual Report to the President and Congress.**
Author: **Chairman Gilmore James**
Source: **RAND**
File Name: ***Gilmore.pdf***

This report is prepared annually by RAND for the above advisory panel also known as the Gilmore Commission. Reports for the years 1999-2003 were reviewed. The reports addressed broad policy reviews and recommendations with regard to improving domestic preparedness for a terrorist incident involving WMD. Exercises were mentioned only in this broad policy and organizational context. As such, the report for 2000 emphasized the importance of exercises in relation to practicing training and response capabilities in general. The 2001 report emphasized the involvement of the federal government in state and local exercises, and the need for better organization and coordination with state and local governments in relation to increasing response capabilities. The lack of awareness in state and local governments of federal resources and programs has hampered efficient preparedness efforts.

Title: **Bioterrorism Scenarios on Anthrax**

Source: **Biohazard News**
File Name: ***scen_anthrax.pdf***

This paper compiles several assessments of how *Bacillus anthracis* might be used in clandestine attacks on American cities, its projected impacts, and the likely sequence of events involved in public and official responses. Some of these assessments were findings from expert role-playing scenarios, while others were based on empirical tests of either the health care bureaucracy or the physical flow of simulated pathogens.

The reports show that *Bacillus anthracis*, used as a terrorist weapon, can be distributed fairly easily and is likely to cause large numbers of deaths. All studies seem to assume that the perpetrators are capable of producing viable anthrax spores in an effective formulation for airborne distribution. Repeated findings include the fact that medical professionals have insufficient familiarity with or awareness of anthrax threats to ensure timely identification of outbreaks; public officials and protocols are untested in response to bioterrorism; and that the lack of official coordination, together with medial coverage, might create panic and civil unrest.

Title: **Smallpox Bioterrorism Scenarios**
Source: **Biohazard News**
File Name: ***scen_smallpox.pdf***

This article summarizes three assessments of how smallpox might be utilized in clandestine attacks on American cities, the projected impacts of such use, and the likely sequence of events involved in public and official responses. The assessments were the results of role-playing by public health experts and public officials in the United States.

The scenarios focus on responses to a bioterrorism attack using smallpox, not on prevention, with only minor consideration paid to the acquisition, development, or dispersal of the agent. Findings unanimously indicated that the damage inflicted by such an attack depends on how prepared the public sector is to respond. Accordingly, common suggestions include increasing vaccination stockpiles, exercising appropriate agencies and procedures, and improving the provision of resources to public health infrastructures. Also of great concern was a general lack of awareness among health care personnel concerning the threat of bioterrorism.

Title: **Smallpox: An Attack Scenario**
Author: **O'Toole, Tara.**
Source: **Johns Hopkins School of Public Health**
File Name: ***Otoole.pdf***

This article presents a hypothetical scenario in which terrorists release a sample of aerosolized smallpox virus at a public event attended by the Vice President. The author posits that smallpox samples are difficult to obtain, formulate, and disseminate in quantity, and thus the most likely actors to use it as a weapon are terrorists backed by rogue states. The stated purpose of the article is to encourage the medical community and public officials to consider the dangers of such an attack, so as to better prepare.

The issues highlighted in need of attention are the capacity for timely detection of bioterrorist attacks; inter-agency and inter-jurisdictional coordination; medical, legal, and ethical questions surrounding quarantine and vaccination procedures; and public information.

Title: **Don't Hold Your Breath: Greater Philadelphia Faces the Threat of Bioterrorism.**
Author: **Loizillon, Anaïs, Anca Mataoanu, Mark Alan Hughes, Donna Gentile O'Donnell, Pamela Seitzer**
Source: **Institute for Strategic Threat Analysis and Response, University of Pennsylvania. August 2002.**
File Name: ***Philadelphia. pdf***

The project that produced this document started as an assessment of Philadelphia's readiness to respond to a terrorist attack involving a biological or chemical agent. This document was intended for public circulation to those individuals who are concerned with the state's preparedness plans. The authors stress that the overarching principle, which should guide preparedness planners, is "consequence management, not prevention." The document reviewed five decision-making areas of importance; stockpiling, surveillance, resource management and communication, quarantine, and drills. The end of each section contained a list of questions on important issues that civic leaders should ask local leaders and state officials. The section that was most relevant to this study was the review of drills and simulations. This was a synthesis of lessons learned in previous exercises, augmented by expert recommendations. Three components were identified as critical to simulating a chemical or biological attack by terrorists:

- Involve multiple jurisdictions and train with personnel resources supplied by state and federal agencies, both expected and potential players.
- Include representatives from the public and private healthcare systems.
- Plan exercises in a realistic manner so that information unfolds to participants in real-time.

The lessons learned were discussed under the following major areas of concern:

- Leadership and decision making
- Reinforcement of contingency plans
- Communication methods
- Importance of local responders
- Training and information on personal protective equipment
- Disease containment

The recommendations and observations by the authors were very similar to those of previous exercises, especially the After Action Reports of the Nunn-Lugar-Domenici preparedness exercises conducted between 1997 and 2002. This report has been compiled in a very informative and comprehensive format. It is objective and makes important observations for improving preparedness planning.

Title: **"Bioterrorism Preparedness: The UK Approach"**
Author: **Graham S. Pearson**
Source: **Personal communication**
File Name: **Only hardcopy of document available.**

This paper reviews the laws and disaster protocols of Great Britain pertinent to bioterrorism, including recent revisions (post-2001). Its overall assessment it that the UK maintains a high level of preparedness, which is aided by the general public's awareness of terrorist

threats as well as formal mechanisms allowing the government to take appropriate actions in preventing or responding to crises.

The nature of a disaster determines which agency will lead response efforts; in the case of terrorism, that agency is the Home Office. The UK has maintained plans for addressing bioterrorism for many years, and regularly reviews, exercises, and revises them. Domestic laws were enacted in 1974 to regulate biological warfare agents; recent changes have focused more attention on the "assessment" and "prevention" phases of integrated emergency management. The paper examines the UK emergency management system's response phases and participating agencies, and examines the role they would play in the event of bioterrorism. The details offer a useful comparison for planners of US security.

B.3 Documents Used in Exercises

Title: **Domestic Preparedness Fremont Exercise Plan-DRAFT**
Author: **Forgy, Michael and John C.K. Cosgrove**
Source: **Freemont Exercise Planning Team**
File Name: ***97_Freemont3.pdf***

CWFSE Fremont's draft plan for its full-scale chemical exercise in 2002 gives detailed instruction to participants on how the exercise will be implemented and how to perform their roles during the exercise. The goal of the report was to help measure collective readiness in the Fremont area. The comprehensive report includes a schedule of events, a site plan, outlines of the roles of each participant, and how each organization fits into the game played. These details would be helpful to any group planning an exercise. However, "real-world" media were not included in the plan, which would likely change the dynamics of this particular exercise.

Title: **DRAFT: Biological Weapons Tabletop Exercise**
Source: **Fremont – Domestic Preparedness BWTTX**
File Name: ***98 Freemont.pdf***

Fremont's draft plan for its biological tabletop exercise in 2001 gives an overview to the participants of how the exercise would be implemented. The goal of the report was to provide the participants with information concerning the structure and implementation of the game. The draft gives a schedule of events and the scenario design. The plan outlines hourly developments for the participants, and includes questions for participants to keep in mind throughout the exercise. The plan would be helpful to any organization planning an exercise.

Title: **Terrorism Preparedness Program**
Source: **Texas Department of Public Safety, Division of Emergency Management**
File Name: ***Texas.pdf***

This preparedness program of the State of Texas is presented in a PowerPoint document. It provides details of the planning, training, and exercise components of this program, and gives detailed information on the processes involving the preparedness effort. Its comprehensiveness is a testimony to the seriousness with which the state is treating the

threat of WMD use by terrorists. The exercise discussion section includes organizational and design details. This document is not dated.

Title: **2002 Statewide Medical and Health Disaster Exercise Handbook**
Author: **Cheryl Starling, RN, Exercise Chair,**
Source: **State of California, Emergency Medical Services Authority**
File Name: ***Lopez_CAexeguide.doc***

This is a handbook for participants of the California statewide medical and health disaster exercise held on 14 November, 2002. The scenario involved responding to a "man-made" radiological incident that required victim decontamination and emphasized elements identified in previous exercises as requiring improvement. The document clearly highlights the specific objectives to be reached by participants and is organized to reflect different stages and facets of responding to a mass casualty incident involving contamination. Communication is an area that was highly emphasized. The handbook also includes exercise evaluation forms for participants and contact information for relevant regional experts.

Although this document is a pre-exercise document, it is useful in understanding the organization of preparedness activities in the state of California. More important is its focus on state-level exercises and their evaluation criteria.

Title: **No Title**
Author: **Unknown**
Source: **Gregory Banner, Emergency Response Coordinator, Rhode Island Department of Health**
File Name: ***19 RI_DOH.doc***

This document sets forth a role-play scenario for hospital workers responding to a bioterrorist-instigated outbreak of pneumonic plague. It includes questions pertinent to each phase of the emerging outbreak, covering medical, administrative, and public information issues. Also included are some details of participant discussion and responses. The date, location, participants, and facilitators of the exercise are not indicated.

Title: **HEALTH Tabletop Exercise**
Author: **Unknown**
Source: **Gregory Banner, Emergency Response Coordinator, Rhode Island Department of Health**
File Name: ***19 RI_DOH.ppt***

This presentation is a tool for use in a tabletop role-play exercise for Rhode Island health care workers, which was designed to test responses to a bioterrorist attack involving pneumonic plague. The participants and facilitators are not indicated. Aside from providing a series of events for the hypothetical scenario, the presentation draws attention to specific issues with which the participants should be concerned.

B.4 Supporting and Related Documents

Title: **Combating Terrorism: Analysis of Federal Counter Terrorism Exercises. June 1999**
Author: **GAO**
Source: **GAO/NSIAD-99-157BR**
File Name: ***Fedex_Analysis99. pdf***

This Government Accounting Office report provides a quantitative guide to the counter-terrorism exercises that were conducted by the United States government from June 1995 to June 1998. Of the 201 total exercises conducted within this period, over half were field exercises and the remainder were tabletop exercises. However, due to the reluctance of government agencies to marginalize their normal functions and responsibilities for preparedness purposes, there were few "no notice" drills conducted. While a majority of the exercises conducted involved WMD terrorism, they all dealt with either crisis management or consequence management aspects of a terrorist incident. The report was compiled using documents, interviews, planning sessions, meetings, and exercises from the Department of Defense, United States Secret Service, Federal Bureau of Investigation, Federal Emergency Management Agency, Department of Health and Human Services, Department of Energy, Veterans Affairs, Environmental Protection Agency, and the Alcohol Tobacco and Firearms agency. Although the title and scope of this particular study suggest a wealth of information, the report was not a qualitative analysis of exercises, and contained only a discussion of the statistical details of exercises in general. A qualitative review exists, but it remains a classified document.

Title: **Compendium on Federal Terrorism Training for State and Local Audiences.**
Source: **Department of Homeland Security. November 10, 2003**
File Name: ***FEMA Training Compendium. PDF***

This is a compilation of federal training programs that are available to state and local authorities. It has been generated by the Federal Emergency Management Agency in an effort to provide a single source of information for state and local authorities seeking training for WMD incident response. This is a comprehensive source of information compiled in an easy-to-use format that is invaluable to all emergency management offices. This document is current as of November 2003.

Title: **ODP Weapons of Mass Destruction Training Program. Enhancing State and Local Capabilities to Respond to Incidents of Terrorism.**
Source: **Office of Domestic Preparedness**
File Name: ***ODP_coursecatalog.pdf***

Like the FEMA compendium on terrorism training, the Office of Domestic Preparedness has prepared this document to provide a resource that identifies training and funding available to state and local jurisdictions to prepare for a WMD incident. The training and resources available are identified from a variety of sources, nationwide. The training courses have been developed and reviewed in coordination with other federal agencies involved in the domestic preparedness program. They cater to a broad spectrum of emergency response, law enforcement, and public health personnel. This is a document that every Office of Emergency Services and Management should possess. The catalog is current as of February 2003.

