

# INFRASTRUCTURE SECURITY IN DELAWARE: ORGANIZATION AND ASSESSMENT

WRITTEN BY  
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PROJECT DIRECTED BY  
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EDITED BY  
**LISA MORELAND**

**DECEMBER 2005**



**INSTITUTE FOR PUBLIC ADMINISTRATION  
COLLEGE OF HUMAN SERVICES,  
EDUCATION & PUBLIC POLICY  
UNIVERSITY OF DELAWARE**

**WWW.IPA.UDEL.EDU**

**IN COOPERATION WITH THE  
DELAWARE DEPARTMENT OF TRANSPORTATION**

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# Preface

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**Jerome R. Lewis, Ph.D.**

As the Director of the Institute for Public Administration (IPA) at the University of Delaware, I am pleased to provide this report on *Infrastructure Security in Delaware: Organization and Assessment*. Conducted between January and July of this year by the Institute for Public Administration (IPA) at the University of Delaware with funding from the Delaware Department of Transportation, the report gives a general picture of the national homeland security framework and the way in which infrastructure security organization and policies have evolved within that framework.

The report studies the national overview of infrastructure security, including the history of federal involvement and influence, and evaluates the risks, threats, and vulnerabilities for three critical infrastructure sectors. In addition, it offers specific analysis on some of the specific risks, threats, and vulnerabilities for Delaware. It outlines the organization of infrastructure security with an assessment of the current structure's effectiveness. Lastly, the report provides recommendations for change to improve the organization of infrastructure security.

I would like to take this opportunity to acknowledge those who served as part of the project research team. Lisa Brennan, IPA Graduate Research Assistant, served as the principal investigator for the project, assessing Delaware's infrastructure risks using open source information and conducting extensive interviews with infrastructure security stakeholders, as well as author of the report. The candor of the stakeholders—including representatives from state and county emergency management agencies, municipal public works departments, first-responder organizations, and private industries—is greatly appreciated. My colleague, Dr. Robert Warren (University of Delaware's School of Urban Affairs & Public Policy and IPA), directed the project and provided guidance and review for the report. I would also like to thank Lisa Moreland (IPA) for managing the overall effort to edit and publish the final report and Mark Deshon (IPA) for designing the report cover.

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# Abbreviations

<b>Abbreviation</b>	<b>Meaning</b>
AAR	After-action report
APHIS	Animal and Plant Health Inspection Service
BZP	Buffer Zone Plans
BZPP	Buffer Zone Protection Plan
CBP	Bureau of Customs and Border Protection
C-TPAT	Customs-Trade Partnership Against Terrorism
DelDOT	Delaware Department of Transportation
DEMA	Delaware Emergency Management Agency
DHS	United States Department of Homeland Security
DHSTPWG	Delaware Homeland Security Terrorism Preparedness Working Group
DLLG	Delaware League of Local Governments
DOJ	United States Department of Justice
DOT	United States Department of Transportation
DPEP	Domestic Preparedness Equipment Program
DSP	Delaware State Police
EOC	Emergency Operations Center
EPCRA	Emergency Planning and Community Right-to-Know Act
FBI	Federal Bureau of Investigation
FEMA	Federal Emergency Management Agency
FSE	Full-scale exercise
FSP	Federal Security Plan
IED	Improvised explosive device
LEPC	Local Emergency Planning Committee
LNG	Liquefied Natural Gas
MARAD	Maritime Administration
MARSEC	Maritime Security Levels
MTSA	Maritime Transportation Security Act of 2002
NVSL	National Veterinary Services Laboratories
ODP	Office for Domestic Preparedness
PPE	Personal protection equipment
RoRo	Roll-on roll-off
RPG	Rocket propelled grenades
SARA	Superfund Amendments and Re-authorization Act
SCADA	Supervisory Control and Data Acquisition
SERC	State Emergency Response Commission
SHSGP	State Homeland Security Grant Program
SPR	Strategic Petroleum Reserve
TSA	Transportation Security Administration
TTX	Tabletop exercise
TWIC	Transportation Worker Identification Credential
UASI	Urban Area Security Initiative
USCG	United States Coast Guard
USDA	United States Department of Agriculture



## Executive Summary

The following study examines infrastructure security, both nationally and within Delaware. In particular, the study evaluates the risks, threats, and vulnerabilities of infrastructure and organization of resources in Delaware to support infrastructure security. The study references risks, threats, and vulnerabilities related to a variety of hazards: namely, intentional, accidental, and natural. Although September 11, 2001, changed the nation's focus on terrorism, the federal government had previous guidance and organization dedicated to the protection of critical infrastructures. The areas included as critical infrastructure have grown over the years, with the most recent federal guidance, "The National Strategy for the Physical Protection of Critical Infrastructures and Key Assets," specifying 16 sectors for heightened protection. This study explores four of these sectors from the national perspective.

The study goes on to assess Delaware's situation based on the federal critical infrastructures and key assets and the location of those infrastructures within the state. In addition, the study outlines the function of infrastructure security in Delaware, based on information gathered from interviews with stakeholders throughout the state. Infrastructure security in Delaware includes a vast web of stakeholders, both public and private, with many points of interconnection, although not always fully utilized. The study identifies areas of complication within the current infrastructure security process, which may impede optimal performance. Among those areas are high turnover rates for contract employees supporting the State Homeland Security Grant Program (SHSGP) within the Delaware Emergency Management Agency (DEMA) and the full sharing of useful intelligence between law enforcement and other stakeholders.

Finally, the study catalogues recommendations for change to the current process proposed by those operating within it. Due to the variety and sometimes conflicting nature of those recommendations, a neutral, open forum is recommended to address the concerns of stakeholders and examine the potential value of the changes suggested. The suggestions for improvement cover organizational, operational, and financial aspects. Some of the suggestions would be simple and inexpensive to implement, while others would require changes outside of the state or significant cost to implement.

## **Introduction and Methodology**

The purpose of the following study was to provide a general picture of the national homeland security framework and the way in which infrastructure security organization and policies have evolved within that framework. The study was conducted by the Institute for Public Administration (IPA) at the University of Delaware with funding from the Delaware Department of Transportation. The work was carried out by a research team from IPA between January and July 2005. The team was composed of Dr. Jerome Lewis, Dr. Robert Warren, and Lisa Brennan. The report was written by Lisa Brennan.

In reviewing infrastructure security in Delaware, the research team undertook to develop a comprehensive overview of the organization and operation of infrastructure security within the state. The risk assessments for Delaware are derived from open source information and interviews with infrastructure stakeholders based on the critical infrastructure sectors outlined by the federal government.

The research team conducted interviews with a variety of infrastructure security stakeholders, including representatives from state and county emergency management agencies, municipal public works departments, first-responder organizations, and private industries. Those interviewed were assured confidentiality of their identity to encourage open communication. As such, information derived from those interviews is not cited to its source. Although the research team attempted to gather complete information on the function of infrastructure security in Delaware, there were some limitations in the data. First, the large number of stakeholders involved in infrastructure security posed difficulties in identifying all stakeholders and interviewing every one. Second, the sensitive nature of the subject made some potential interviewees reluctant to participate. The information provided in the report represents the most complete information available to the research team given these limitations. The organization and procedures for infrastructure security continue to evolve and the data in this study reflects conditions at the conclusion of the research in July 2005.

The first section of the report provides the national overview of infrastructure security, including the history of federal involvement and influence and an evaluation of the risks, threats, and vulnerabilities for three critical infrastructure sectors. The second section of the report analyzes some of the specific risks, threats, and vulnerabilities for Delaware. While several areas have been analyzed, several other significant areas of vulnerability have been intentionally omitted to prevent providing a guide for attack. The third section outlines the organization of infrastructure security with an assessment of the effectiveness of the current structure. The final section summarizes the recommendations for change to improve the organization of infrastructure security given by those interviewed.

# National Overview

## *Federal Influence*

Even before September 11, 2001, state and local governments prepared and responded to disasters, from hurricanes to nuclear incidents to terrorist attacks, including the previous attack on the World Trade Center and federal building in Oklahoma City. State and local governments had existing relationships with federal agencies, such as the Federal Emergency Management Agency and the Department of Justice. The events of September 11, 2001, and the passage of the Homeland Security Act of 2002 altered those relationships and placed more demands on state and local governments. The Homeland Security Act created the executive-level federal agency known as the Department of Homeland Security, which brought elements of other federal agencies under the same umbrella for the purpose of security. Separate responsibility for safety regulation remained with other agencies, such as the Department of Transportation. Some confusion regarding the appropriate lead agency on issues has arisen due to the fine line between safety and security functions.

In addition to the mandates placed on state and local governments to prepare and respond to natural disasters and nuclear hazards, the Department of Homeland Security brought a new emphasis on terrorism that, in many ways, overshadowed the role of natural and technological hazards despite the impact they have on the nation's lifestyle and economy. The state of Florida's experience with hurricanes and tropical storms in the fall of 2004 and the Gulf Coast's experience with Hurricanes Katrina and Rita in 2005 demonstrate the significant impact natural disasters can have on American communities.

