

## Unit III

# Critical Infrastructure Dimensions

A complete understanding of the WMD terrorism threat requires us to focus on the unique challenges of protecting a nation's critical infrastructure, particularly its energy, food and water supplies, transportation systems, and public spaces. In Unit three, we have assembled a group of articles that examine the meaning of, and threat to, critical infrastructure, and describe various local, national, and multi-national strategies for improving security.

In the first selection, Gary Ackerman (of the University of Maryland), Jeffrey Bale (of the Monterey Institute for International Studies) and Kevin Moran (of the U.S. Naval Postgraduate School) describe how the concept of critical infrastructure has evolved, with special attention to how various government commissions, presidential directives, and national strategies have defined it. After defining the concept, the authors examine what sorts of targets might be of most interest to certain kinds of terrorist groups, and why, highlighting the broad spectrum of potential targets throughout the United States.

Next, Liddy Heneghan of the Homeland Security and Defense Business Council provides an analysis of the nation's mass transit security. She highlights how post-9/11 attacks on mass transit systems abroad—including Madrid, Moscow, London, Mumbai, and others—demonstrate the need for more proactive protection of our transportation infrastructure and increased safety measures for the American commuter. She then describes the financial, logistical, and other challenges faced by local, state, and federal officials in their efforts to improve public transportation security. John McNabb of InfraSec Labs follows with a study of the potential vulnerabilities of public water systems to a chemical, biological, or cyber attack. Following a brief review of attacks (and attempted attacks) against public drinking water systems, he describes how each system component (supply, treatment, storage, and distribution) have different kinds of vulnerabilities which require different kinds of security responses.

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Finally, his study addresses the growing vulnerabilities of public water systems to a cyber attack, and he offers recommendations for improving cybersecurity of these systems.

Next, the threat of agricultural terrorism is examined by Mark Wheelis (of UC Davis), Rocco Casagrande (of ABT) and Laurence Madden (of Ohio State University). Their analysis reveals that the United States is vulnerable to a deliberate introduction of exotic plant and animal diseases by terrorist groups with an ideological agenda or by governments, corporations, or individuals with a profit motive. The vulnerability to an agricultural bioterrorist attack is a consequence of the low security of agricultural targets, the technical ease of introducing consequential diseases, and the large economic repercussions of even small outbreaks. Further, the level of vulnerability they describe is exacerbated by structural features of U.S. agriculture that are unlikely to change without forceful government intervention.

The next two selections examine the potential terrorist threat to nuclear facilities. First, Gavin Cameron, of the Center for Military and Strategic Studies in Canada, assesses the threat of terrorist attacks on nuclear reactors or attacks using radiological materials. He begins by examining the danger posed by aircraft being crashed into a reactor, and compares that threat with the more familiar one posed by terrorists using truck bombs against reactors. He then examines the history of terrorism directed against nuclear facilities; the problems posed by insiders, both as potential saboteurs and thieves of nuclear material; the risk to parts of the nuclear fuel cycle other than reactors; and finally, the threat of radiological terrorism. Cameron concludes that although the ramifications for the nuclear industry of the attacks on 11 September remain unclear, better protection of facilities and materials is clearly justified.

This is followed by another examination of the threat to nuclear power and research reactors, authored by George Bunn and Chaim Braun of the Center for International Security and Cooperation at Stanford University. They begin by suggesting that if terrorists could steal 25kg to 50kg of highly enriched uranium fuel (meant for use at one or more large research reactors), they might be able to make a nuclear weapon from it. The same is not true of unburned fuel from power reactors, because the uranium is not highly enriched and therefore not useful for making such weapons without a difficult uranium enrichment process. If terrorists could steal radioactive fuel that has been burned in either kind of reactor, they could probably make a radioactive dispersal device or "dirty bomb." If terrorists could use an airplane or truck bomb to crash through walls and fences protecting either kind of reactor and penetrate the reactor's containment, or blow up in the pond where irradiated spent nuclear fuel is stored, they might be able to disperse radioactivity over an area the shape and size

of which would depend not only on the effect of the crash or explosion but also on the direction and speed of the wind. The amount and degree of radioactivity of irradiated fuel is likely to be much greater in power reactors, but the vulnerability of irradiated fuel is likely to be greater in research reactors. Their analysis has implications for where the Department of Homeland Security and the Nuclear Regulatory Commission should focus more attention and resources.

Together, these essays inform our understanding of the challenges to protecting our nation's critical infrastructure from terrorism. However, there are obviously other avenues to explore beyond what is covered in this volume. Thus, this collection will hopefully also stimulate readers to pursue further research on their own, in order to expand our collective understanding of the WMD threat to critical infrastructure.

*Second Edition*

# WEAPONS *of* MASS DESTRUCTION

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## *and* TERRORISM

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*Foreword by*  
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