Title: **Homeland Security Exercise and Evaluation Program. Overview and Doctrine.**
Source: **Department of Homeland Security, Office of Domestic Preparedness**
File Name: ***DHS_Exerciseguide.pdf***

The Department of Homeland Security's Office of Domestic Preparedness (ODP) has compiled this document to assist state and local authorities in effectively evaluating their level of preparedness for a WMD terrorism incident. As such, it provides a good overview of the Homeland Security Program and its organization, information about the Homeland Security Exercise and Evaluation Program (HSEEP) and its doctrine, and a guide to the exercise planning process. Although this document does not provide a detailed discussion of any of the topics mentioned, it does provide a broad understanding of the present context of the ODP, what is expected from these exercises, and the process involved. This information is invaluable to state and local personnel involved in preparedness exercise planning.

Title: **Medical Management of Chemical and Biological Casualties – Field Training Exercise Instructor Guide**
Source: **Chemical Casualty Care Division, the US Army Medical Research Institute of Chemical Defense**
File Name: ***Chem_Training.doc***

This field training manual has been developed by the Chemical Casualty Care Division of the U.S. Army Medical Research Institute for Chemical Defense. The manual is intended to provide a guide for training medical units for chemical casualty management. It is designed specifically for medical practitioners and first responders in both the military and civilian spheres.

Although this is not an analysis or exercise guide in the current context, it is a complementary and extremely valuable source of information for exercise planning and training.

Title: **A Comprehensive Functional System Description for Mass Casualty Medical and Health Incident Management**
Author: **Barbera, Joseph A. M.D., Anthony G. Macintyre, M.D**.
Source: **George Washington University – Institute for Crisis, Disaster, and Risk Management**
File Name: ***GWU_IncidentResponse.pdf***

This extensive functional guide has been prepared by Joseph Barbera, M.D., and Anthony Macintyre, M.D., at George Washington University's Institute for Crisis, Disaster, and Risk Management. According to the authors, the goal in preparing this document was "…to develop a peer-reviewed, requirements-based operational model for mass casualty response, based upon medical, public health, and emergency management science."(1-1) The guide describes systems for each "functional" area of a response effort and processes to allow officials to coordinate their common objective of saving as many lives as possible in a mass casualty event.

Title: **EPiCS – A Command-Level Emergency Response Stimulator and After-Action Tool to Address DHS Requirements.**
Author: **Carl R. Baxley, Colonel, U.S. Army (Retired), Julie A Seton, Ph.D.,**

Source: **EPiCS - Advanced Systems Technology, Inc.**
File Name: ***Epics journal article.doc***

This article discusses a computer program that simulates response exercises. According to the authors:

> "The EPiCS system uses a computer-based event-driven simulation to stimulate commanders to make decisions, allocate resources, and seek additional resources, as necessary. The simulation is used to record the consequences and activities of decisions made at command levels."

In effect, this program is a computer generated table-top exercise for decision makers that allows them to exercise, develop, and update response plans in a standard resource-effective manner. The program is capable of being used to practice multiple response scenarios involving both conventional and unconventional terrorism. Although the article is not an unbiased review of the program and is not detailed, it does provide information on the technology and resources that are available for WMD terrorism-related exercises, especially response exercises.

Title: **Introduction to Integrated Emergency Management and Incident Command System**
Author: **Dr. Bogdon, Greg, Chris Lindey and Dr. Don Sutton.**
Source: **Denver Center for Public Health Preparedness**
File Name: ***Denver_ICSintro.pdf***

This PowerPoint presentation prepared by the Denver Center for Public Health Preparedness provides an introduction to an integrated incident command system. It is a useful educational resource for state preparedness planning efforts that addresses key components such as communication, coordination, and organization. This has been included as information received from the Denver Office of Emergency Preparedness in response to our request for exercise related information.

Title: **Critical Incident Protocol – A Public and Private Partnership**
Author: **Jones, Radford W.**
Source: **Michigan State University**
File Name: ***Incident_Response.doc***

A critical incident is defined as one that threatens society, requiring decisive action in multiple functional areas outside of the normal routine. This includes "…natural disasters, workplace violence, or domestic terrorism." Participants involved in emergency response and security from both the public and private sectors guided the development of this protocol. A separate group of experts developed corresponding plans to respond to an incident involving WMD. All participants adhered to the principle that, "Denial of the potential for a critical incident must be eliminated, for it is not if but when disaster will strike."

The protocol guide discusses preparedness planning techniques and is organized in a practical manner based on the threat involved, thereby providing guides to practicing those plans. The preparation and sequence of exercises discussed, like the planning procedure, is a practical and incremental guide. It is recommended that exercises be simple, short, and focused on practicing specific functional response areas in order to enhance the learning process as efficiently as possible. The exercise planning guide is useful in providing general, basic rules for preparing and implementing exercises.

Title: **Ataxia: The Chemical and Biological Terrorism Threat and the US Response, Stimson Center Report No. 35**
Author: **Smithson, Amy and Leslie-Anne Levy**

Source: **Stimson Center**
File Name: **available at: http://www.stimson.org/cbw/pubs.cfm?id=12**

Ataxia is a comprehensive research report that examines the many facets of the unconventional terrorism issue in the United States. The first sections examine the actual threat of terrorism involving chemical and biological weapons, including technical feasibility, statistical trends, and a re-examination of the 1995 Aum Shinrikyo sarin attack in the Tokyo subway system. From there, Ataxia inventories the various federal response assets and training and equipment programs, and airs widespread feedback from the front lines on these federal efforts. Chapter 6, "Metropolis, USA," offers chronological descriptions of local responses that would follow a chemical or biological terrorist attack and shares innovative ideas from local emergency personnel on coordination, plans, tactics, and capabilities for dealing with these type of incidents. Finally, the report concludes with an extensive series of observations and recommendations for policy makers in Washington and beyond.

Title: **Review of Models, Simulations, and Games for Domestic Preparedness Training and Exercising**
Author: **Rebecca Agrait, David Evans, Lisa Grossman, Thomas J. Hamell, Julia Loughran, and Marchell M.Stahl**.
Source: **Thoughtlink Inc.**
File Name: ***Thoughlink_review.pdf***

Despite the title of this document, the review was concerned with evaluating products used in models, simulations, and games, and not the activities themselves. Thoughtlink Inc. was tasked to make this evaluation of products used in the Department of Homeland Security's Office of Domestic Preparedness training and exercise program. Products have been evaluated against the needs of this office's training and exercise program. Seventeen products were evaluated through a framework that was developed to be flexible enough to change and expand over time.

C) *Correspondence and Interviews*

This section includes all relevant information gathered from correspondence and interviews with individuals contacted for this project.

C.1 Correspondence

Below is the e-mail request for information, which was accompanied by a letter of authorization provided by Dr. Jeffrey Milstein of DTRA/ASCO. The following section represents all information received in response to approximately 50 requests.

Request for Information

Dear _____,

The Center for Nonproliferation Studies is currently undertaking a literature review of manned gaming and simulation of terrorist threats that involve weapons of mass destruction, on behalf of the Defense Threat Reduction Agency. As part of this process we are canvassing various agencies that we have identified as potentially having conducted role-playing, table-top or field exercises involving WMD terrorism.

Therefore, we request if possible your assistance with the following:

1) *Listing any such simulations your organization/state has conducted or is planning to conduct.*
2) *Gaining access to any written data (scenarios, reports and analyses) concerning these simulations. This need not be in the form of a formal document – even rough notes would be helpful.*
3) *The names and contact details of any other personnel you have worked with or are aware of, who have developed or managed such exercises or simulations/games.*

We understand that you might have reservations about making some of this data available and will guarantee you that we will not make any information publicly available should you so wish [simply put – DO NOT DISTRIBUTE PUBLICLY on the front of any documents and they will not be circulated outside of government]. We have attached an electronic copy of an authorization letter from the Defense Threat Reduction Agency (we have a signed copy on file that we can fax to you if necessary).

We appreciate your assistance in this endeavor, which seeks to create a compendium of all such simulations, from which best practices etc. can be derived.

Please do not hesitate to contact myself, or my Research Assistant, Praveen Abhayaratne (praveen.abhayaratne@miis.edu), with any questions or information you may have.

Sincerely,

Gary Ackerman
Senior Research Associate
WMD Terrorism Project
Center for Nonproliferation Studies
Monterey Institute of International Studies
Tel: (831) 647-6545
Gary.Ackerman@miis.edu

Replies Received

Received June 26, 2003 from Dr. Edwards-Winslow

All of the information on our exercises is confidential. During the interview I will share as much as I can. The after action report done by the contractor for our 10/98 was a cut and paste job - literally. The original draft described an exercise in "Kennedy Stadium" and no such facility exists in San Jose! They were so interested in getting to Monterey to play golf that they took the device before our Haz Mat and Bomb teams could make entry...it was a travesty!

Every MMRS city in the US has done full scale exercises. All the California MMRS cities have completed at least their chem full scale. I think some of our Monterey folks, like Jason Pate for example, are part of BATWING and should have access to information on the MMRS cities. In addition there are lists on internet sites that list the MMRS cities. I doubt that anyone else would have had the training to do a full scale exercise on terrorism outside of the MMRS jurisdictions.

Capt John Walmsley and Capt Chris Jones of USPHS in San Francisco supervise the Region IX cities and would have contact lists for the rest of the California cities. Again Jason should have the contact information. I am currently off site.

Dr. Edwards-Winslow

Received August 1, 2003 from Harri Humaloja

Message
From: "Harri Humaloja" <Harri.Humaloja@osce.org>
Subject: Re: Information Request
To: Praveen Abhayaratne
Friday, August 01, 2003 3:08:20 AM

Dear Praveen,

In response to your query regarding gaming or simulation of a terrorist attack utilizing WMD, the OSCE recently participated in a USG-sponsored tabletop scenario focused on a bioterror incident. Several Central Asian countries participated in this exercise, held in Vienna in June. For further information, you should contact the State Department's Office of the Coordinator for Counterterrorism (S/CT), Chris Sibilla (Regional Affairs Officer) or, William Pope (Deputy Coordinator). S/CT's phone number is 202 647 9892. Chris should be able to provide you with details of this exercise. S/CT also has held similar tabletop exercises such as two annual Top Officials (TOPOFF) exercises and other WMD gaming scenarios with regional countries.

Not directly related to WMD, in June 2002, precedent to the above event, the OSCE participated in "Central Asia and Caucasus Counterterrorism Conference" held in Ankara, Turkey. The conference agenda included a brief scenario titled "Pipeline", introduced by Sam Brinkley, Office of the Coordinator for Counterterrorism, US DoS.

Also not directly related to gaming or simulation, but included for your information: the OSCE Office in Yerevan, Armenia, organized a professional-to-professional workshop entitled Counter-Terrorism Scenarios: Addressing the Legislative and Operational Capacity. A series of scenarios were presented by international experts active in the counter-terrorist field, with the aim to share their experience so as to look further into the command/control structures in the event of a contingency. One of the case studies was Nuclear Power Plant Protection.

I hope this helps.
Regards,

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Counselor Hirano was contacted through Dr. Raymond Zilinskas, director of CBWNP. He was very cooperative in terms of providing as much information as his office was authorized to share. Following is list of exercises conducted by or involving the National Police Agency, along with his response to our information request and corresponding exercises.

Received June 20, 2003

Manned simulations conducted by National Police Agency and/or Prefectural Police in conjunction with other national and/or local government agencies through July 2001 to May 2003

As far as our relevant division is concerned, National Police Agency and/or Prefectural Police Headquarters have conducted at least 30 manned simulations on consequence management against dissemination of nuclear, chemical or biological agents since July 2001. Among these 30 simulations, 11 were held within police. Another 19 were held in conjunction with other national and/or local government agencies. As for the scenarios, 2 were based on accidents but other 28 were [based] on terrorist incidents (see the table).

Most of these simulations were drills at soccer stadiums, trains and other public facilities. In these drills, special police units to deal with NBC (WMD) terrorism were the main players to find, verify, and decontaminate agents. Other police force and first responders were coordinated to cordon, rescue and bring victims to relevant medical facilities.

Special police units to deal with NBC terrorism have been established since the sarin gas attack [on the] Tokyo subway system. Now they are standing by at 8 major Prefectural Police Headquarters all over Japan, equipped with necessary protection gear and sensors to determine the nature of the agent. Their findings are transmitted to on-site coordination station to help other first responders and medical institutions. They also retrieve samples and evidence for the sake of further verification and investigations.

World Cup Soccer Tournament co-held by Japan and Korea in 2002 was another good occasion to improve preparedness at [the] local level. That was partly because each game was held at [a] local stadium, placed in 10 different cities and towns around Japan. Another reason was that [the] terrorism threat at the time was very real and imminent, in the aftermath of 9.11 and the war in Afghanistan. [A] Total of 15 simulations were held to prepare for the tournament, and fortunately, no terrorism incident occurred.