The Department of Homeland Security is divided into directorates, namely Management, Science and Technology, Information Analysis and Infrastructure Protection, Border and Transportation Security, and Emergency Preparedness and Response.<sup>1</sup> Although one of the directorates uses infrastructure protection in its title, more than one directorate deals with critical infrastructures present in the United States.

Mandates placed on state and local governments, first responders, transportation organizations, and others have severely strained the resources of those groups. In response, the federal government, through a variety of agencies, has provided grants for homeland security activities and projects. Several of the grants function as a reimbursement program. The receiving agency is generally given an award amount and guidelines on how the money can be spent. Then, the receiving agency submits receipts for items or services purchased. The reimbursement method for grants presents complications when a state or locality may not have the funds for the initial outlay without reworking their budgets. A large number of grants originate with the Office for Domestic Preparedness, with other federal departments and agencies having grant authority for some areas specific to their sector. The number, amount, and variety of grants have changed over time and will likely continue to change. Grants to state and local governments, in particular, have been the subject of much criticism.

The State Homeland Security Grant Program (SHSGP) has been criticized because of the funding formula used to determine each state's and territory's share of the total award. In the past and at the present, each state and territory received a baseline



award from the total available and the remaining funds were distributed according to population. States with greater populations received more money than states with lesser populations, but the percentage of states' awards based on population were low enough that states with smaller populations received a greater award per capita.<sup>2</sup> The percentage of the award based on population has increased, but the allocation method still faces criticism from those who feel the funds should be given to states with presumably the most risk of a terrorist attack, like New York and California, rather than Wyoming or the Northern Mariana Islands. The alternative argument for the current formula centers on the belief that all states have risk and each should have a minimum amount of protection. In addition, there is the argument that heavily funding one area at the expense of another could create soft targets for exploitation. Despite the addition of the Urban Area Security Initiative grants to increase the funding to highly urbanized areas with unique threats and vulnerabilities, calls for a risk-based approach to funding through the SHSGP have remained.<sup>3</sup>

The federal grants have also been criticized for failing to understand the needs of states and local governments and disallowing useful expenditures. For example, the SHSGP initially permitted purchase of personal protective equipment (PPE), but not purchase of trailers or buildings to store it. After complaints from state and local governments, trailers were added to the list of approved purchases, but vehicles to transport the trailers were not. Again, complaints precipitated the addition of vehicles to the approved list. While state and local governments eventually received approval, the time involved in getting the change meant insufficient preparation for an attack. State governments have been the subject of criticism for not transferring funds to local governments in a timely fashion, which has led to additional legislation in Congress meant to force states to speed up transfer of funds. In addition, state and local governments have received criticism for not spending the federal grants fast enough or completely. State and local governments, however, have encountered difficulty in getting approved equipment because only a few manufacturers make the items and demand from each state is high. Since the grant is not considered spent until the receipt for a good is reimbursed, the money may essentially be used, but the items are on backorder.

### ***Infrastructure Security***

The American way of life depends heavily on physical and technological infrastructures to sustain a high standard of living. In their daily lives, American citizens benefit from a wide variety of infrastructures, many of them privately owned and operated. Infrastructures important to the United States range from highways and railroads to food and telecommunications. Each infrastructure present in the United States has a wide array of threats, vulnerabilities, and risks unique to it. Beyond individual concerns for infrastructures, many infrastructure sectors in the United States depend on other sectors in order to operate. The highly interdependent nature of infrastructure in the United States makes the risk of attack on one infrastructure more significant as it could cripple other sectors and cause cascading failure. Among the vast list of infrastructures in the country, some have been deemed "critical infrastructures" based on the potential casualties, economic losses, and negative impact on other sectors that could occur if they were attacked and disabled. Experiences with attacks, such as

those on the Alfred Murrah Federal Building in Oklahoma in 1995 and the World Trade Center in New York and the Pentagon in Virginia in 2001, demonstrated to the country and the world the ramifications of a terrorist attack on infrastructure. While the Clinton Administration had put emphasis on critical infrastructure protection, the events of September 11, 2001, and the war on terrorism have increased the focus on infrastructure in the Bush Administration.

In 1996, President Clinton issued Executive Order 13010 related to critical infrastructure protection.<sup>4</sup> The order deemed telecommunications, electrical power systems, gas and oil storage and transportation, banking and finance, transportation, water supply systems, emergency services, and continuity of government critical infrastructures.<sup>5</sup> Executive Order 13010 established the President's Commission on Critical Infrastructure Protection and several subordinate committees within the commission.<sup>6</sup> The commission was charged with defining the threats and vulnerabilities to critical infrastructures, outlining the legal issues involved in protection efforts, and recommending a national policy and implementation strategy for critical infrastructure protection, specifically from physical and cyber attacks.<sup>7</sup>

The policy of critical infrastructure protection continued in the Bush Administration through the formation of the Department of Homeland Security, which houses the Transportation Security Administration and the Information Assurance and Infrastructure Protection directorate. In 2003, two documents were released from the White House related to critical infrastructure. Homeland Security Presidential Directive-7 expanded the critical infrastructure protection policy of the United States, giving the Secretary of Homeland Security responsibility for integrating and coordinating the implementation of protection measures in federal departments and agencies, state and local governments, and the private sector.<sup>8</sup> The directive further assigns responsibility for specific infrastructure sectors, including vulnerability assessment assistance and coordination with stakeholders, to other federal agencies.<sup>9</sup>

In addition to Homeland Security Presidential Directive-7, the Bush Administration developed and distributed "The National Strategy for the Physical Protection of Critical Infrastructures and Key Assets." The strategy defines the national objectives and guiding principles for protection of critical infrastructures and key assets, as well as the nature of potential attacks. For example, the strategy divides potential attacks in three groups based on the effect each may have, namely direct infrastructure effects, indirect infrastructure effects, and exploitation of infrastructure.<sup>10</sup> A direct infrastructure effect would be caused by an attack on a particular system or node, where an indirect effect would be caused by the reaction to an attack by the public and private sector.<sup>11</sup> Exploitation of an infrastructure would involve using a particular infrastructure to attack or destroy another infrastructure,<sup>12</sup> such as crippling a water system in order to shut down a nuclear power plant. The strategy includes specific infrastructure sectors as critical to the entire nation and sets forth the particular responsibilities of the public and private sectors. Figure 1 shows the respective responsibilities of the federal and state and local governments as outlined in "The National Strategy for the Physical Protection of Critical Infrastructures and Key Assets."

**Figure 1. Federal and State and Local Responsibilities**

<b>Federal Government</b>	<b>State and Local Government</b>
Monitor preparedness of critical facilities, systems, and functions across economic sectors and governmental jurisdictions	Identify and secure critical infrastructures and key assets they own and operate within their jurisdiction
Assure federal, state, local, and private cooperation to protect critical infrastructures facing imminent threat or whose loss would have a national impact	Stimulate coordination of protective and response activities among local jurisdictions in collaboration with federal lead agencies
Provide and coordinate national-level threat information, assessments, and warnings	Facilitate coordinated planning and preparedness for critical infrastructure and key asset protection, using unified criticality criteria, investment protection prioritization, and exercise preparedness
Create multi-tiered protection programs and policies	Act as conduits for requests for federal assistance
Explore incentives for stakeholders to devise solutions for their unique systems	Facilitate exchange of relevant security information and alerts with the local level
Develop protection standards, guidelines, and protocols	
Facilitate sharing of best practices and assessment methodologies	
Conduct pilot programs	

Figure 2 shows the infrastructure sectors deemed critical for the entire nation and federal level agencies with responsibilities for those sectors.