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In order to help local people to establish effective consequence management structures against WMD terrorism, [the] Cabinet Office and other related national agencies and ministries have co-operated to build models for co-ordination and information sharing among first responders, medical and military institutions and experts. Such models have been distributed to local governments in November 2001 and worked as a basis for their own response plans to WMD terrorism. Table-top exercises were also conducted to test and reinforce co-ordination and information sharing among related national and/or local players.

Kazuharu Hirano
Counselor
Commissioner General's Secretariat
National Police Agency

List of Exercises Submitted by Japanese National Police Agency

Players	Scenario
JROsaka, Osaka Prefectural Police (PP), Osaka City FireDepartment(CFD)	CW: dissemination (dm) in trains
Osaka PP, CFD; Red Cross (RC); Doctors' Assosiation (DA)	BW: mail CW: dm at event halls
Kanagawa PG, PP; Yokohama CFD; Kawasaki CFD	BCW: dm at underground shopping centers
Oita PP	BW: mail
Saitama PG, PP, CFD; Self Defense Forces (SDF)	CW: dm at PG building
Nagano PP; Kanto Resional Police Bureau (RPB); SDF	BW: dm at PG building
Osaka PP; Kinki RPB	BCW: dm at soccer stadium
Saitama PG, PP, CFD; Japan World Cup Organization Committee (JAWOC)	CW: dm at soccer stadium
Kanto RPB; Tokyo Metropolitan Police Department (MPD); Kanagawa PP	CW: dm at soccer stadium
Miyagi PP	BCNR TRO Incident
Tokyo MPD	BCNR TRO Incident
Kanagawa PP; Kanto RPB	BCNR TRO Incident: at soccer stadium
Saitama PP; Kanto RPB	CW: dm at soccer stadium
Fukuoka PP; Kyushu RPB	BCNR TRO Incident
Kumamoto PP; Kyushu RPB	BCW: dm at soccer stadium
Niigata PP; Kanto RPB	BCW: dm at soccer stadium
Aichi PP; Chubu RPB	BCNR TRO Incident
Osaka PG, PP, CG, CFD, Medicare Center (MC); SDF; Medical Institutions(MI)	BCW: dm at soccer stadium (table-top)
Kanagawa PP; JAWOC	BCNR TRO Incident
Hokkaido PG, PP, Sapporo CG, CFD, MC; SDF; MI	BCW: dm at soccer stadium (table-top)
Fukuoka PP, CFD; SDF	CW: dm at hotels
JAWOC; Niigata PG, PP, CDF	BCW: dm at soccer stadium
JAWOC; Hokkaido PP; Sapporo CFD; MI	CW: dm at soccer stadium
Fukuoka PP; Kitakyushu CFD; SDF	Accident: at chemical factory
Fukuoka PP, CFD; SDF; MI	CW: dm at a passenger bus
Hokkaido PG, PP, Sapporo CG, CFD; DA; SDF	Accident: at chemical factory
Iwate PG, PP Ichinoseki CG, CFD; SDF; MI	CW: dm at athletic stadium
Ishikawa PP; Kanazawa CFD; RC; DA	CW: dm at event halls
Ehime PG, PP; Matsuyama CFD; DA	CW: dm at event halls
Hokkaido PP; Sapporo CG, CFD	CW: dm at public apartments

Neal Doten
San Francisco International Airport
Emergency Planning Coordinator
Neal.Doten@flysfo.com

The emergency planning coordinator for the San Francisco International Airport, Mr. Neal Doten, responded to our request for information circulated through the Bay Area Terrorism Working Group. Following is the response we received from him. The information he provided included exercise design and planning documents.

Received July 14, 2003 from Neal Doten

Subject: Requested information - WMD simulation
To: Praveen Abhayaratne
Cc: "Dale Dunham" <Dale.Dunham@flysfo.com>
Attachments: T2 ramp layout 03.doc 751K
End of T2.doc 44K
Decon procedure diagram.doc 34K
Decon response diagram.doc 32K
Decon procedure diagram 2.doc 25K
Monday, July 14, 2003 8:10:03 AM

Praveen,

The attached files provide some of the basics for our current planning effort. SFO will conduct a counter-terrorism exercise on 24 Sep and it will involve a chemical release in the terminal, decontamination activities on the airport ramp area, and a hostage situation. The primary players are: FBI, SFPD, SFFD, numerous airport divisions and sections, plus mutual aid agencies from the local area.

If you would like additional planning materials as they are developed, please advise by e-mail.

Sincerely,

Neal Doten
Emergency Planning Coordinator

C.2 Interviews

As a consequence of the paucity of scholarly literature available on WMD Terrorism exercises in general, project researchers decided to conduct formal interviews with practitioners in this area. These interviews were not intended to be comprehensive, but merely to represent a variety of viewpoints with respect to WMD terrorism response exercises.

Interviews were conducted according to the following format, with additional questions asked and opportunity for comments included as necessary:

Interview Questions

1. In which types of exercises have you participated? Tabletop/field/full-scale?
   1.1. Why were certain types of exercise/agent etc. chosen over others?
   1.2. How many exercises have been conducted?

2. Have you designed any yourself or participated in the design process?
   2.1. How realistic do you feel they were? Did writers understand all aspects of the topic, i.e. medical, incident command, local conditions, terrorist behavior, etc.
   2.2. How much research went into writing?

3. Did they have well defined goals and were these goals met?
   3.1. How was this judged – i.e. were results judged against goals? Gauges of performance?
   3.2. How was the reporting done? Standardized process, ad-hoc, submission of report to FEMA, etc.
   3.3. How was post-mortem/feedback accomplished?

4. Did these scenarios have external/impartial observers/recorders?

5. What do you feel the general utility of exercises is? Training, testing plans, developing awareness, prediction, getting to know one another- does this differ from exercise to exercise and participant to participant?

6. Contacts*

* A complete list of contacts is included in Appendix B and is not reproduced here.

Interview Responses

Dr.Tara O'Toole*

*This interview was conducted before developing the above format and is thus more loosely structured.

Dr. Tara O'Toole is a physician and public health professional by training. Currently, Dr. O'Toole is the Director of the Johns Hopkins Center for Civilian Biodefense Strategies, and a faculty member of the Bloomberg School of Public Health. From 1993-97, she served as the Assistant Secretary of Energy for Environment Safety and Health. O'Toole served previously as a senior analyst at the Congressional Office of Technology Assessment.

Dr. O'Toole stated that there are a lot of exercises being conducted by the military and other organizations. She believes that even modest exercises increase awareness, which was the real intent of Dark Winter. Beyond increasing awareness, much depends on the quality of the scenario and how it is run, so we don't know how effective they are for teaching information. The question then arises whether they are a good way to teach operational preparedness.

Dark Winter had a wide range of exercises from a tabletop to full drills. According to Dr. O'Toole, it was a 'home run', and although it had modest goals, it succeeded in those goals. The exercise was not intended to be predictive, an idea that was misconstrued by the media. It had specific generic goals, with a scenario written to cover many points. It is important to remember that Dark Winter was written for decision-makers to confront tragic choices on unfamiliar issues. Hopefully exercises such as this can give leaders an emotional experience with intellectual content in an engaging way. In this sense, similar exercises can be cost-effective.

Part of the problem is that most scenario writers don't know what they are talking about because the writers are unfamiliar with issues such as medicine and other aspects of a real scenario. In fact, scenarios are intended to be more than simply awareness, but TOPOFF was a poor scenario that was misleading and expensive. It needed rough gauges of performance.

Such exercises can be productive at the very least because they allow the participants to get to know one another. This is a very positive thing, because in bioterrorism response activities no one knows each other well. The same thing could be said for hospitals and health departments; the federal and local branches don't know each other well. In this sense, DHS may only complicate things.

Another aspect of the program was the drills. Drills are helpful because they can test an operational plan. Israel, for example, relies a lot on drills.

However, due to the time and opportunity costs, drills are expensive. One place to look for experience with using drills would be industry, because it has more experience than the government. Companies such as Shell have run business scenarios that have proven to be very valuable.

Current exercises have proven that users are not yet very deft at planning scenarios. They can't all cross-educate; the same scenario won't work for Dark Winter participants as for public health. Each exercise sees different players and different audiences. Therefore, participants must be carefully chosen for each exercise, with experts from both the technical and policy fields. Participants must rate scenarios against their objectives. For example, an exercise could be good at raising awareness but not at testing procedures. Observations must be deliberate and methodical, and there is an important need for observers to overcome cognitive dissonance. Scenarios therefore need to be reactive, interactive, and flexible.

Important: exercises need to include observers who can analyze these scenarios, people who watch arguably get more out of it than participants. Those who plan the scenarios need to be careful and choose the right observers, so that the community can get a holistic perspective. Observers could be in an environment as simple as a room that lets you see what's going on; they don't necessarily need to be out in the field of play. Film could also be a powerful tool, using clips from scenarios to highlight the exercise, or even to document it. Recordings could be even more helpful than written record, because different participants have different recollections of events. This is because after an exercise, many participants are relieved that it's over, so often not much attention is paid to post-mortems.

Each exercise also needs a good facilitator. Facilitation has to be written into a scenario. This doesn't necessarily have to be one person; some of the people around the table can be facilitators and participants, acting as immersive facilitators. Scenarios get actors into a room. This can be revealing, although that's all that is possible if the facilitator is omniscient. It's not easy to use a facilitator as a predictive tool. Facilitators are productive usually only if you are facilitating a group analysis, not really in a scenario.

Exercises can be powerful pedagogical tools, particularly if people are being honest, and not just trying to look good. Dr. O'Toole expressed concern about shoehorning scenarios into good and bad, because you can learn something from everything as long as we are very aware about what you want to get out of exercise.

Dr. Frances Edwards-Winslow
Director, Office of Emergency Services
San Jose
July 7, 2003
Email: frances.winslow@ci.sj.ca.us

1. Which types of exercises have you participated in? Tabletop/field/full-scale?

Participated in all types of exercises. Tabletop, full-scale and field have all been done a couple of times a year.
San Jose was a part of the first 27 cities in the 1997 cities. San Jose first used federal format in 1998 and the exercise was a disaster. East Coast-West Coast format difference was very apparent in the 1998 exercises run by Federal contractors. (See previous e-mail correspondence)
San Jose Exercise-June 2000: Facilitated exercise used by military and fire departments and applied to terrorism for the first time. The exercise was later asked to be replicated for the federal government (USDHHS).

1.1. Why were certain types of exercise/agent etc. chosen over others?

Using the three FEMA levels and formats (these formats are quite loose and not constraining in any way).
Have done radiological through National Security Exercise programs; Old procedure (MMRS) was chemical tabletop, chemical full-scale, bio-tabletop.

1.2. How many exercises have been conducted?

Full scale: 7, 8th one being done this month (July 2003)
Tabletop: 3 biological, 3 chemical, 3 aircraft
(San Jose – first city to finish training)

How were the scenarios chosen? All possible scenarios or based on threat?

Threat analysis done to choosing appropriate scenario- what are the vulnerabilities, targets worth attacking? These analyses done by qualified, experienced professionals.

2. Have you designed any yourself or participated in the design process?

Designed all of them as Chairman of the committee.

2.1. How realistic do you feel they were? Did writers understand all aspects of the topic, i.e. medical, incident command, local conditions, terrorist behavior etc.

Made them as realistic as possible. The team was pretty comprehensive. Doctor cared for agent orange victims in Vietnam. Danielle Goodridge: 10

years in US Marine Corps. with counterterrorism, explosives, ballistics knowledge. Also included mental health professionals.

2.2. How much research went into writing?

Access to Stanford experts for feedback and advice.
Four learning stations for exercises.
Always multi agency groups involving all relevant sectors.

3. Did they have well defined goals and were these goals met?

Specific goals for exercises.
E.g.: (Nov 2000) Wanted to ensure that all public service personnel were aware of secondary devices and to see whether personal protection was correct for first responders.

3.1. How was this judged-i.e. were results judged against goals? Gauges of performance?

Example of measure was: Can you identify a secondary device?

3.2. How was the reporting done? Standardized process, ad-hoc, and submission of report to FEMA, etc.

HOTWASH - within an hour, 1 page written questionnaire was completed by participants.
Written input given to senior person in each participating department; go through these to get a sense of what was great/what should be done differently next time/ what to never do again.