**Figure 2. Critical Infrastructure Sectors and Responsible Federal Agencies<sup>13</sup>**

<b>Sector</b>	<b>Lead Federal Agency</b>
Agriculture and Food	<ul style="list-style-type: none"> <li>• Department of Agriculture (agriculture)</li> <li>• Department of Agriculture (meat and poultry)</li> <li>• Department of Health &amp; Human Services (all other food products)</li> </ul>
Water	Environmental Protection Agency
Public Health	Department of Health & Human Services
Emergency Services	Department of Homeland Security
Defense Industrial Base	Department of Defense
Telecommunications	Department of Homeland Security
Energy	Department of Energy
Transportation	Department of Homeland Security
Banking and Finance	Department of the Treasury
Chemical Industry and Hazardous Materials	Environmental Protection Agency
Postal and Shipping	Department of Homeland Security
<b>Key Assets</b>	
National Monuments and Icons	Department of the Interior
Government Facilities	Department of Homeland Security and all other departments and agencies
Commercial Assets	Private industry owners and operators
Nuclear Power Plants	
Dams	

## ***Risks, Threats, and Vulnerabilities***

### **Transportation**

The various systems making up the transportation network share many common vulnerabilities, among them the number of employees with access to the network and interconnectivity of the different systems. To ensure the efficient functioning of the transportation network, many people must perform specific duties, leading to a large number of people with access to the system. Due to the confluence of passengers, freight, employees, and equipment at intermodal points in the transportation network, they present viable targets for potential terrorists.<sup>14</sup> The interconnectivity of different transportation modes can cause an interruption in one system to impact the performance of another, whether by terrorist act or not. For example, port workers in California, Oregon, and Washington went on strike in 2002, resulting in a 30 percent reduction in intermodal rail freight compared to the previous year.<sup>15</sup> Cargo containers epitomize intermodal freight with their ability to move easily from ship to train to truck, but present an equally easy and useful target. The potential vulnerability of cargo containers was realized in October 2001 when Italy detained an Egyptian national found in a cargo container with Canadian passports, maps, cell phones, a laptop computer, airline tickets, and Thai Airlines security passes.<sup>16</sup>

In addition to common risks, threats, and vulnerabilities, individual modes and operations must protect themselves against specific actions. By design, mass transit systems have many access points to allow a large number of people to flow through them.<sup>17</sup> As a result, monitoring and controlling entry and exit of specific people proves difficult.<sup>18</sup> High ridership, especially in densely populated urban areas, presents terrorists with the opportunity to inflict mass casualties and destroy expensive infrastructure.<sup>19</sup> The vulnerabilities of mass transit to attack have been seen with the 1995 sarin gas attack on the Tokyo Subway, March 2004 Madrid bombings, and the July 2005 London bombings.

Several transportation modes depend on bridges and tunnels to connect facets of their infrastructure, such as motor vehicle and rail transport. The loss of a bridge or tunnel, particularly on a high volume highway, could cripple movement of people and products. An attack on such a structure could lead to casualties in the hundreds or thousands, force several billions of dollars in repair and reconstruction costs, and in the case of a toll-access bridge or tunnel undermine the solvency of a toll authority.<sup>20</sup>

Railroads depend on bridges and tunnels to connect their infrastructure and the impact of an intentional attack against one would likely resemble or exceed the impact of accidents. The July 18, 2001, fire in Baltimore's Howard Street Tunnel shows the danger of fire in a rail tunnel. On that day, a train carrying predominantly wood pulp, along with five cars of acid, caught fire.<sup>21</sup> One car each of tripropylene and hydrochloric acid was punctured.<sup>22</sup> The tunnel fire persisted for five days, canceling three days of Orioles games, forcing service to the Camden commuter station to stop, burning fiber optic cables located in the tunnel, and stalling freight traffic around the region.<sup>23</sup>

**Figure 3. Railcar carrying hydrochloric acid<sup>24</sup>**



**Figure 4. Railcar carrying chlorine<sup>25</sup>**



Another vulnerability existing with rail transport of hazardous chemicals concerns the practice of “storage-in-transit.” The practice involves leaving railcars of chemicals like chlorine and hydrochloric acid, Figures 3 and 4, in storage on rail sidings and in rail yards while they wait for shipment to their final destination. On May 31, 2002, 200 gallons of hydrochloric acid leaked from a railcar on a siding in Lowell, Massachusetts, causing a hazardous vapor cloud. With “storage-in-transit,” the risk of accidental or intentional leakage of a car increases due to the decrease in coordinated safety and security at the locations of storage.

### **Water and Wastewater**

Due to the criticality of water to human survival and the American standard of living, a public water system could become the target of attack. The discovery of training manuals in Afghanistan on how to conduct an attack on drinking water systems heightens concern in the United States.<sup>26</sup> Distribution systems, source water supply, Supervisory Control and Data Acquisition (SCADA) systems, treatment chemicals, and a lack of redundancy cause particular concern.

The distribution systems, especially in large metropolitan areas, consist of vast pipelines and support infrastructure. The expansiveness of the system provides many points of access of varying types. Buildings offer access to the distribution system after completion of the treatment process.<sup>27</sup> Although residual chemicals in the distribution system may be able to destroy contaminants introduced into the system, no detection systems exist once the water has entered the distribution phase.<sup>28</sup> A potential terrorist or criminal would then have the ability to test the system to determine the strength of contaminant needed to conduct a successful attack.

The vast area of source water supply, also, provides easy access to potential terrorists. The watershed areas for source water can cover a wide swath of land, giving terrorists many points of access and opportunities to introduce contaminants with little likelihood of being caught.<sup>29</sup> The ability of the body of water to dilute contaminants and the distance traveled before reaching the treatment facility can mitigate the impact of contamination of source water.<sup>30</sup>

Water systems rely on computer Supervisory Control and Data Acquisition systems to monitor and control internal processes. SCADA systems perform a myriad of functions from communicating with remote facilities to measuring water pressure and flow.<sup>31</sup> They perform one of the most critical functions in any water treatment facility, analyzing inbound water to determine the appropriate mixture of treatment chemicals

needed for the production of safe water.<sup>32</sup> As with any computer system, it has associated vulnerabilities of cyber attack, from simple hackers to more deliberate attackers. Cyber attacks on the SCADA system at a water treatment facility could range in severity from reducing the water pressure to homes, businesses, and fire hydrants to using too little or too great an amount of chemicals in water treatment to render water unsafe for drinking.<sup>33</sup>

Treatment chemicals themselves pose a danger if targeted for attack. Although some water treatment facilities have transitioned to the less vulnerable liquid form of chlorine, many facilities continue to use the gaseous chlorine in treatment.<sup>34</sup> Facilities store the compressed-gas chlorine in cylinders on-site.<sup>35</sup> If compromised, the cylinders would release a toxic cloud of chlorine gas, which could have dramatic impacts on any nearby populations.<sup>36</sup> Another potential risk involved with treatment facility dependence on chlorine for disinfection involves the intentional contamination of the chemical before arriving at the facility.<sup>37</sup> A host of problems could spring from contaminated treatment chemicals, such as weakened chemicals causing incomplete treatment; strengthened chemicals allowing harmful levels of chemicals to remain in treated water; and introduction of a toxic chemical agent in place of the expected chemical causing poisoning of the water supply.

In addition to vulnerabilities of individual components of the water treatment process, the lack of redundancy throughout the system poses a significant problem. The design of water treatment facilities has generally followed a linear model, isolated from other water treatment facilities.<sup>38</sup> Only a single set of transmission lines leads into the treatment facility, with single pumping stations delivering water into distribution lines, and a single computer system controlling the process.<sup>39</sup> Adding a second set of transmission lines would require enormous resources, including land, manpower, and time. An attack on a transmission line, however, could cripple a water system by preventing water from entering the system<sup>40</sup> and forcing the system to rely on already treated, stored water to supply the community.

Further, facilities depend on specific providers to supply power, communications, and chemicals.<sup>41</sup> An attack on the transportation infrastructure preventing the delivery of chlorine for a significant period of time would deplete the on-site storage of chlorine and leave the treatment facility unable to produce safe drinking water. Reliance by facilities on outside sources of essential resources makes them vulnerable to any attack on those sources. In the event of one water treatment facility failing, another nearby water treatment facility could provide water to the affected community, except for a lack of integration and redundancy among systems.

Although similar in operation, vulnerabilities in wastewater systems represent a more significant danger than those in water systems, mostly because less has been done to mitigate them. Sewers in particular create a sizeable vulnerability due to the many access points created for maintenance and the sheer size of pipes necessary to meet the needs of communities.<sup>42</sup> Pipes with large diameters, such as 20-foot diameter storm water collection pipes, can accommodate significantly sized vehicles. Packed with explosives, a truck could drive through a storm water collection pipe and into a densely populated urban area, causing enormous damage and high casualties. Similar accidental and intentional scenarios have already occurred in North America.



In 1977, sabotage at an Akron, Ohio, rubber-manufacturing plant released naptha, a cleaning solvent, and alcohol into the sewer system.<sup>43</sup> An explosion 3.5 miles from the plant damaged 5400 feet of sewer line and caused \$10 million in damage.<sup>44</sup> In a 1981 accidental spill of thousands of gallons of hexane from a processing plant into a Louisville, Kentucky, sewer line, explosive fumes ignited from a spark of a passing vehicle.<sup>45</sup> A pipe 12 feet in diameter collapsed and two miles of streets were damaged as a result of the ensuing series of explosions.<sup>46</sup> While no serious injuries occurred, repairs to the sewer line took 20 months to complete.<sup>47</sup> The April 1992 sewer line explosion in Guadalajara, Mexico, caused more significant damage and many casualties.<sup>48</sup> An ignited gasoline leak into the sewer damaged 1600 buildings, destroyed 1.25 miles of sewer, and led to 215 deaths and 1500 injuries.<sup>49</sup> In addition to explosives, potential terrorists could introduce agents into the sewer lines to destroy the treatment process. In 2002, chemicals introduced in Hagerstown, Maryland, entered the treatment plant and destroyed the biological treatment agents.<sup>50</sup> The introduction by an unknown source allowed the release of millions of gallons of partially treated wastewater into a location only 100 miles from a water supply intake used in Washington, D.C.<sup>51</sup>

Like sanitary and storm water collection pipes, pumping stations help move wastewater to the plant for treatment. Pumping stations exist because the natural system of gravity cannot perform the needed function, making properly working pumping stations critical to the wastewater treatment process. Physically destroying or simply disabling a pumping station would cause the entire sewage system to backup, eventually reaching individual homes, businesses, streets, bodies of water,<sup>52</sup> and even the sterile environment of public health facilities. Rendering a pumping station useless for a temporary amount of time could cause tremendous backflow if the station pumps several million gallons of sewage every day.<sup>53</sup> The consequences would extend beyond simple inconvenience to a major public health situation as raw sewage allowed disease to develop. In many cases, pumping stations lie in remote areas and lack continuous surveillance,<sup>54</sup> which would require significant resource investment to reverse and secure. Wastewater treatment system operators face the challenge of protecting a geographically widespread set of pumping stations, with budget constraints and a long list of priorities. If the pumping stations do not become a target for disabling, attacking the headworks could cause similar problems. Used in the initial phase of treatment, the headworks screen out large objects and debris.<sup>55</sup> Choking off the headworks and restricting wastewater from entering the treatment plant would cause a sewage backup<sup>56</sup> similar to an attack on a pumping station. A public health hazard would also develop, with risks from direct contact with harmful agents and contamination of drinking water.<sup>57</sup>

SCADA systems in the wastewater sector, as in the water sector, offer opportunities for corruption of the treatment process. The electronic control system monitors remote assets, such as pumping stations and facility treatment processes.<sup>58</sup> A cyber attack on a wastewater treatment plant SCADA system could permit dangerously high levels of chemicals to enter the system and exit into bodies of water, reduce the chemical levels and biological treatment to permit the release of insufficiently treated water, or shut down the operation of a pumping station causing sewage to backup.<sup>59</sup> The vulnerabilities of SCADA systems stem from inadequate cyber security infrastructure and training. In many instances, wastewater treatment plant staff members receive little cyber security training and fail to implement simple protection options, such as rotating

passwords and securing network connections.<sup>60</sup> While some facilities manually operate control systems in the case of automated failure, others lack the ability and could not operate after cyber attack.<sup>61</sup>

**Figure 5. Chlorine canisters at a wastewater treatment facility<sup>62</sup>**



Wastewater plants use a variety of chemicals to treat sewage, including chlorine, sulfur dioxide, and ammonia.<sup>63</sup> Although the leakage of any of these chemicals into the environment would pose problems, chlorine presents the greatest risk. Treatment facilities use chlorine in the disinfection process and usually store canisters on-site for future use, as shown in Figure 5. Due to the volatile and hazardous nature of chlorine, transport, storage, and use of the chemical require many precautions. In the event the liquefied chlorine gas under pressure leaked, a cloud of toxic gas would soon form along the ground, causing eyes to burn, lungs to become inflamed, and possibly killing those who inhaled the fumes.<sup>64</sup> Approximately 1200 facilities store 2500 pounds of chlorine gas or more on-site.<sup>65</sup>

Exploiting the harmful effects of chlorine gas by terrorists could come as an attack at a treatment facility near a population center or by attacking or hijacking a chlorine delivery truck or train for use on any populated area.<sup>66</sup> Many wastewater treatment plants in or near densely populated areas continue to use chlorine gas for treatment.<sup>67</sup> Several instances of accidental release have occurred,<sup>68</sup> most recently on January 6, 2005, in the town of Graniteville, South Carolina.<sup>69</sup> Nine people died, more than 250 suffered injuries, and 5400 had to evacuate their homes when a Norfolk Southern freight train slammed into a parked train on a rail spur.<sup>70</sup> The crash, resulting from the parked train crew not returning the track switch to the main rail line, punctured a chlorine tanker car,<sup>71</sup> which carries 90 tons of chlorine gas.<sup>72</sup>

Energy represents another key vulnerability for wastewater treatment facilities. Treatment plants rely on electricity to run their operations and a failure in the electric grid would shut down operations.<sup>73</sup> Wastewater treatment plants in Cleveland, Ohio, suffered a major power failure in 2003.<sup>74</sup> With wastewater backing up at the plant, operators had to release 60 million gallons of raw sewage into Lake Erie, the Cuyahoga River, and tributaries.<sup>75</sup> As much as treatment plants depend on energy for operations, energy sources depend on released water from plants, known as effluent, for their operations. In particular, effluent serves as the cooling waters for nuclear power generation, as in the case of a nuclear power plant in the western United States used to supply much of the power to a multi-state region.<sup>76</sup> Without the power from the nuclear plant, the

wastewater treatment plants would fail and without the effluent from the treatment plant the nuclear power plant would fail.

## **Oil and Natural Gas**

The oil and natural gas sectors share some vulnerabilities with the water and wastewater sectors, namely electronic control systems and interdependencies with other infrastructure sectors. Operators use SCADA systems to control oil and natural gas infrastructure components, like pipelines and refineries.<sup>77</sup> A cyber attack on the SCADA system could shut down a refinery or pipeline, causing both significant economic losses and shortfalls in oil and natural gas used for heating homes.

Interdependencies between other infrastructures present vulnerabilities. Just as nuclear power plants rely on wastewater effluent for power production, so do electric power generation facilities depend on oil and natural gas.<sup>78</sup> Transportation of raw materials and finished products by methods other than pipeline provide targets for potential terrorists because an attack would have a negative economic impact and force realigning of resources until the correction of any failure.<sup>79</sup> While not an intentional act, the blockage of a shipping channel in 2000 forced the withdrawal of oil from the Strategic Petroleum Reserve due to the anticipated depletion of on-site inventory at two major refineries before reopening of the channel,<sup>80</sup> demonstrating the consequences an intentional act might have on the industry.

The pipeline network for oil and natural gas faces the risk of destruction through a variety of means, most notably explosion.<sup>81</sup> To date, accidental acts have led to more significant damage than intentional acts. Two children and an adult perished in a 1999 gasoline pipeline explosion in Bellingham, Washington.<sup>82</sup> In addition to the human casualties, the explosion caused \$45 million in damage to the city water treatment plant and other property.<sup>83</sup> A natural gas pipeline explosion also killed 12 people near Carlsbad, New Mexico, in 2000. Intentional attempts to destroy or disrupt the oil and natural gas industry occurred well before September 11, 2001. Vigilant safety and security efforts prevented many of those attempts from becoming successful attacks. For example, Ku Klux Klan members planned to bomb natural gas storage tanks as a distraction for a robbery in 1997, but were prevented by Texas police.<sup>84</sup> Several attack plans have involved the trans-Alaska pipeline. Vancouver police thwarted an effort by one attacker to blow up the trans-Alaska pipeline in hopes of reaping personal rewards from oil futures in 1999.<sup>85</sup> Another successful high-powered rifle attacker in 2001 shutdown the pipeline for two days during a law enforcement showdown, leading to both economic and ecological damage.<sup>86</sup> More significant and coordinated attacks on the pipeline network would certainly entail even more detrimental consequences for the industry and all those dependent on its services.

Due to the combustible nature of natural gas, the release and gasification of Liquefied Natural Gas (LNG) presents the risk of fire in an unconfined space and potential explosion in a confined space.<sup>87</sup> Easily identifiable LNG tankers carrying a large volume of flammable and explosive material offer a target for terrorists.<sup>88</sup> Although no intentional acts have lead to an LNG fire or explosion, accidents show the danger arising from any successful future attack. On the whole LNG has had only a small number of serious accidents, with only 13 accidents at terminals and two deaths between

1944 and 2004.<sup>89</sup> Two incidents, however, show the serious nature of the threat to LNG. In 1944, at an early LNG terminal in the United States, 128 people lost their lives in an accident.<sup>90</sup> An Algerian LNG facility experienced a fire in January 2004 that killed 27 workers and injured another 74 people, reawakening concerns over LNG safety and security.<sup>91</sup>

## **Agriculture and Food**

Disease poses the greatest risk to the agriculture and food sector. The concentration of animals in feedlots for efficient production and transportation of animals over vast distances in confined spaces increases the risk of disease spreading to other animals or humans.<sup>92</sup> Of the many plant and animal diseases in existence, experts feel the most likely diseases for intentional introduction include foot and mouth disease, avian influenza, swine fevers, and exotic Newcastle disease for animals and soybean rust for plants.<sup>93</sup> The effects of outbreaks of foot and mouth disease and avian influenza have already been felt, predominantly in Europe and Asia. As of March 2005, 42 humans had died from avian influenza in Asia since the outbreak began in January 2004.<sup>94</sup> The 2001 outbreak of foot and mouth disease in the United Kingdom forced the slaughter of four million animals and caused \$5 billion in losses in the agriculture and food sector.<sup>95</sup> In November 2004, soybean rust was discovered in Louisiana, followed by Alabama, Arkansas, Florida, Georgia, Mississippi, Missouri, and South Carolina. Soybean rust has the potential to reduce yields by more than 80 percent, depending on whether treatment occurs in time.<sup>96</sup>