3.3. How was post-mortem/feedback accomplished?

Evaluation process called "hotwash".
Evaluation done for each goal through survey after exercise where everyone had three Post-it notes (comments including good, useful, useless) that were sent to a large board and then collected and analyzed. Comments made anonymously about exercise as whole.
Tried to get a general feel for how the exercise went for everyone as this feedback was important.

4. Did these scenarios have external/impartial observers/recorders?

Facilitators and evaluators at each station. Some looking at exercise, others at real world.

5. What do you feel the general utility of exercises is? Training, testing plans, developing awareness, prediction, getting to know one another- does this differ from exercise to exercise and participant to participant?

Exercises were facilitated because instead of having them run headlong into the situation and then "die", it was better to be told before doing something

the best way it could be done. Facilitator made them think and act for themselves before responding to a situation. Didn't tell them what to do, made them think. Decisions made, actions delegated.

Threat assessment must come first, then a response plan, then acquisition of equipment and training and only then should a full-scale exercise be conducted to check and evaluate the preparation.

Exercises are not checkboxes: need good preparation, can be politically dangerous and risky.

Media – occasionally need a dog-and-pony show: to make VIP and press happy; otherwise better to do it in-house and quietly; managing media is a resource sink; don't use real reporter in an exercise – can't trust many (local print reporter best to use because are forced to return to same sources and thus have vested interest in not burning bridges).

Is the USA the most advanced country in this kind preparedness?
No, Britain, Israel have had to face the threat for a long time so more experienced.
Federal level exercises are useless and national threat level studies worthless.
Federal interference is phenomenal in exercises sponsored by them.
The Amy Smithson report (Ataxia, 2000) brought up issues that are still relevant and have gotten worse.
USDHS funding has not reached this office yet.
San Jose has been able to prepare adequately from money they have received so far.
MMRS funding – nationwide pretty successful; however channeling money through states is a bad idea.

Mike Forgy
Branch Chief, Office of Domestic Preparedness
Department of Homeland Security
July 22, 2003
Telephone: (202) 514 7881
Email: michael.forgy@dhs.gov

Mike Forgy was previously in charge of conducting WMD Terrorism exercises in the Central and Western United States, as mandated under the Nunn-Lugar-Domenici domestic preparedness program. He has recently taken over all terrorism-preparedness work for the Office of Domestic Preparedness (ODP). Thus, he is familiar with all 130 cities and is the central figure in the office of the ODP (now part of the Department of Homeland Security).

1. In which types of exercises have you participated? Tabletop/field/full-scale?
1.1 Why were certain types of exercise/agent etc. chosen over others?
1.2 How many exercises have been conducted?
Participated in functional, drills, tabletop, field exercises.
There are specific exercises that have to be conducted in order. Tabletop exercises are conducted first to have some idea of the process and to prepare for full scale. All exercises were conducted according to Nunn-Lugar- Domenici amendment.
Agents usually determined by goals and objectives of each exercise.

2. Have you designed any yourself or participated in the design process?
2.1 How realistic do you feel they were? Did writers understand all aspects of the topic, i.e. medical, incident command, local conditions, terrorist behavior, etc.
In charge and verifies all the above and related criteria.
Sometimes cities and regions perform exercises that demonstrate their strengths rather than test their weaknesses in order to appear efficient.
Some jurisdictions are more willing to do more realistic ones for tabletops but not full scale because of time and resources. For example, Pittsburgh had to shut down its subway system for 4 hrs to do an exercise, because they felt it was the most vulnerable of their infrastructure, but not all cities are willing to do this.
2.2 How much research went into writing?
2.3. Point of contact/ organizers
Usually the person that organizes an exercise and runs the preparedness program is a strong personality. Exercise planning and implementation is personality driven to a large extent. Also depends on the role that the Office of Emergency Preparedness plays in the region.

3. Did they have well defined goals and were these goals met?
3.1 How was this judged-i.e we results judged against goals? Gauges of performance?
3.2 How was the reporting done? Standardized process, ad-hoc, submission of report to FEMA, etc. Did these scenarios have external/impartial observers/recorders?
3.3 How was post-mortem/feedback accomplished?
Reporting is done by the counties and regions themselves. This makes the reporting not completely honest and unbiased. Reporting is also not done as well as it can and should be. Therefore, DHS tweaks the reports to standardize them and make them somewhat presentable.
359 After Action Reports (AAR) are currently with DHS. The Memorial Institute for Prevention Terrorism is to be the future repository of these reports. N-L-D preparedness program has a standard format of discussion points and recommendations.
Three major goals taken from National Homeland Security Strategy are – Prevention, Preparedness, and Recovery. Every state, including territories (56), must be on the same "level" with regard to exercises.

4. What do you feel the general utility of exercises is? Training, testing plans, developing awareness, prediction, getting to know one another- does this differ from exercise to exercise and participant to participant?

Tabletops – People sometimes become upset, but they are good for networking, learning more in general.
Public participation is valuable as citizens should know what to do/react, what's going on and how to help.
Media- depends on relationship the city has with the media. The spin on stories is determined by this.

Dr. Marcell Leighton
New York City Department of Health
28th July 2003
Telephone: (212) 788 4193

1. In which types of exercises have you participated? Tabletop/field/full-scale?
1.1 Why were certain types of exercise/agent etc. chosen over others?
1.2 How many exercises have been conducted?
Conducted a number of exercises since 1995, mostly biological terrorism attacks, since that is her area of specialty. Coordinates with the Office of Emergency Management(OEM).
Conducted small to large-scale exercises including models to distribute medicines to victims and practice for staff.
Since 2003, has been involved in 3 exercises; took lead in preparing exercise for new administration staff, and coordinated with OEM. 'Bio-watch' program exercise to develop response plan, funded by the DHS. Also a Chemical and Radiological exercise in Brooklyn.

2. Have you designed any yourself or participated in the design process?
2.1 How realistic do you feel they were? Did writers understand all aspects of the topic, i.e. medical, incident command, local conditions, terrorist behavior, etc.
2.2 How much research went into writing?
Played, designed, and participated in many exercises since 1995. Familiar with scenarios used. Responsibility to ensure exercise is medically plausible. Consultants sometimes advise on building scenario. More interested in getting the response right (priority) rather than making sure scenario is correct. Trying to make good decisions in response and train staff for response. Terrorist behavior is not important. Bio-agent chosen based on issue of response that needs to be addressed.

3. Did they have well defined goals and were these goals met?
3.1 How was this judged-i.e. were results judged against goals? Gauges of performance?
3.2 How was the reporting done? Standardized process, ad-hoc, submission of report to FEMA, etc.
3.3 How was post-mortem/feedback accomplished?
Involved with developing exercise objectives. Always outline goals. Goals may vary depending on specific exercise.
Purpose:1. To increase awareness.

2. Chance to see if decision makers are familiar with decision making: during situation and response, everything is covered.

3. Interagency coordination.

Always completed After Action Reports (AAR) and held a "hotwash".
Task list of issues raised and how they were resolved. This depends on the incident and might be different for other agencies.

4. Did these scenarios have external/impartial observers/recorders?
Haven't had anyone playing the media, but a drill to address the role the media plays has been conducted with media representatives. The purpose of this drill was to address the issue of the media's role. Also to understand and get to know some of the people involved, despite representative turnover.

5. What do you feel the general utility of exercises is? Training, testing plans, developing awareness, prediction, getting to know one another- does this differ from exercise to exercise and participant to participant?

- *Identify issues and raise awareness*
- *Familiarize and practice interagency roles*
- *Recognize coordination and communication*
- *Test response to old problems to see if adequately corrected*
- *The bigger the drill, the less useful. A lot of people watching at all levels for big drills.*

Rainer Streib*
Office of Emergency Preparedness
Fresno City, California
Email: Rainer.Streib@ci.fresno.ca.us

* The interview questions were submitted to Mr. Streib; he subsequently completed and returned the questionnaire to us.

1. Which types of exercises have you participated in? Tabletop/field/full-scale?
The City of Fresno has conducted tabletop, field and full scale exercises.

1.1. Why were certain types of exercise/agent etc. chosen over others?
*We selected agencies for participation in the exercises and developed the scenarios to provide a viable challenge to the participants. Combination of threats were instrumental in developing interdiscipline communication. Police and Fire have historically been incapable of performing in the "**Unified Command"** environment.*

1.2. How many exercises have been conducted?
November 20, 2002 was the initial field exercise to fulfill a Federal Transportation Administration Grant for $25,000. May 1, 2003 completed the grant with a county wide full scale exercise. This exercise consisted of 4 sites, all county hospitals and numerous agencies. A "Summary Video" was produced and reflects the participating agencies.

The financial expenditure on both exercises totaled $25,000, this in itself is a noteworthy accomplishment.

2. Have you designed any yourself or participated in the design process?
I personally designed the November 2002 exercise.
2.1. How realistic do you feel they were? Did writers understand all aspects of the topic, i.e. medical, incident command, local conditions, terrorist behavior, etc.
Realism was a key element in the development of the scenario. The climatic condition in the local area cooperated and provided severe fog for the duration of the exercise. Discipline-specific representatives were selected to provide realistic challenges within the scenario.
2.2. How much research went into writing?
Research for the scenarios was conducted by the primary design team members. The May 2003 team consisted of myself and three Fresno County EMS/Bioterrorism representatives.
2.2.1. Who were other parties involved in exercise design?
I have been included in the county wide vulnerability and threat assessments involving numerous disciplines.

3. Did they have well defined goals and were these goals met?
The discipline specific representatives evaluated their portions of the exercise and provided After Action Reports.
3.1. How was this judged-i.e were results judged against goals? Gauges of performance?
3.2. How was the reporting done? Standardized process, ad-hoc, submission of report to FEMA, etc.
All reporting was conducted using After Action Reports and participating agencies were provided "raw" video of their participation during the exercises for debriefing and future training.
3.3. How was post-mortem/feedback accomplished?
After Action Reports were delivered to all participating agencies along with a summary video.

4. Did these scenarios have external/impartial observers/recorders?
Yes. City of Visalia Fire Department , Madera County OES, Madera County Sheriffs Dept. Public Information Officer, National Weather Service.

5. What do you feel the general utility of exercises is? Training, testing plans, developing awareness, prediction, getting to know one another- does this differ from exercise to exercise and participant to participant?
The recent exercises have developed positive relationships between the County and City , Fire and Law Enforcement and private industry.
We are currently in the planning for the May 2004 exercise and anticipate an increase in participating agencies.
The limitation of financial support precludes a conventional approach to exercise development and the evaluation of the results. We have developed relationships between

numerous agencies which ultimately will benefit the community in the event of an emergency. Our approach to team building is effective and inexpensive. One of the critical issues discovered was the "test" approach to an organization's polices or processes. We have eliminated the "test" verbiage and adhere to internal evaluation as the norm for the conduct of our exercises.
Our current challenge is to include the participation of the highest level of County and City Government in the 2004 exercise .
Mr Lee Adley, Fresno County Bioterrorism Coordinator, 559.445.3206 is a resource for copies of the "Summary Video" and After Action Report.

D) *Reference Exercise*

Since researchers relied for much of their analysis on reports received from a single source (the After Action Reports), they felt it necessary to directly observe and report on at least one WMD terrorism exercise. This 'reference' exercise was intended to serve as a basis for comparison in order to verify that there were no systemic biases or distortions present across all the After Action Reports.[21]

The City X FBI representative was kind enough to allow the principal investigators of this project to attend the following full-scale exercise as observers. This led to the following report:

[21] The location and participants of this report will remain anonymous, in order to avoid singling out a specific jurisdiction for criticism. The location will therefore be referred to as City X.

City X, WMD Terrorism Exercise, August 12th 2003

Chemical Full-scale Exercise (sarin) conducted at major league baseball stadium

Phase One Observations:

- Victims of blast and resulting sarin symptoms were not attended to by emergency response teams in real-time. With no sense of urgency or hurry, it did not appear as if law enforcement and emergency response personnel were attending to victims realistically.
- Civilians exposed to sarin did not react in real-time.
- Most response teams were already on premises. Investigators questioned the extent to which this would apply during a normal crowded baseball game?
- Evacuation was not undertaken in the most efficient manner and responders did not seem to have accounted for alternatives, e.g. ambulatory victims were not sent down stairs.
- Decontamination had begun, so it was obvious the emergency response teams knew it was a CW attack, but no one except FBI team was wearing adequate protective gear. Unprotected fire department personnel stood too close to the contaminated area with no windscreen to contain the site.
- The decontamination process was not set up to adequately treat mass casualties or non-ambulatory victims.
- At approx. 10.30 am, over an hour after blast occurred, there were no level A suits or masks being used.

Comments from participants during post-exercise hotwash:

- HAZMAT teams say no information on the situation was transmitted to them. This is why SWAT went into the building without adequate protection.
- There were severe communication problems between agencies, e.g. the bomb squad was not informed about the initial explosion and secondary device, and ended up acting on its own.
- The fire department didn't get the 911 call but simulated a response because they knew what was going on; indeed it seems most of the agencies acted in this way.
- Fire department people thought triage went well and operation was a success.

Phase Two Observations:

Observers participated in this segment of the exercise by each accompanying a particular patient, and were therefore unable to provide general observations. In both cases observed, hospital staff seemed generally well-prepared although not entirely sure about specific procedures.

Comments from participants during post-exercise hotwash:

- Hospital acted quickly, in real-time.
- Emergency response crews were not protected and had to be decontaminated later (since were exposed to victims).
- The hospital was not overwhelmed but faced only a limited number (fourteen) simulated patients.
- Public awareness concerns: exercise was carried out during normal hospital operations and some participants suggested that this may have been distressing for children and others present at the hospital entrance who viewed the exercise and may have been unaware that it was a simulation.

The above exercise displayed many of the same weaknesses as the exercises described in the AARs, yet project investigators seemed able to describe these (as well as exercise strengths) in greater detail than was apparent in many of the AARs. It is unclear whether this is merely a function of the AAR format or of AAR authors perhaps attempting to downplay negative elements in their jurisdiction's exercise response. However, despite this apparent difference in the level of detail of reporting, observation of the exercise in City X did indicate that the AARs probably do not contain any wholesale distortion of the reality of the exercises they describe. This leads to the tentative conclusion that AARs, while often imperfectly, do capture at least the primary elements of the exercise process.

E) *WMD Terrorism Exercises Reported in the Media*

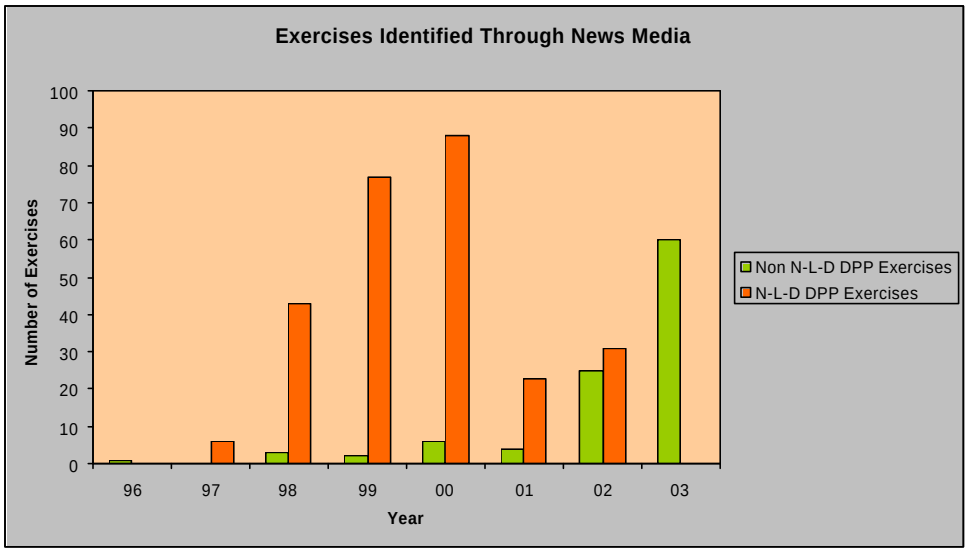
In addition to the AARs (which are analyzed separately[22]), investigators decided to identify and review available media reports available on WMD terrorism exercises conducted worldwide between January 1995 and December 2003. This is especially relevant in light of the fact that investigators encountered a significant lack of scholarly literature on many of the WMD terrorism-related exercises that have been conducted internationally.[23] Using a variety of sources[24], investigators identified 109 exercises in addition to the Nunn-Lugar-Domenici Domestic Preparedness exercises and other inter-agency exercises. They were able to obtain detailed documentation for only ten of these 109 exercises. Media reports of these exercises were generally descriptive as opposed to critically evaluating the results of the exercises, in sharp contrast to the Nunn-Lugar-Domenici Domestic Preparedness exercise After Action Reports or the general literature on exercises.

The table below illustrates the frequency of exercises conducted annually from 1996 to 2003. The Nunn-Lugar-Domenici Domestic Preparedness exercises have also been included for comparison purposes.

[22] Owing to the fact that AARs followed a regularized format, provided far more detailed information in most cases and represented an official record of a government program, they can be analyzed in a substantively different way than exercises reported in the media and are therefore dealt with separately in the following section. For instance, many media reports lack the most basic details about exercise participants and scenarios.

[23] Project investigators attempted to use this information as a segue to identify those organizations that conducted the exercises, and requested access to the pertinent documentation. However, due to the sensitive nature of the information requested, the paucity of documentation in many cases, and the uncooperative nature of some of the individuals contacted, this effort proved to be highly unproductive.

[24] Resources utilized by project investigators are listed in Section 2.



The frequency of reports generally increased over time during the period studied. This is probably attributable not only to increased public awareness and interest following several prominent attacks, but also to the increased number and heightened profile of the exercises being conducted. Specifically, the above table appears to indicate that the number of non N-L-D exercises was minimal prior to 2002 and then increased exponentially. So, while it does seem plausible that in the wake of the September 11, 2001 attacks U.S. jurisdictions and foreign countries that had not previously put much emphasis on the threat of WMD terrorism decided to begin exercising their response to WMD attacks in earnest, sampling factors may account for at least part of this apparent increase.[25]

As most of the literature on exercises collected originated from newspaper reports, only limited, basic information was available. Given the novelty of the situation for the general public, the majority of the reports were devoted to explaining the threat and the functions of the agencies involved in the exercise. Given the sensitivity of the exercises, factual information provided was vague, and the officials interviewed were not always directly involved. However, it was possible to discern the broad goals and scenarios of the exercise in most cases. This included information on the agent, delivery method, and jurisdiction of the exercise.

Scope: Most exercises conducted in the United States involved practicing coordination and support functions between local emergency response and law enforcement personnel, or with relevant federal and state government agencies. The exercises that did not involve interagency coordination focused

[25] To mention but two possible distortions – the media may have only begun paying serious attention to WMD terrorism exercises as newsworthy after September 11, 2001, and governments may have consciously begun publicizing these exercises, even if they had been conducting them previously.

specifically on issues such as counterterrorism, incident containment, bomb disposal and facility security. The reports describe WMD terrorism response exercises as dealing with such issues as communication between emergency response and recovery agencies, crisis and consequence management, and testing response capabilities.

Location: WMD Terrorism related exercises have been conducted in the following overseas locations:

1. Australia, Newport
2. Australia, Perth
3. Australia, Sydney
4. Canada, Montreal
5. Canada, Vancouver
6. Denmark
7. France, Canjurs
8. France, Paris
9. Greece, Athens
10. Greece, Attica
11. Guandong, Guangzhou City
12. Hong Kong
13. Israel, Tel Aviv
14. Japan, Kawasaki
15. Japan, Tokyo
16. Mongolia, Northern Region
17. Russia, Kalinin
18. Russia, Kambarka
19. Russia, Noginsk
20. Russia, VEKTOR
21. Ukraine, Lviv
22. United Kingdom, Edinburgh
23. United Kingdom, Harrogate
24. United Kingdom, London
25. United Kingdom, Yorkshire

Bearing in mind the possible selection bias of media reports, the number of WMD terrorism exercises conducted internationally seems to have increased dramatically since 2001. It is perhaps little surprise in the face of the current terrorist threat that most of the exercises have been held in countries that are regarded as part of the West (Europe, Russia, Israel, Australia, North America) and Japan, although it is interesting that exercises have also been held in China. In this vein, the absence of WMD terrorism exercises in the Middle East (besides Israel) may be linked to a lower threat perception of governments in these areas of a large-scale WMD terrorist attack. Investigators could find no reports of WMD terrorism response exercises in Latin America or Africa, despite the fact that states in these regions have repeatedly been the target of terrorist attacks. While this may stem from a lack of media coverage or greater government secrecy among states in these areas, it is more likely a reflection of the lower socioeconomic levels of these

regions, where there are insufficient funds to engage in response exercise activities.

The majority of reports collected (68 percent) were, however, conducted in the United States.

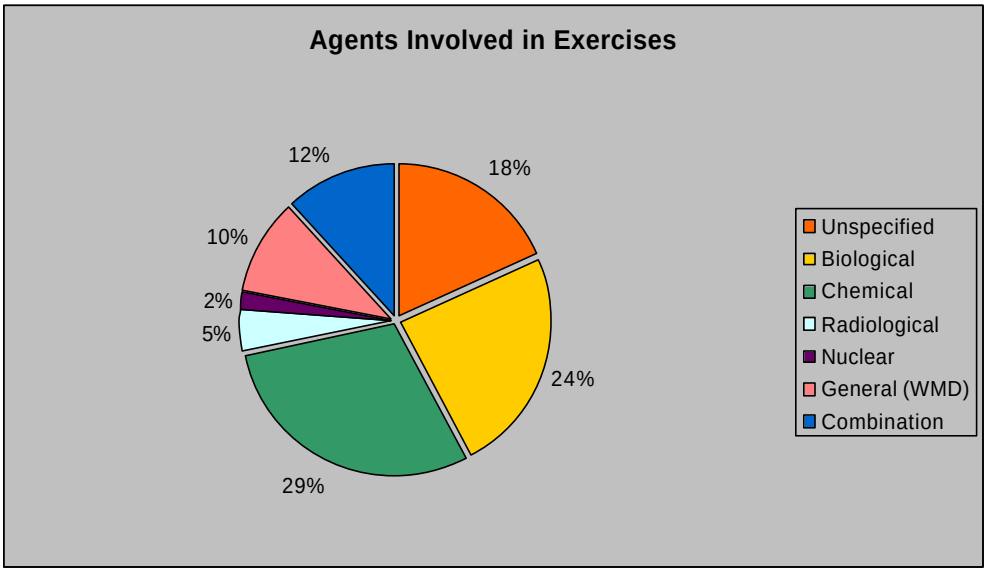
Following is a list of the cities and states in which exercises were conducted:

1. Arizona, Graham County
2. Arizona, Mariposa Port
3. Arizona, Rio Rancho
4. California, Alameda County
5. California, Coronado
6. California, Fremont
7. California, Fresno
8. California, Los Angeles
9. California, San Francisco
10. California, San Jose
11. California, Ventura County
12. Colorado, Aurora
13. Colorado, Denver
14. Connecticut, New London
15. District of Columbia, Andrews Air Force Base
16. District of Columbia, Washington
17. Florida, Gadsden County
18. Florida, Niceville
19. Florida, St. Petersburg
20. Florida, Tallahassee
21. Hawaii, Guam
22. Illinois, Chicago
23. Kentucky, Louisville
24. Louisiana, New Orleans
25. Maryland, Baltimore
26. Maryland, Prince George's County
27. Massachusetts, Boston
28. Michigan, York County
29. Minnesota, Anoka County
30. Minnesota, Hibbing
31. Minnesota, Minneapolis/ St. Paul
32. Montana, Sweetgrass
33. Nevada, Clark County
34. Nevada, Las Vegas
35. New Hampshire, Portsmouth
36. New Jersey, Port Newark
37. New York, Fredonia
38. New York, Indian Point
39. New York, NYC
40. North Dakota, Bismarck
41. Ohio, Cincinnati
42. Ohio, Columbus
43. Oklahoma, McAlester
44. Pennsylvania, Carlisle Barracks
45. Pennsylvania, Philadelphia
46. Rhode Island, Providence

47. South Carolina, Kershaw County
48. South Dakota, Pierre
49. South Dakota, Rapid City
50. Texas, Houston
51. Virginia, Fairfax County
52. Washington, Seattle
53. Wisconsin, Dane County
54. Wisconsin, Milwaukee

Even without taking the N-L-D exercises into consideration, there are reports of most states (and the majority of heavily populated states) conducting WMD terrorism response exercises, reflecting the increased awareness nationwide of the threat of WMD terrorism in the past five years.

Agent type: The following chart provides a breakdown of the type of agent used in these exercises.