The nation's methods to detect and treat animal and plant pests and disease demonstrate the most vulnerability. The number of agricultural inspections performed at ports-of-entry has declined from 40.9 million in fiscal year 2002, when the United States Department of Agriculture (USDA) had inspection responsibility, to 37.5 million in fiscal year 2004, when the Department of Homeland Security had primary inspection responsibility.<sup>97</sup> Inspections at ports-of-entry have the ability to prevent widespread outbreak of disease and infestation of pests, as they did twice in 2004 when agents discovered wood-boring beetles in a shipment of tile and citrus canker-infected branch clippings in a package.<sup>98</sup> A second shipment of tile with the same dangerous beetles, however, passed through undetected because of reduced inspections.<sup>99</sup>

Beyond insufficient inspections to detect harmful agents, a shortage of veterinarians trained to identify foreign animal diseases plagues the country.<sup>100</sup> After initial introduction at ports-of-entry and direct infection, observation and proper diagnosis by veterinarians offers the next line of defense in containing disease to a localized population. Only 12 of the 28 veterinary schools in the country offer courses dedicated to foreign animal diseases and nearly half of those exist as part of the core curriculum.<sup>101</sup> Inadequate training coupled with too few veterinarians entering public service makes comprehensive detection difficult. Without sufficient numbers of properly trained veterinarians, many initial outbreaks will prove difficult to contain before they become widespread.

Even with early suspicion of a diseased animal, the time involved in confirming or ruling out a disease increases the risk of widespread outbreak, specifically because the USDA does not use rapid diagnostic tests at the site suspected of animal infection.<sup>102</sup>

Although the USDA currently has rapid diagnostic tests for classical swine fever, African swine fever, Rinderpest, avian influenza, and exotic Newcastle disease, it only uses those tests in designated laboratories.<sup>103</sup> The current diagnostic process involves collecting a sample from a suspect animal and sending the sample to a National Veterinary Services Laboratories facility, where technicians use either the traditional diagnostic technique, which can take three to four days for a result, or the rapid diagnostic test if available.<sup>104</sup> In the meantime, animals in recent contact with the suspect animal are quarantined. If the suspect animal has a confirmed disease, officials order slaughter of the entire herd and all susceptible wildlife within a minimum of ten kilometers around the infected farm.<sup>105</sup> If the disease has spread to other locations, the process repeats itself, testing and slaughtering animals until eradication.<sup>106</sup> The current process allows time for the disease to spread while in some cases rapid diagnostics could reduce the impact and does not prevent elimination of the entire animal population in the process of eradicating the disease. Potential terrorist introduction of a highly contagious animal disease, such as foot and mouth, could allow for the destruction of a sizeable portion of the food supply, putting the human population at great risk without directly causing human casualties.

The lack of ready vaccines to prevent animal infection further perpetuates the vulnerability of slow diagnostics. While undergoing the diagnostic process, or even before, at-risk animal populations could be vaccinated to prevent outbreak rather than slaughtering large numbers. The United States, however, only keeps supplies of vaccine concentrate for foot and mouth disease because agreements with other nations prevent trade in vaccinated animals.<sup>107</sup> Even the vaccine concentrate stockpiled in the United States would take several weeks to begin use.<sup>108</sup> Preparation of the foot and mouth vaccine concentrate for use can only take place at a facility in the United Kingdom, requiring shipment of the concentrate overseas and shipment of viable vaccine back to the United States.<sup>109</sup> As in the case of slow diagnostic techniques, the disease may spread while waiting for a more effective solution.

## **Delaware Risks, Threats, and Vulnerabilities**

Although few people would consider Delaware a target for terrorist attack, especially in the international terrorism context of al-Qaeda, the state has considerable vulnerability. One must remember, when considering the potential for attack in a state or region, that terrorism goes beyond the efforts of Osama bin-Ladin and includes individual attacks for political motives, as in the attack on the Alfred Murrah Federal Building by Timothy McVeigh and the bombing at the Olympic Park in Atlanta, Georgia, by Eric Rudolph. Beyond terrorists, separatist, racial, religious, and environmental groups have been known to use violence in support of their aims. While terrorism poses a risk to Delaware, intentional criminal acts, natural hazards such as hurricanes, and accidents at nuclear and industrial facilities represent more likely disasters. In general, locations where a large number of people gather and facilities that if lost would cause a significant impact on quality of life or the economy have the greatest risk. In many instances, preparation for a terrorist attack against infrastructure provides useful skills that can be used in the event of a natural disaster or accident. The risks, vulnerabilities, and threats below represent some of the most critical or significant areas for the state of Delaware in terms of potential for human casualties, property damage, and economic losses from the entire spectrum of terrorist groups.

### ***Poultry Farms***

Poultry production represents a critical industry in the Delaware economy, especially in Sussex County. Throughout the state, poultry farms raise approximately 251 million birds each year.<sup>110</sup> Chickens outnumber humans in Delaware 300 to 1, with Sussex County having the highest number of chickens per capita of any county in the United States.<sup>111</sup> Poultry represents a \$543 million industry within the state,<sup>112</sup> with \$60 million in annual exports to Hong Kong, China, and Russia alone.<sup>113</sup> Approximately 900 farm families grow commercial birds in the state,<sup>114</sup> primarily in Sussex County. The introduction of avian flu or other animal diseases into the Delaware poultry flocks could cause considerable economic losses and human illness.

In February 2004, two poultry farms in Delaware,<sup>115</sup> one in Kent County and one in Sussex County,<sup>116</sup> had outbreaks of the avian flu. The strain of avian flu found on Delaware farms proved less virulent than the form of avian flu found in South East Asia, but 85,000 birds were destroyed on infected farms.<sup>117</sup> Direct costs to the state, University of Delaware, and poultry industry for testing amounted to nearly \$500,000.<sup>118</sup> After the discovery of avian flu on Delaware farms, 30 countries banned exports from the state.<sup>119</sup> Hong Kong banned poultry imports from Delaware for three months, Russia for six months,<sup>120</sup> and China for ten months.<sup>121</sup> The 10-month Chinese poultry ban caused a 76 percent decline in the value of poultry imports to China from the United States.<sup>122</sup> United States exports to China consist mostly of chicken feet and wingtips, which have little to no market outside of Asia.<sup>123</sup> Perdue Farms, Mountaire Farms, and Allen Family Foods each do business in China<sup>124</sup> and Russia.<sup>125</sup> The strong domestic demand for poultry during the export ban prevented crippling losses for the industry,<sup>126</sup> but a more significant outbreak of the avian flu in the future may not encounter the same situation.

Luckily, Delaware only experienced a mild form of the avian flu virus. The more



potent strain of the virus would likely have killed 90 to 100 percent of infected chickens within a couple of days of contraction of the virus.<sup>127</sup> In addition to poultry infection, the more virulent strain of the flu can infect humans, typically infecting an intermediary animal, like a pig, before transmitting to humans.<sup>128</sup> The potent virus would put the entire Delmarva poultry industry at risk, rather than a couple of infected farms.<sup>129</sup> The virus can spread rapidly in a variety of ways. Waterfowl and other wild birds act as carriers for avian flu, transmitting the disease without showing signs of infection themselves.<sup>130</sup> Farmers working on a variety of farms or simply interacting with others in their community can carry the virus to other flocks on their clothing or equipment.<sup>131</sup> Trucking birds to live markets or processing facilities can spread the disease as infected birds contaminate other birds and the vehicle.<sup>132</sup> Live markets in particular offer a breeding ground for avian flu through manure from infected birds.<sup>133</sup> As little as one gram of manure contaminated by the virus can infect one million birds.<sup>134</sup> Live markets carrying a variety of animals offer the opportunity for infected poultry to come into contact with an intermediary animal, increasing the risk of infection for humans.