Looking at this chart, one immediately notices the preponderance of exercises looking at the response to both chemical and biological agents. Radiological and nuclear weapons are comparatively rarely used as model agents in WMD terrorism exercise scenarios. This is interesting, particularly when considering that the N-L-D exercises only looked at chemical and biological agents, and one would have expected that non N-L-D exercises, as reflected in media reports, would have put greater emphasis on radiological agents. Radiological attacks are regarded in some quarters to be even more likely than chemical or biological attacks, and will probably cause massive disruption; therefore in the opinion of the project investigators these attacks should be exercised at least as often as chemical and biological attacks.

When considering the small number of scenarios addressing nuclear terrorism, many planners believe that nuclear weapons are a) less likely to be used by terrorists than other types of weapon and/or b) will likely cause so much devastation that expending resources on exercising a response is impractical and unhelpful. Yet the above factors do not necessarily imply that emergency planners should exclude nuclear weapons from exercises entirely, since a nuclear terrorist attack, if it occurs, will most likely result in a relatively low-yield explosion whose consequences may be amenable to local, state and federal response efforts. Therefore, it is recommended that exercises simulating the detonation of a nuclear device be conducted more often than the 2% in the above chart indicates.

Scenarios: Following is a list of the targeting scenarios used in the exercises:

Transportation

Airplanes

- Airline hijacking and CW explosion in airport
- Gas released into airport terminal
- Direct CBW attack on airline passengers
- Radiological explosion in cargo hold of passenger airliner

Trains

- Explosion on train
- Sarin release in subway system
- Device containing cyanide exploded on train
- Smallpox virus released on subway

Other Transportation

- BW and hazardous chemical leak in city, resulting from a bus crash caused by terrorists
- Terrorists blow up a chemical tanker truck
- Truck explosion involving hydrogen phosphide
- A barge crashed into pier at a fuel terminal, releasing anhydrous gas into the air

Specific infrastructure target

- Simulated nerve gas release in city hall
- Combination of chemical and biological attack set in the Olympic village
- Terrorist take-over of US Naval Submarine station
- Employees in local sewer plant exposed to a CW agent dispersed from a helium tank
- Attack on chemical weapons depot
- Terrorist attack on chemical factory
- Attacks on nuclear power plant
- Attack on military installation using CW resulting in a hazardous airborne release
- A chemical agent released in a theater during an awards ceremony
- Material sprayed on food at a pep rally causing botulinum toxin poisoning
- Nerve agent released at a basketball game
- Two thermos bottles exploding at a sports stadium and releasing gas

- A large gasoline leak outside arena during a baseball game
- Sarin released in school
- Sarin attack in enclosed building
- Smallpox infection in theater
- Simulated release of CW into university dorm
- Sarin explosive device detonated in public arena

Broad targets

- Plague bacteria spreads from specific targets to general public
- Use of crop duster to disperse biological agent
- C-47 airplane releasing gas over city
- Weaponized anthrax bacteria released via light aircraft
- Simultaneous release of aerosolized anthrax bacteria in several American cities
- Terrorist attack on nation's food supply; resulting in lethal contamination
- Radiological attack with a secondary device targeting first responders
- Smallpox direct exposure to populace

Miscellaneous scenarios

- Terrorists seize virus strain
- Terrorist attack on the American Midwest in 2013
- Specialist troops simulated finding and disposing of illegal nuclear weapons
- Cyberterrorism combined with WMD attack
- Foot and Mouth Disease break-out

The scenarios described above represent a broad range of targets, both directed against infrastructure and against large-scale civilian targets. Project investigators believe that the range of targets in exercises is sufficiently wide to include the most probable WMD attacks and therefore have no suggestions for improvement of this aspect of exercises.

General: Those media reports that did offer normative assessments of exercises appeared to convey a message of reassurance. Specifically, the message contained in post-2002 media reports of WMD terrorism exercises generally seemed to imply that adequate funding exists, that communication and cooperation is occurring between agencies, and that most of the nation is preparing for a WMD terrorist attack at every level of public service. This contrasts with the less sanguine observations of project interviewees and those contained in the AARs. Although definite progress in crisis response and consequence management has been made, there remain obstacles to be surmounted. These include the facts that numerous communities have yet to receive the full complement of funding, training, and equipment that they have been promised from the federal government, and that many exercises revealed that inter-agency and inter-jurisdictional cooperation and communication remains a perennial weakness in preparedness efforts. The nation is certainly more unevenly prepared for a terrorist attack involving WMD than investigators found in recent media portrayals. While there may

be cogent reasons for portraying a public façade of preparedness (such as deterrence and public morale), policymakers must not rely such media portrayals when addressing the threat.

There was a perceptible shift in both the focus and frequency of media reports on WMD terrorism exercises after the September 11 attacks on the World Trade Center. In general, reports preceding the attacks focused on discussing the need for domestic preparedness drills and explored how much of a threat WMD terrorism posed to the public. After September 11, 2001, with the threat of mass casualty terrorism seemingly confirmed, the reports took the threat for granted and instead emphasized the level of preparedness.

F) *After Action Report Review*

F.1 Introduction to AARs

The Domestic Preparedness Program exercise series consisted of a set of exercises, funded as part of the Nunn-Lugar-Domenici Domestic Preparedness Program (N-L-D DPP), designed to assess the capacity of 120 of the country's largest cities to respond to a terrorist attack involving WMD. These exercises were created to evaluate the coordinated response capability of local, state, and federal response agencies to a chemical or biological agent attack.

The United States Army Soldier and Biological Chemical Command (SBCCOM) and the local participants (often with the input of private contractors) were expected under the program to design the exercises based on a threat assessment of their jurisdictions. Each city was required to prepare an After Action Report (AAR) that would provide a written record of response strengths and weaknesses discovered in the course of the exercise and offer recommendations for improvement.[26] Essentially, AARs provide a guide for improving response capabilities and for designing future exercises. These reports are also intended to provide local, state, and federal agencies with an agenda for continuous dialogue aimed at enhancing WMD-response capabilities.

Project investigators reviewed, summarized and assessed each AAR separately and entered their comments into an electronic database (accompanying this report). The complete review of all 270 AARs can be found in Appendix C. This section of the report provides a summary of the contents of several aspects of the AARs that were reviewed by project

[26] A compilation of these reports will be available in the future on the Memorial Institute for the Prevention of Terrorism website (see http://www.mipt.org).

investigators. Since the main focus of this report is the manned simulation of WMD terrorism and not preparedness levels *per se*, this section concentrates on assessing the utility of both the N-L-D exercises and their After Action Reports, and provides suggestions for improvements. Despite cursory references to specific preparedness issues, most of the following comments relate specifically to the exercise and reporting processes.

F.2 Exercise Objectives as Discussed in AARs

Since all 120 cities participating in the program were under the direction of the Nunn-Lugar-Domenici Domestic Preparedness Program, each city was provided with an identical set of broad objectives. In addition to these overarching objectives, each city also had locally identified objectives.[27] Below is a summary of the main objectives found in the AARs:

- Examine local, state, and federal agencies' communication and coordination efforts in WMD crisis response
- Examine and assess the ability of response agencies to implement the Incident Command System (ICS) and transition to a Unified Command System (UCS)
- Test and assess local Standard Operating Procedures (SOPs) and Emergency Operating Procedures (EOPs)
- Evaluate the performance of Emergency Operations Centers (EOC)
- Assess local emergency responders' ability to detect, identify, monitor, and respond to WMD-incidents
- Examine and revise hospital WMD-response procedures and protocols
- Review access control and quarantine procedures
- Examine local decontamination procedures
- Educate local agencies on state and federal directives and resources available to them in event of an attack using WMD
- Provide WMD-awareness training for local agencies
- Harmonize epidemiological and criminal investigations

F.3 Lessons Learned from Exercises as Discussed in AARs[28]

In the process of testing these objectives, each exercise was also intended to identify weaknesses in response procedures and protocols. Most AARs discussed response shortcomings in a "Lessons Learned" section. Below is a

[27] For each jurisdiction's local objectives see individual AARs (Appendix C).

[28] Both this and the following sections are intended to stress the types of results that can be obtained from WMD terrorism response exercises, but can also serve as a preliminary source for further analysis of preparedness levels themselves.

collection of the most common weaknesses found in the exercises of all 120 cities[29]:

- Transitioning to a Unified Command System (UCS) remains a problem area
- The lack of a specific section on WMD terrorism in Emergency Operations Procedures (EOP) and Standard Operating Procedures
- Many response units, especially law enforcement agencies, lack personal protective equipment (PPE)
- Hospitals would be overwhelmed by large scale attacks, because they lack beds, equipment, and medicine (antidotes, vaccines, etc.)
- Local agencies are often unaware of state and federal assistance available to them
- Communication and notification systems used in response efforts require further improvements, because in a chaotic situation, such as a WMD-incident, they would be overwhelmed and ineffective
- Well-facilitated interaction with local media is key to accurate information dissemination and improving response efforts, as this will mitigate public fear
- There is a need to improve communication and notification procedures as they pertain to credible threat information dissemination; often hospitals are left out of the loop and are not aware of credible threats released by the Federal Bureau of Investigation (FBI) or even of what is going on at the incident scene
- Improvements must be made to public health surveillance systems which would provide the preliminary indication that a biological attack has occurred
- Decontamination procedures need revisions, especially at hospitals, because current procedures are not designed to handle mass casualties, such as those seen following a WMD-incident
- Further awareness training is needed for dispatchers, 911 operators, and response agencies
- More training is needed for response efforts involving secondary devices
- A critical incident stress management system must be established for first responders and victims dealing with post-incident stress[30]

[29] One must bear in mind that for many of the cities the N-L-D exercises was their first exposure to the issues of responding to WMD. Some of the weaknesses identified in the conduct of the N-L-D exercises have subsequently been addressed, especially after the September 11 attacks. However, reports from recent exercises (see Sections 6B, 6C, 6D, and 6E) indicate that many lacunae in preparedness persist. See for example: Ataxia (Smithson, Section 6B.4 above) and Stephen E. Flynn, Project Director, America – Still Unprepared, Still in Danger: Report of an Independent Task Force, Council of Foreign Relations (2002), for in-depth discussion of current preparedness levels.

[30] Early intervention is considered by some to be important in preventing or minimizing Post Traumatic Stress Disorder or Acute Stress Disorder symptoms, although recently several researchers in disaster

F.4 Recommendations Appearing in AARs

Each of the AARs was also supposed to contain recommendations for addressing weaknesses in response procedures and protocols. Below is a list of the most common recommendations seen in the AARs collected from the cities that conducted exercises:

- Further training for responders and public health officials to identify the signs and symptoms of WMD agents and covert terrorist attacks
- Local authorities must work with state and federal officials to create or enhance regional health plans
- Local agencies should obtain more PPE and should develop procedures for obtaining external assets in their WMD-response protocols
- Local, state, and federal agencies need to develop a coordinated plan for implementing quarantine protocols
- All pertinent agencies should review procedures for requesting and integrating state and federal resources
- Medical facilities should develop standardized protocols for assessment and treatment of victims
- The use of public address systems to give instructions to victims for crowd control and treatment management, taking into account a possibly contaminated environment and the use of PPE
- Immediately following a WMD incident, medical facilities should be notified about the number and severity of victims, the level of decontamination performed before transfer to hospitals, and should also be kept up to date on developments at the incident site
- Adding WMD response protocols to the medical and emergency response and management agencies' existing plans

Most of these recommendations seem to merely be restatements of the Lesson Learned described above. Very few of the recommendations in the AARs provide tangible, practical guidance for actually bringing about the improvements for which the exercises identified a need.

F.5 The Utility of N-L-D Exercises

From the review of the AARs, it appeared that the major function of the exercises was to test the effectiveness of city and government agencies' abilities to respond to a WMD terrorist attack through pre-determined

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psychology have suggested that people will recover spontaneously and that so-called critical incident debriefing may do more harm than good.

exercise objectives. The success of the exercises could thus be measured against the extent to which the participants achieved these objectives.

Broadly speaking, these exercises provided an opportunity for response personnel and authorities in decision-making positions to become familiar with responding to new threats. This familiarization was made necessary by the fact that response to a WMD-incident requires procedures that in certain key respects differ greatly from conventional disasters. The exercises also allowed agencies to identify shortcomings in inter-agency coordination and to examine the WMD response decision-making process. They provided a useful forum for local, state, and federal response agencies to observe their counterparts in other agencies' response plans, not only to gain a better understanding of their capabilities, but also to determine the roles of participating agencies in relation to local response plans.