The actions taken within the state during the outbreak prevented further spread of the virus, particularly treating transport vehicle tires with disinfectant.<sup>135</sup> The Delaware outbreak was contained in a short period of time. Since the 2004 outbreak, producers, the state, and the federal government have instituted measures to prevent a repeat scenario. Allen Family Foods, Perdue Farms, Mountaire Farms, and Tyson Foods have begun to track unusual mortality patterns in order to identify potential infections early.<sup>136</sup> Delaware instituted new regulations requiring the registration of all poultry growers with the state, from small backyard flocks to large commercial farms.<sup>137</sup> In addition, Delaware created new sanitation requirements with penalties for failing to adhere to regulations, an industry hotline to report suspicious poultry activity, and requirements for records of all sales outside of the state.<sup>138</sup> The United States Department of Agriculture has given \$10.8 million for the development of an avian flu prevention program, in which the Animal and Plant Health Inspection Service will create a monitoring system for the broiler, turkey, and egg industries.<sup>139</sup>

Although significant efforts have been made to reduce the likelihood of a natural outbreak, the impact of intentional introduction of a human-transmitting virus has yet to be determined. A widespread infection of the human form of the avian influenza would likely strain the medical resources in the state, with only eight, privately owned hospitals. Only a small number of birds were destroyed in the state during the 2004 outbreak, but only two farms had infected flocks. Widespread infection would precipitate the need to destroy a larger number of birds, reducing the revenue available from the sale of remaining birds and impacting the livelihood of many farming families in the state. With a widespread outbreak, countries around the world would likely ban imports from the United States, including those exported from Delaware. If the outbreak proved significant, domestic demand for poultry would likely drop in response to public fear. A foreign export ban and a large drop in domestic demand could cripple the industry for many years and cause sizeable economic losses.

## *Port of Wilmington*

The Port of Wilmington sits on 350 acres at the confluence of the Delaware and Christina Rivers.<sup>140</sup> The nearly 400 vessels docking at the Port each year carry a variety of cargoes.<sup>141</sup> Fruit and fruit juice concentrates and petroleum liquid bulk represent the primary non-containerized cargo entering the Port.<sup>142</sup> The Port of Wilmington handles an annual import/export cargo tonnage of 5 million tons.<sup>143</sup> Commercial and personal vehicles can access the Port via I-95.<sup>144</sup> CSX Transportation and Norfolk Southern have direct access to the Port by rail, with railcar loading docks adjacent to terminal warehouses.<sup>145</sup> Ships docking at the Port of Wilmington can use one of ten berths, depending on their cargo.<sup>146</sup> General cargo ships dock at one of the seven deepwater terminals along the Christina River.<sup>147</sup> Tankers bringing heating oil, fuel oil, or other petroleum products into the Port can dock at the bulk petroleum berth situated at the intersection of the Christina and Delaware Rivers.<sup>148</sup> Automobile imports and exports have access to both a floating berth for roll-on roll-off (RoRo) vessels and an Auto & RoRo berth<sup>149</sup> with a dedicated roadway linking the berth with vehicle storage facilities.<sup>150</sup>

The Port of Wilmington has the top imports in North America for fresh fruit, bananas, and juice concentrate.<sup>151</sup> In addition, the Port operates the largest dockside cold storage facility in North America,<sup>152</sup> critical to importation of perishable food products. Five warehouses at the Port provide nearly 700,000 square feet and 11 million cubic feet of chilled and freezer storage space.<sup>153</sup> Another 16,000 square feet of controlled atmosphere storage space is available.<sup>154</sup> Due to just-in-time shipping, the food entering the Port of Wilmington could occupy grocery store shelves east of the Mississippi River within 24 hours of release from the facility.<sup>155</sup> Keeping the food at the Port refrigerated and free from contamination is a major concern. During peak heat in the summer, the cost for electrical services at the Port can top a million dollars because of the power required to keep fresh foods properly refrigerated. The enormous amount of electricity needed makes backup generators unfeasible both financially and in terms of the space required for a generator with enough power generation capability to serve the needs of the cold storage facilities. The Port of Wilmington has the physical advantage of being located where multiple major power lines cross, making a successful physical attack on the external electrical system supplying power to the facility difficult. The Port, however, would be vulnerable to a cascading power failure like the one seen in the northeastern United States in the summer of 2003. In addition, a cyber attack on the supervisory control systems for the electrical supplier of the Port could impact operations. The loss of power for an extended period of time would cause significant financial losses for those operating out of the Port, as spoiled food would have to be discarded. The reduction in the food supply of some products would also cause a rise in the price for the good.

All trucks leaving the Port, especially with food, must be inspected. In the case of an emergency evacuation of the facilities, all vehicles would need inspection before they could leave the Port for fear of contamination of food and release of a potential hazard loaded on an exiting truck. With only seven lanes at the main gate for entry and exit, an emergency during the peak times for loading and transporting cargo would provide complications for evacuation. The Port has begun building alternate entry and exit points

around the facility, but the Transportation Security Administration will not install the Transportation Worker Identification Credential card readers at those gates until completely built. At the present, the gates would not assist in an emergency evacuation because the universal credential information is lacking, which would increase the time involved in inspection of exiting vehicles.

In particular, attacks of a chemical, biological, or radiological nature would have the most lasting impact on companies at the Port because of the standards required for food to go to market. Generally, cleanup from a chemical or biological attack would eliminate the risk to food with little residual effects. A successful radiological attack on the Port, however, could cause elimination of shipments of food to the facility because the lingering radiation would make food unfit for human consumption. While consumers in the general market would have access to the food because of other Ports receiving the shipments, the impact on the local Delaware economy would be significant as direct and indirect jobs of the Port would be lost.

The Port of Wilmington has taken many steps to improve the security of the facility and the cargo entering and exiting. For the protection of food, the Port has made tamper resistant, numbered, plastic seals available free of charge to all trucks or trailers carrying food products.<sup>156</sup> Commercial carriers of food products receive a seal before leaving the facility and security officers at the main gate inspect the vehicle to ensure the number of the seal matches the number on the bill of lading and no other evidence of tampering is present.<sup>157</sup> The Port has sought to control and monitor access through simple fencing around the perimeter of the property<sup>158</sup> and sophisticated technology for proximity access cards and driver and vehicle identification image capture at the gate.<sup>159</sup> The security workforce at the Port of Wilmington has increased by 20 percent since September 11, 2001, as have warehouse patrols.<sup>160</sup> As part of the requirements of the Maritime Transportation Security Act of 2002, the Port has completed a Facility Security Plan and has conducted drills related to the plan. The Port of Wilmington participates in the pilot program of the Transportation Worker's Identification Credential card, which will create a universal card for transportation workers in all modes with biometrics for accurate identification.<sup>161</sup> In addition, the Port has become a certified member of the Customs-Trade Partnership Against Terrorism, which aims to increase security through proactive measures on the part of the maritime shipping industry.<sup>162</sup> For screening of individual cargo containers, the Port operates the Mobile Vehicle and Cargo Inspection System, which uses gamma ray technology to quickly and more effectively screen the internal cargo of a container for contraband.<sup>163</sup> The carriers of palletized cargo and containers bar code their products and have the bar codes of the cargo on the bills of lading for use in preventing suspect shipments from going unnoticed. The United States Bureau of Customs and Border Protection began a project in the northeastern United States where they install radiological detection equipment at the entrances and exits of ports. The project was already supposed to come to the Port of Wilmington, but has not because of delays and decisions to first place the technology in the most critical ports.

### ***Route 9 Corridor, Delaware City***

The Route 9 corridor outside of Delaware City has become the home to several heavy industries, including chemical production, petroleum refining, and plastics

manufacturing. The Occidental Chemical Corporation produces and sells the most chlorine in the United States.<sup>164</sup> One of the company's plants resides outside Delaware City and produces both chlorine and caustic soda. Water and wastewater facilities around the country depend on chlorine to eliminate viruses and bacteria in water. Other industries rely on chlorine as a base product in the creation of other materials, such as polyvinyl chlorides (PVC) used for water pipes in buildings.<sup>165</sup> Caustic soda, also known as lye, is used in a variety of industrial operations<sup>166</sup> to produce agricultural chemicals, detergents, cellulose film, and chemicals like ammonia, salicylic acid, and styrene.<sup>167</sup> Despite the critical functions the chemicals produced at Occidental Chemical's Delaware City plant play, inherent dangers in production of the chemicals make the operation at risk for attack. The plant, known as OxyChem, employs approximately 100 employees and 50 contractors.<sup>168</sup> As a producer of chlorine, OxyChem has large stores of the chemical on-site.<sup>169</sup> The recent Graniteville, South Carolina, release of chlorine gas from a rail car brought the danger of chlorine gas into the minds of the general public. The OxyChem plant has experienced a leak of chlorine from the facility before. In May 2003, chlorine escaped from an open valve, releasing a small cloud of gas for approximately six minutes.<sup>170</sup> The apparent workplace accident did not injure anyone,<sup>171</sup> but shows the vulnerability of the plant to an intentional act.

The federal government raised concerns about an attack on chlorine gas storage and production in the "National Planning Scenarios," an internal Department of Homeland Security document inadvertently released to the general public that gives details on possible types of attack. The national scenario assumes a population of 700,000 within a 25-mile radius of the attacked facility.<sup>172</sup> While the population of the area surrounding the Delaware City plant would not be as high as the national scenario, a 25-mile radius around the facility would include the city of Wilmington, parts of New Jersey, and the Delaware Memorial Bridge. The attack in the scenario would occur with a low-order explosive,<sup>173</sup> such as black or smokeless gunpowder sold at local firearms stores. The explosive would destroy the storage tank man-way, releasing the liquefied chlorine under pressure and allowing it to become a gas.<sup>174</sup> In the federal government scenario, 35,000 people will experience lethal dosages of chlorine and 17,500 will die before or during treatment, 10,000 people will suffer severe injuries, and another 100,000 will require hospitalization.<sup>175</sup> In the resulting self-evacuation of panicked citizens, at a minimum hundreds of automobile accidents would occur.<sup>176</sup> Bodies of water or wetlands within the affected area would absorb the chlorine gas creating hydrochloric acid.<sup>177</sup> Metal objects in the surrounding area would become heavily corroded, including other manufacturing and petroleum refineries in the case of Delaware City and possibly the Delaware Memorial Bridge.<sup>178</sup> In the federal scenario, the healthcare system would face overwhelming numbers of injuries and people concerned for their health although well.<sup>179</sup> Certainly, in Delaware the healthcare system would experience a similar situation, with only eight hospitals. Economic damage could reach into the millions, primarily from the repair and rebuilding of the facility, environmental cleanup, and loss of jobs and consumer confidence.<sup>180</sup> In addition, the loss of a chlorine facility for an extended period of time would impact many water and wastewater facilities that do not store more than a few days supply of chlorine on-site because of the safety risk.

The Valero Petroleum Refinery occupies land not far from the OxyChem plant. The Delaware City Refinery processes approximately 191,100 barrels a day<sup>181</sup> of heavy-

sour and high-acid crude oil.<sup>182</sup> Valero's refineries nationwide produce gasoline, diesel fuel, jet fuel, railroad fuel, and liquefied petroleum gas for home heating.<sup>183</sup> Propane produced at the Delaware City Refinery is used at poultry farms throughout the state to heat chicken houses during cold weather. The refinery is under considerable pressure to produce propane for poultry farming uses. Distribution of the petroleum products from the Delaware City facility occurs by pipeline, barge, and truck.<sup>184</sup> The refinery operates its own port, which makes the company subject to regulation under the Maritime Administration (MARAD). As part of Maritime Security Levels (MARSEC) regulations, the refinery has a facility security plan and security steps it must take. The port allows the refinery to move its product to make room for new product. If the refinery cannot move the oil it must reduce production, which impacts the overall oil supply due to the small number of refineries in the United States. Maintaining an open shipping channel is extremely important to the refinery. The blocking of the Delaware River because of the Athos I oil spill on November 26, 2004, upstream from the refinery caused a temporary reduction in production. A longer block of the shipping channel would have a more significant impact on the refinery causing even greater reductions in production due to limited storage capacity.

Nearly 550 full-time employees and 500 contractors work at the facility.<sup>185</sup> The refinery has its own response team and an established relationship with the Delaware City Volunteer Fire Department for assistance with any incidents. The refinery, like many critical infrastructures, depends on other infrastructures to complete its daily operations. On some days the refinery has the ability to put energy back into the electrical grid, while on other days it must draw from the grid in order to produce. The Delaware City Refinery depends on water from the local water system for portions of the production process. Several companies have owned the facility, with Premcor purchasing the plant in 2004 from Motiva Enterprises<sup>186</sup> and Valero purchasing the plant during the summer of 2005. While owned by Motiva Enterprises, the plant suffered an accidental fire and explosion.<sup>187</sup> The 2001 event killed one person and spilled more than a million gallons of sulfuric acid.<sup>188</sup> Premcor and Valero have invested millions of dollars in safety and security improvements since purchasing the refinery. In addition, the refinery has a positive working relationship with the Federal Bureau of Investigation (FBI) and the Delaware State Police for assistance in questioning those engaged in suspicious activities near the refinery.

Like chlorine facilities, the National Planning Scenarios include an incident at a petroleum refinery. In the scenario, coordinated attacks occur on refineries and a port.<sup>189</sup> In the case of Delaware, only one refinery could be involved and the Port of Wilmington, which has a petroleum berth for tankers. Additional refineries in Pennsylvania and New Jersey could be included in a multiple refinery attack in the area, along with ports in Philadelphia and southern New Jersey. The scenario involves an initial attack via helicopter on refineries with rocket-propelled grenades (RPGs) and improvised explosive devices (IEDs) to cause massive oil fires.<sup>190</sup> Shortly after the fire and explosion at the refineries, IEDs would explode in close proximity to cargo ships carrying flammable liquids or solids, such as petroleum, while in port.<sup>191</sup> The resulting fires at the refineries would cause dense clouds of smoke to drift into populated areas.<sup>192</sup> In the Delaware situation, the plumes of smoke could gather over higher population centers, like the cities of Wilmington, Newark, and New Castle, as well as a vast area of New Castle County.

Assuming a densely populated area under the cloud of smoke caused by the refinery fire, 350 people will most likely experience lethal exposure, with 175 dying.<sup>193</sup> Approximately 1000 people will require hospitalization, but many other “worried well” individuals may seek medical treatment.<sup>194</sup> The carcinogenic effects of the smoke may cause increases in long-term disease.<sup>195</sup> Physical damage to the refineries and ports would be significant with repair and replacement costs reaching into the billions of dollars.<sup>196</sup> Reduction in the production of petroleum products as a result of the attacks could drive prices for fuel and home heating oil higher.<sup>197</sup> The port may also suffer financial losses during the repair process, when fewer imports and exports can be realized. The Port of Wilmington would likely have to consider the impact of residual toxins on their major import, food products, and potentially lose the industry until the cleanup reduced the risk of contamination of food coming in through the port. Additional contamination may affect the nearby waterways,<sup>198</sup> such as the Delaware River.

### *Dover, Delaware*

“The National Strategy for the Physical Protection of Critical Infrastructures and Key Assets” outlines 16 critical infrastructure areas or assets of concern for the entire nation. The general vicinity of Dover, Delaware, contains a high concentration of targets in these areas, most notably in the areas of defense industrial base, government facilities, and commercial key assets. Nearly 4000 active-duty military and civilian employees support the 436<sup>th</sup> Airlift Wing at Dover Air Force Base.<sup>199</sup> Dover Air Force Base plays a critical role in support of the nation’s military efforts, providing 25 percent of its strategic airlift capability, operating the largest and most active air freight terminal in the Department of Defense portfolio, and running the largest and only joint-services mortuary facility in the continental United States.<sup>200</sup> Dover Air Force Base links combat troops with equipment and supplies, military personnel serving abroad with flights home, and fallen servicemen and women with their families. As a critical asset in the United States military arsenal, generally, and as a node in the supply chain to forward serving troops in Afghanistan and Iraq, Dover Air Force Base represents a potential target for international terrorism efforts.

As the capital of Delaware, the seat of Kent County, and an individual municipality, Dover is home to a number of government buildings. In one area alone sits the Town Hall, Legislative Hall, and buildings housing the governor, lieutenant governor, and executive agency leadership offices. The proximity and value of these locations offer a significant target of opportunity for anyone wishing to make a political point, an international terrorist, or disgruntled state or municipal resident. Beyond the area of “The Green,” government targets are scattered around the Greater Dover area. Many of these offices could represent a political or psychological target for an attacker, such as the Delaware State Police Headquarters. A successful attack on a government facility like Legislative Hall or the Delaware State Police Headquarters could easily undermine the ability of the state to maintain law and order and dissolve public confidence in the institutions of government to protect the population. The destruction or contamination of a government facility would also impact important records of the state, county, or city government. An explosion or fire from any cause could destroy documents related to taxes, property, and vital statistics, important for the functioning of government. Without



adequate off-site backup of critical records, the daily functions of government that citizens have come to expect could grind to a halt in the event of destruction, whether by intentional or accidental acts.

In addition to defense and government facilities, several significant commercial key assets are located around the city. The co-location of the Dover International Speedway and Dover Downs, also, represents a key commercial asset. Dover Downs offers casino, horse racing, and hotel facilities for Delawareans and visitors around the region. Dover International Speedway can hold 140,000 spectators in its grandstands<sup>201</sup> and additional people in the surrounding parking and recreational vehicle lots and in the infield of the track. Twice a year the track holds NASCAR series races over a three-day period, drawing fans from around the eastern seaboard and nationally televised attention to the high-profile event.<sup>202</sup> The high concentration of people, attention on the event, and celebrity status of the drivers and owners makes the NASCAR series races at Dover International Speedway a high-risk infrastructure and event.