The WMD-incident response exercises, at least in principle, provided an opportunity for individuals involved in various agencies to test their response procedures in a non-threatening environment.[31] During and after the exercise, agencies could identify areas that needed improvement and discuss possible solutions. Some of the major findings during the exercises, such as inadequate supplies of PPE, chemical/biological detection and decontamination equipment, and medical supplies, are important discoveries that agencies should be made aware of before an attack occurs, rather than during one. Moreover, nearly all the domestic preparedness exercises included hospitals, which are often left out of response-coordination efforts, but are an essential part of WMD-incident response. The inclusion of hospitals in these exercises allowed the medical community to demonstrate its role in WMD response and receive feedback from other agencies, allowing for the enhancement of overall response coordination.

So, in general, each exercise had some utility in that it highlighted gaps in local WMD-response plans and provided a foundation upon which subsequent exercises should be built, with the ultimate goal of making WMD-incident response plans more robust.

While the overall utility of these exercises is readily apparent, there were major shortcomings in most exercises that inhibited their usefulness in improving response efforts for a real-life attack. The most significant problem afflicting many exercises was their inability to achieve all the

[31] While it appeared from the AARs as if a non-threatening environment did exist for most exercises, the interviews in Section 6C revealed that at least in some cases certain observers (for example, local politicians and press) made participants reluctant to reveal any weaknesses in response. It was, however, impossible to discern from most AARs whether their exercises were present or not, since participants were hardly ever described in detail and it is unlikely that AAR authors would admit to politically-oriented environmental constraints.

objectives set prior to the exercise. Since these objectives represented crucial areas in response efforts that required evaluation, all objectives presented prior to the exercise should have been addressed.

Another weak point of many exercises was an unrealistic scenario. While there is some merit to the argument that it is better for an exercise to address its objectives (for example, testing response protocols and procedures) than to be technically 'correct',[32] utilizing scenarios that are overly contrived and represent a radical departure from a probable attack does little to improve WMD response capabilities. Indeed, unrealistic scenarios may prove counterproductive if they create a false perception of readiness. The AARs often revealed a poor choice of agent type, and dissemination methods were not optimal for a realistic scenario. Specifically, the choice of dissemination method often did not realistically correspond to the ensuing number of victims. Some exercises placed caps on the number of casualties, while some had unrealistically high casualty rates, which would seldom occur in a real-life situation. In other exercises, the time allotted to complete the exercise far exceeded the time realistically available in an actual emergency response. An example illustrates the dangers of artificiality: in most field exercises the victims did not attempt to flee, which most certainly would happen if an attack occurred. In the event of a real attack, many response agencies will be unprepared to deal with victims that attempt to leave the scene; this could lead to further contamination, complicating and hampering response efforts.

Another problem plaguing many exercises was a lack of full participation from various agencies and groups involved in WMD response efforts. While it is understandable that it is difficult in practice to ensure complete attendance at exercises (since active-duty personnel are needed to respond to actual emergencies), many of the personnel absent from exercises were not those employed in roles where they could not afford to participate in an exercise. Often state and federal agencies were underrepresented at the exercises. For example, although the FBI attended most of the exercises, it usually sent only one representative. Moreover, the Federal Emergency Management Agency (FEMA) and the Environmental Protection Agency (EPA) were not present at many of the exercises, which is problematic, as they would play a large role in WMD-incident response efforts. The media would also be instrumental in effective response efforts, yet media interface with response agencies was barely addressed in the exercises, if it was addressed at all. Finally, although hospitals were involved in almost all exercises, at least from the AARs it appeared as if a major shortcoming in some exercises was that hospitals did not receive sufficient attention in the

[32] For example, see interview with Dr. Leighton. Also, Dr. O'Toole expressed concern about shoehorning scenarios into good and bad, because one can learn something from everything as long as one is very aware about what one wants to get out of an exercise.

exercise and should have played a larger role. Most often they were left out of information flows, which hampered their ability to operate and it is not clear from the AARs that the these shortcomings were ever translated into an imperative to coordinate and/or fund improvements.

Some of the exercises did not place enough of a focus on local, state, and federal agency coordination efforts. Although the issue was broached, the exercises did not address it in depth. Since inter-agency coordination is a major factor in response effectiveness, it should have been one of the most important objectives of every exercise. A related problem was the insufficient attention paid in most exercises to examining the decision-making and command-and-control processes in response efforts. The establishment of the ICS and transitioning into a UCS is crucial to successful response, and coordination of these efforts should have been at the forefront of issues to address during the exercises. Finally, many exercises did not focus enough on examining local SOPs and EOPs. The exercises should have involved a thorough examination of all procedures to find gaps so that future WMD-incident response is more effective.

Whether the ultimate utility derived from a particular exercise justified the financial and resource investment in the exercise must be assessed on a case-by-case basis, taking into account such factors as financial expenditures[33] and the opportunity costs of alternative means of WMD preparedness. An accurate determination is extremely difficult in that many of the factors necessary for an accurate cost-benefit analysis are intangible and stochastic, for example the monetary value of extra lives that would be saved as a result of the exercise, taking into account the probability of a specific attack actually occurring.

F.6 The After Action Report (AAR) Format

As mentioned previously, the After Action Report (AAR) was intended to provide a written record of exercise proceedings. Following the exercise, each city was required to create an AAR in a similar format. As an integral part of the domestic preparedness exercises feedback system, the AAR was meant to document shortcomings and best-practices in response efforts, and to provide recommendations for improving the efficiency of WMD-incident response. The AAR was also intended to include participant, observer, and evaluator comments on areas in need of improvement, not only in response efforts, but

[33] Each city directly received at least $300,000 under the N-L-D program over the 1997-99 time period for all expenses including equipment, training, and exercising. U.S. Department of Homeland Security, Office for Domestic Preparedness, Homeland Security Exercise and Evaluation Program, Volume 1: Overview and Doctrine, (March 2003).

in the exercise itself. Finally, AARs were developed to include a detailed description of the exercise design and scenario.

Overall, the reports reviewed did prove useful in providing a written roadmap from which agencies could work when attempting to strengthen their WMD-attack response procedures and protocols. Some of the reports followed the ideal format, which included an objective-by-objective discussion of problems encountered during the exercise and recommendations for improvements. Some of the reports even included a section at either the beginning or end that discussed whether the objectives were met and whether enhancements were needed to reach objectives. Clear, well-organized reports were useful in identifying areas for further discussion, clarification, and improvement.

Although all the reports provided some constructive guidance for WMD response improvements, many of the AARs were poorly written. A good number were clearly the products of extensive cutting and pasting from previous reports. Indeed some reviewed reports were so sloppy that references were made not to the exercise being reviewed, but to an exercise whose AAR was being plagiarized. Also, many AARs were disorganized. A common complaint about the AARs is that the format was not synchronized, and depth and detail in important sections was lacking. Many reports did not address weaknesses and recommendations in an objective-by-objective format, making it tedious to extract pertinent information from the reports. In addition, many of the reports should have included a "Did We Meet Our Objectives?" section, clearly marking the highlights of the exercise at the outset. The disorganization found in many reports means that a reader must search for the important details, making the AARs less effective. The AARs should have begun with the most important objectives – those relating to agency coordination, decision-making procedures, and local protocols – and then provided comprehensive observations and recommendations. In many cases, the recommendations were very vague and did not provide sufficiently detailed suggestions on how to improve the local response efforts.

Another drawback of many AARs is that they appeared to be written from a biased perspective. Often they failed to mention obvious weaknesses of the exercise or even highlight areas in which the exercise could be improved. Even though some of the reports included written feedback about the exercise from participants and observers, most often it appeared tailored to offer only positive comments on the usefulness of the exercise. All of the reports should have included constructive criticism from participants and observers indicating how to improve the exercises, especially since these documents were intended to be for official use only and to assist preparedness efforts.

Section 7: WMD Terrorism Response Exercise Best Practices

In order to elucidate many of the lessons relating to WMD terrorism exercises suggested by the sources in Section 6, this section synthesizes a set of observations made by project investigators in a 'best practices' format. It is not intended to be an exhaustive list, but rather to provide broad guidelines in several important areas for those planning future exercises. A set of guidelines such as these are by their very nature generic and ignore local idiosyncratic variables. Therefore, it must be emphasized that not all the following guidelines will be applicable to every jurisdiction and that certain jurisdiction-specific factors may necessitate amending some of these practices to best fit local conditions.

A) *Concept and Design*

1. The purposes of an exercise should be explicitly stated at the outset of the design process. WMD terrorism exercises have been held for a wide variety of purposes, but only some can justify the money, time, and other costs they incur.

The purposes for holding a WMD terrorism response exercise can be broadly grouped into the following categories:

Exploration / Awareness – when exercises are conducted primarily to familiarize personnel with the unique issues involved in WMD terrorism response, and to investigate what plans need to be put in place for an effective response.

Since most sizable jurisdictions have already conducted at least one such exercise, there is little justification for conducting further exercises solely for exploratory or awareness purposes. The only real value in holding more than one such exercise is in training new senior-level personnel, but in this case exercises can be limited to small-scale, tabletop simulations to familiarize new personnel with local area issues.

Evaluation – when exercises are used to evaluate existing plans and procedures in the context of a simulated event, since many lacunae in these plans only come to light when actors actually attempt to activate them.

It is also important to make sure that problems discovered during previous exercises have been addressed and are not repeated. Both tabletop and full-scale exercises can effectively employ an evaluative function.

Training – exercises (especially full-scale) used to provide a "realistic" environment in order to assess readiness levels and to enable personnel to "solidify" their training.

Training should not be the sole purpose of an exercise, but it is necessary and valid to include this element in most exercises. The personnel involved must have already been trained in other venues – the exercise is not optimal for engaging in primary training. If training is one of the purposes of an exercise, there must be careful evaluation of and credit given to participating personnel.

"Dog-and-Pony Show" – when exercises are conducted merely to comply with statutory requirements, or to satisfy various political constituencies (such as the mayor's office, citizens' groups, the media, etc.).

This is not a valid reason to hold an exercise and in fact can be counterproductive, insofar as it undermines the appropriate execution of tasks essential to other exercise goals. As a side note, some observers noted that, in general, exercises became less useful as they became larger in scale. This is largely due to the fact that the larger a drill is, the more observers it has, especially high-ranking observers. Their presence increases the pressure felt by exercise participants, and thus detracts from the goal of creating a non-threatening environment.

Enhanced Interagency Cooperation – when exercises are intended to familiarize response personnel with their counterparts in other agencies and to assess and practice issues of joint coordination and cooperation.

This is a valuable purpose for WMD terrorism exercises, and indeed exercises are one of the few means by which to further this goal. If this is one of the goals, it is extremely important that the exercise be planned with this in mind and evaluated accordingly.

Pushing the Envelope – when an exercise overstresses existing procedures, resources and training by presenting an incident that is novel (exotic agent, etc.) or of larger-scale than the responders are capable of handling.

This should only be conducted in jurisdictions that have already demonstrated well-developed and mature response capabilities vis-à-vis WMD terrorism. Otherwise such exercises can undermine morale and obstruct other important goals (i.e., evaluation, training). Also, when planning a scenario during which resources will be overstressed, serious consideration should be given before designing it as a full-scale exercise – often a tabletop exercise will suffice for this purpose.

Generally speaking, therefore, the most valuable uses for an exercise are to evaluate existing response plans, procedures and training, to enhance interagency cooperation and to cement prior training. In limited circumstances exercises can be used to raise awareness and to push the envelope; however, these should probably be regarded as supplementary purposes and will rarely justify holding an exercise in their own right.

2. Scenarios should be as realistic as possible – neither too severe nor too limited. These should be based on accurate threat assessments after consultation with recognized terrorism experts, federal intelligence personnel,

scientists, etc. Scenarios that are overly severe can demoralize personnel and fail to show real response capabilities. Conversely, scenarios that are too limited may make everyone confident in their capabilities, but are not especially helpful in preparing for WMD terrorism. There is some debate on the question of whether it is better to design an exercise that is as realistic as possible, or better to design one that is less realistic but maximizes opportunities to train and test participants. Ultimately, designers should find a balance between the two that is appropriate for the stated goals of the exercise.

3. There is a danger in using "cookie cutter approaches" when designing exercise scenarios. While consultants or federally-provided experts may be useful in assisting local jurisdictions with the mechanics of running large-scale exercises, many of the exercises we surveyed were too generic. Consultants should do a better job of working with local authorities to design a unique exercise that is suited to local conditions. Specifically, more attention should be paid to demographics, geography, and potential threats. (See the remarks of Fran Winslow and others in Section 6C).

4. The mental health and societal aspects of a WMD terrorism attack are crucial and must be included in response exercises. This rubric includes discussions of crisis communications, evacuations, quarantines, and public panic. Mental health professionals, especially disaster relief experts, should be involved in all stages of the exercise, beginning with design. Many exercises dealt with these issues only cursorily, if at all; for example, many considered crisis communications but not broader mental health or social issues.

5. The exercise design (and conduct) should be as free from outside interference as possible. All stakeholders should cooperate and political interference should be minimized (except insofar as this is useful in terms of simulating response). Some suggestions for accomplishing this include thorough education and briefing of stakeholders about the exercise process, federal or state-level mandates, budgetary inducements, and external certification of non-interference.

6. A few additional suggestions emerged during the expert interviews and exercise analysis that may be useful in some instances. For instance, no-notice drills can be valuable for exercises designed to assess training effectiveness and retention. The lack of warning lends to a scenario's realism by creating a situation of confusion as participants adjust to the unfamiliar requirements of WMD terrorism. In the same vein, the inclusion of a Red Team in some drills is advisable. A simulated opponent whose behavior is non-scripted contributes to an environment of uncertainty, and requires

participants to display flexibility in their response. Whether the presence of a Red Team increases realism depends largely on the type of terrorist being simulated; since an active and present opponent is plausible, however, it is advisable to train for such an eventuality. As with no-notice drills, however, Red Teams should be used only if they are congruent with exercise goals. Focusing on how to deal with an opponent could easily detract from the precise execution of protocol, and thus this aspect would best be employed once fundamental skills had been solidified.

B) *Participants*

1. One of the most important lessons drawn from analyzing both the AARs and from interviews with participants is the need to involve all relevant personnel in WMD terrorism exercises. Exercise developers must not only invite representatives from all levels of pertinent agencies, but insofar as is possible, must compel attendance. Cooperative procedures cannot be adequately examined in exercises attended only by those who are interested and/or willing to attend. Some have observed that notable absentees are often people in senior positions. While scheduling is undoubtedly a challenge, exercise coordinators should bring to bear as much pressure as possible, to ensure that all participants are well invested in the process and to overcome any obstructionist tendencies.

As mentioned previously, since many participants who need to be involved in WMD terrorism exercises are in positions that require them to be on-duty and responding to real-life emergencies, it may be impossible to schedule an exercise that can be attended by every person concerned. For this reason, strong consideration should be given to holding exercises more than once, particularly when training and inter-agency cooperation are among the primary goals.

2. Most exercises did not sufficiently account for the role of the media. Many exercises did acknowledge that, in the event of a WMD attack, the media would play an important role and methods for dealing with media activities would need to be addressed, but typically went no further than planning how to coordinate press releases or where to station reporters responding to an event. While important, these considerations do not adequately simulate the "media circus" that is likely to ensue during a real event; the handling of this situation should certainly be rehearsed. If possible, representatives of the real media should be included as participants. There are some problems with including the media, i.e., the possibility of negative coverage could increase, and the exercises may involve sensitive information that authorities would not want to see disseminated. One suggestion for overcoming these concerns

would be to involve media representatives "off the record" and restrict inclusion to only the local press. Local representatives are less likely to produce negative or revealing reports, as they have a vested interest in the preparedness of their home community, and their continued access to public officials requires that they act in such a manner as to retain a good working relationship. Cooperative journalists could also be offered exclusive coverage of exercises, provided that sensitive information is not divulged. Another possible course of action is to consider retired media representatives as exercise participants, or to include members of participating agencies who have some experience in the media field, allowing them to role-play the part.

The essential point is that the press is composed of independent actors whose actions in an emergency must be considered. Not only do they pose logistical challenges for responders, they will play a huge role in the reaction of the general public to a WMD attack. As with the use of "no-notice" drills and Red Teams, the inclusion of media players may be best handled only after initial exercises have been conducted to solidify fundamental skills.

C. *Preparations*

1. Exercise facilitators should ensure that all necessary materials are available on site, with the obvious exception of resources that responders are expected to provide themselves.

2. The need for better measures to demarcate the Hot, Warm, and Cold Zones was a lesson that arose time and again from the exercises, as was the use of triage tags. These should only be included in an exercise, however, if they have actually been issued to the agencies responsible for their use.

3. Those participants simulating victims should be well-briefed on their roles. They should not just be asked and instructed to portray their physical "symptoms," but to exhibit plausibly erratic behavior. Such behavior should be based on sound empirical research, but would likely include panic, confusion, anger, non-compliance with instructions, and flight from the scene.

D) *Conducting and Observing the Exercise*

1. WMD terrorism exercises need to impart a sense of urgency to the participants. To this end, they should be conducted in real-time (or as close as possible thereto), and the consequences should be flexible. For example, if responders arrive late, more victims should "die." In large part, this point is an extension of the call for realism under design aspects, and should receive

the same caveat. That is, the emphasis on urgency and real-time should be balanced against the exercise goals. If responders make a crucial mistake at the beginning of an exercise, facilitators must make a decision: Is it more important to the individual drill to call a "time out" so as to illuminate the mistake and let responders resume without consequences; or is it better to allow the exercise to continue, with appropriate consequences, and let the participants practice any aspects that remain unaffected? Either way, it is important to strongly assess any shortcomings, and to not disguise or deemphasize crucial errors.

2. A range of observers should be employed at as many areas of the response as possible (command post, decontamination, site of agent release etc.). Observers should be knowledgeable about preparedness issues (or well-briefed beforehand) and there should be at least several external observers who have no stake in the outcome of the exercise. A detailed plan for preparing and managing observers is needed to maximize their usefulness.

E) *Evaluating and Recording the Exercise*

1. Evaluations must be systematic and apply a transparent methodology. They must also measure performance very specifically against objectives. For each broad objective in an exercise, there should be specific and measurable standards of performance. For example, if one goal is, "Assess awareness of the peculiarities of WMD terrorism," one of several standards for evaluating performance might be, "Were decontamination stations situated in a safe and optimal position?"

2. In evaluating WMD terrorism exercises, honesty and self-criticism are essential. On the one hand, evaluators should be scrupulously honest and avoid any pressure to gloss over weaknesses in an effort to placate political interests. On the other hand, evaluators should avoid accentuating weaknesses in an effort to secure more funding and equipment. It is out of concern for the possibility of these types of institutional behavior that the inclusion of impartial, external observers and evaluators (i.e., people who are not a part of emergency operations, first responders, city governments, etc.) is crucial and these evaluators must be given substantive roles. Hotwash sessions immediately after exercises are useful, but they should be supplemented with more global evaluations, preferably from observers with a completely disinterested perspective. Participants involved in evaluation should be cautioned to avoid cognitive dissonance and groupthink when assessing exercises in a group setting.

3. As much thought and care should be given to the AARs as to the planning and execution of an exercise, as the report is crucial to communicating and following through on the lessons learned. AARs should have a dedicated report-writing team, and should not be tasked to already overburdened personnel.

4. Thought should be given to the use of more objective means of recording exercises, such as videotaping a full-scale exercise or voice recording tabletop interactions. Recordings could in certain contexts prove even more helpful than a written record, because different participants often have different recollections of events.

F) *Implementing Lessons Learned*

1. There must be some procedure of follow-up and some mechanism for ensuring that "lessons learned" become "lessons applied." Project investigators had a sense that too often a jurisdiction that successfully identifies its shortcomings subsequently does very little to rectify them due to intervening factors, such as political or budgetary issues.

2. Greater efforts should also be made to share best practices between jurisdictions that already have experience conducting WMD terrorism response exercises and those unfamiliar with many of the pitfalls that can beset the exercise process. Project investigators found that some jurisdictions are quite parochial about what they have accomplished and are unwilling to share their experiences (often achieved through extensive outlays of resources) with other localities. Of course, while certain elements of a response are specifically local, others have broad application and it should not be necessary for each new jurisdiction to expend resources "reinventing the wheel."

Section 8: Conclusion

This project was initiated as a review of the literature on WMD manned games and simulations. However, owing to the paucity of open-source literature, the project quickly gained a more analytical component, especially in the context of WMD terrorism response exercises. Even restricted to using open sources, several potentially useful findings emerged, such as the utility of including role-playing hobbyists in red teaming and other simulation activities.

The area with the least amount of literature publicly available is detailed accounts of red teaming (or, more broadly, wargaming) efforts. Since these efforts involve identifying and exploiting vulnerabilities in defense, there are clearly sound reasons for denying public access to their results. The examination of open sources did, however, reveal a great deal of information on those organizations and government offices involved in the wargaming process, allowing those with suitable security clearance to explore these simulations in greater detail.

Similar concerns can be raised with making the design and results of WMD terrorism response exercises publicly available. There is a difference in the sensitivity of the information in this case, in that it is more the weaknesses in response and preparedness levels in specific jurisdictions that may prove of interest to adversaries, than any specific or systemic vulnerabilities. It is thus appropriate that access to the results of wargaming efforts are restricted to the organizations conducting them. At the same time, the results of exercises can serve an important educational function across the response community. While it is inadvisable to make their results publicly available, exercise reports properly receive wider distribution and are designated “For Official Use Only.”

There still seems to be some degree of apprehensiveness regarding releasing this information, together with a degree of parochialism in terms of sharing information, as suggested by the fact that although a number of the individuals and organizations identified were approached with an official request for information for this project, few were entirely cooperative. The unwillingness of officials to share information with other preparedness programs should be considered a serious drawback in developing best practices and guiding less developed preparedness programs. Such attitudes only add to the burden of state and federal authorities responsible for coordinating, funding, and overseeing preparedness efforts. The above situation may be yet another symptom of a larger systemic problem that extends beyond sharing lessons learned and is evident in both the WMD response exercises and in general preparedness efforts, namely the lack of

communication and coordination between government agencies at the local, state, and federal levels.

In the review of WMD terrorism response exercises, it is important to distinguish between the recommendations contained in this report, which refer primarily to the design, conduct and reporting of exercises, and substantive determinations regarding preparedness levels themselves, which require far more in-depth field research and are beyond the scope of this project. However, the exercise reviews and best practices described in the course of this project can provide one important source of data for analyzing preparedness levels.

The level and quality of exercises also varies tremendously across the country. For example, the Offices of Emergency Preparedness in San Jose and New York City regularly conduct WMD terrorism and terrorism-related exercises that are designed, planned, and evaluated by experts in relevant fields, such as terrorism studies, public health, bomb detection, hazardous material handling, etc. Many smaller communities, however, seem to not have progressed beyond the exploratory stage of exercising WMD terrorism response activities and were still exercising to train and familiarize personnel with WMD in the year 2003.

Of the comprehensive reports and both scholarly and expert reviews available in open-sources, most were written based on simulations conducted prior to 2002. There has been a concerted effort by all personnel involved in homeland security activities to improve response capabilities in the past two years, and so it is possible that many of the shortcomings discussed in the literature may have already been mitigated. At the same time, weaknesses in both exercises and levels of preparedness persist. For example, despite the fact that TOPOFF 2 was designed to build on the lessons learned from TOPOFF 1, closer analysis of the reports available for both exercises show that TOPOFF 2 suffered from many of the same communication and coordination difficulties that were apparent in the first exercise.

Merely running federal or state mandated exercises is in no way an indication of adequate preparedness, although this remains a popular perception with most response activities according to media reports. Therefore, while exercises are undoubtedly useful in principle for many of the reasons outlined in this report (especially Section 7), there has been little indication that exercises (or for that matter any other preparedness efforts) have resulted in substantively improved levels of preparedness for a WMD terrorism attack.[34] The primary problem seems to be not so much with the

[34] See, for example, Stephen E. Flynn, Project Director, America – Still Unprepared, Still in Danger: Report of an Independent Task Force, Council of Foreign Relations (2002).

exercises themselves, but with the inconsistent implementation and sharing of the lessons learned from exercises in a manner that leads to greater preparedness levels. Given the plethora of exercises conducted and the number of professionals involved in preparedness activities prior to 2003, the failure to draw from the lessons learned in the past and to create and share best practices applicable to all preparedness activities should be considered wasteful.

Exercises and other manned simulations of the threat of WMD terrorism are an important component in preparing for and preventing the threat. Their ultimate utility, however, depends on thoughtful design, institutional support and implementing lessons learned. The first step towards achieving these goals is cognizance of previous efforts, something this report has sought to address.