# Organization of Infrastructure Security in Delaware and Assessment

## *State Level*

### **Delaware Emergency Management Agency**

Within Delaware, emergency management functions at the state, county, and to some extent the municipal level. On the state level, the Delaware Emergency Management Agency (DEMA) operates as the lead emergency management agency.<sup>203</sup> The existence of DEMA stems from the Delaware Office of Civil Defense created by the Civil Defense Preparedness Office of the Department of Defense during World War II.<sup>204</sup> The Delaware Office of Civil Defense focused on protecting against and preparing for attacks from Axis forces.<sup>205</sup> Over time, the mission and focus of emergency management in the state shifted from protecting against Axis attacks to the threats of the Cold War to natural and technological hazards.<sup>206</sup> The current incarnation of emergency management in the state involves “all-hazards,” including natural disasters, such as hurricanes, floods, and tornadoes, and man-made disasters, such as nuclear accidents, chemical spills,<sup>207</sup> and terrorist attacks. The current mission of DEMA is “coordination of comprehensive emergency preparedness, training, response, recovery and mitigation services in order to save lives, protect Delaware’s economic base, and reduce the impact of emergencies.”<sup>208</sup>

Federal funding for terrorism preparedness began before September 11, 2001. DEMA first received federal funding for terrorism preparedness for FY 1992 from the Federal Emergency Management Agency (FEMA) in response to the first World Trade Center bombing. From FY 1992 to FY 1999, DEMA received increasing amounts of terrorism preparedness funding from FEMA. During these years, DEMA employed only one planner responsible for the area of terrorism. In January of 2000, the Department of Justice invited Delaware, through DEMA, to participate in a three-year grant program called the Domestic Preparedness Equipment Program (DPEP). DPEP funding spanned FY 1999 to FY 2001, with Delaware receiving a total of \$1.3 million over the course of the grant period. Under the guidelines of the grant, DEMA could only use the money to purchase defensive equipment for first responders, like firefighters, police officers, and emergency medical technicians. The defensive equipment had to fall into one of four categories, namely personal protective equipment; chemical, biological, or radiological detection; decontamination; or communications.<sup>209</sup>

In order to qualify for FY 2000 and FY 2001 funding, each state had to conduct a statewide needs assessment comprised of the Jurisdiction Risk Assessment, Centers for Disease Control and Prevention’s “Public Health Assessment Instrument for Emergency Preparedness,” and the Capabilities and Needs Assessments.<sup>210</sup> DEMA also had to create a three-year interagency implementation plan taking into account statewide needs. The DPEP called for states to subdivide into jurisdictions. Based on a number of factors, such as the size of the state, the likelihood of state level coordination in the event of a disaster, and the lack of consistent county-operated first response entities, Delaware chose to make the entire state a single planning jurisdiction. The establishment of Delaware as a single emergency planning jurisdiction for federal funds continues with the State Homeland

Security Grant Program (SHSGP). After the attacks on September 11, 2001, the Department of Justice combined the application for FY 2000 and FY 2001 DPEP funding and disbursed the money as one lump sum grant for both years.

Following the attacks on the World Trade Center and the Pentagon, Delaware began to receive funding as a state grant for homeland security, with the eventual elimination of the DPEP. During the initial years of the grant, the criteria limited funding to first response activities through reimbursement. Over the years of the State Homeland Security Grant Program (SHSGP), the amount of the award and the activities and disciplines qualified under the grant have constantly changed. The term discipline refers to a functional area, such as law enforcement, public works, and public health. Each grant award is for one fiscal year only. For the first and only time in the FY 2003 SHSGP, each state received a supplemental allocation for critical infrastructure preparedness. Delaware received an allocation of \$1,831,000 for critical infrastructure preparedness. The state spent most of the critical infrastructure allocation on reimbursements to law enforcement for overtime costs previously incurred to protect assets. Changes in the accepted disciplines and funding eligibilities for the FY 2004 and FY 2005 SHSGP permitted public works and infrastructure hardening activities to receive part of the funding. One of those interviewed felt the eligible disciplines had expanded too far and that permitting public works, which they described as a support function for first response, to receive funding diluted the money available for the original disciplines. Although the FY 2004 and FY 2005 SHSGP criteria allow public works funding, the state is operating on the FY 2003 allocation with the FY 2004 division of the award finalized in January 2005 and the FY 2005 requests still under consideration. Actual use of the funding for public works and infrastructure remains a goal for the future.

In Delaware, an entity called the Delaware Homeland Security Terrorism Preparedness Working Group (DHSTPWG) evaluates requests for funding and determines the distribution of funds between disciplines and areas, such as equipment, training, and exercises.<sup>211</sup> Each of the ten response disciplines outlined in Delaware's Homeland Security Strategy has a representative on the DHSTPWG.<sup>212</sup> The representatives communicate with the members of their respective response community to gather project proposals and funding requests. The subcommittees review the proposals from individual disciplines and decide which projects to fund.<sup>213</sup> The decisions of the subcommittees then go before the full DHSTPWG for final approval.<sup>214</sup> The final decision of the DHSTPWG lays the foundation for the Department of Homeland Security federal grant implementation program.<sup>215</sup> DEMA processes the information and submits it to the Office for Domestic Preparedness of the Department of Homeland Security, which approves and administers the grant.<sup>216</sup> The representatives for each discipline serving on the DHSTPWG participate as volunteers in addition to their responsibilities with their full-time employers. In many cases, serving as the representative for a discipline requires extensive outside coordination with a large number of constituents of those disciplines. Sometimes the representatives must seek permission from their employers to participate in activities related to the DHSTPWG, taking time out of their workday for a volunteer activity. Those interviewed had a variety of opinions on the usefulness and effectiveness of the DHSTPWG. Some complained that the growth of the working group has created too much bureaucracy through subcommittees and decreased efficiency. Others felt the growth of the working group detracts from the critical

discipline areas most in need of assistance, namely first responders. Several interviewees felt the DHSTPWG was the best way to create buy-in from those in each discipline because they have their representatives in the meetings making decisions, rather than having government officials decide for them.

**Figure 6. Membership of the Del. Homeland Security Terrorism Preparedness Working Group<sup>217</sup>**

<b>Discipline Represented</b>	<b>Representative's Organization Affiliation</b>
<i>Working Group Chair</i>	Delaware Emergency Management Agency
Government Administration	Delaware League of Local Governments
Hazardous Materials	Department of Natural Resources and Environmental Control
Health Care	Delaware Healthcare Association
Emergency Management	New Castle County Office of Emergency Preparedness
Emergency Management	Kent County Division of Emergency Management
Emergency Management	Sussex County Emergency Operations Center
Emergency Management	City of Wilmington Office of Emergency Management
Emergency Medical Service	Sussex County Emergency Medical Services
Fire Service	Delaware Volunteer Firemen's Association
Fire Training	Delaware Fire School
Law Enforcement	Delaware Police Chiefs' Council
National Guard	Delaware National Guard
Police Training	Council on Police Training, Delaware State Police
Public Health	Division of Public Health, Department of Health and Social Services
Public Safety Communications	911 Center, Kent County Division of Emergency Communications
Public Works	Public Works Department, City of New Castle

The area of funding presented many complications for those interviewed. Generally, complaints fell into two categories, the State Homeland Security Grant Program and lack of assistance from state and local government in support of homeland security and infrastructure protection. Elimination of problems with the SHSGP will certainly prove more difficult than problems at the state and local levels. Interviewees complained of a lack of long-term planning in the distribution of the grant funding. Several interviewees attributed the lack of planning to the distribution in one-year increments, which they feel has led to purchases of equipment because they are tangible items with an immediate sense of reward as opposed to training and exercises that may take time to experience the true benefits. In addition to short timeframes for funding, interviewees cited changing funding levels and criteria as impediments to a comprehensive planning process for the grant. They felt constantly changing funding levels for the grant have encouraged purchasing of equipment for fear the funding will eventually run out and the state will no longer have money for such items. They expressed the feeling that longer timeframes for funding with guaranteed levels over the period of the grant would assist in proper planning and potentially more effective use of the grant money.

Under provisions of the SHSGP, only three percent of the award can pay for administrative costs. Only three full-time staff members and ten contractual employees support homeland security related emergency management functions within DEMA. The state does not supplement the three percent administrative costs from the grant with any money out of its annual budget. With limited resources for homeland security planning and grant administration, DEMA had been able to obtain additional positions since the beginning of the grant program. Unfortunately, the limitations on those positions cause

internal and external problems for DEMA. The state clearinghouse has approved several additional positions over the years of the grant for DEMA, but has stipulated that all of the funding for those positions must come from the SHSGP and the positions cannot be career ladder in nature. The ten contractual employees have no state benefits and little hope of career advancement in their current positions. DEMA has resorted to using the state contract with a temporary agency to recruit contract employees. In both the public and private sectors, recruitment and retention of employees represent significant costs. High levels of turnover only increase the costs for employee recruitment.

The combination of a lack of benefits and career advancement opportunities has led to high turnover among contract employees at DEMA supporting the SHSGP. In an average year, eight to ten employees funded by the SHSGP leave DEMA, impeding internal planning efforts because many employees leave before or shortly after overcoming the initial learning curve. The short tenures for the contract employees make building a comprehensive cadre of homeland security experts through extensive professional development difficult. With contract employees leaving after only months of employment, creating continuity for external stakeholders and an institutional memory for the organization proves nearly impossible. Externally, high turnover prevents the development of long-term professional relationships with intergovernmental and private stakeholders, undermining effective communication between levels of government and the private sector. The majority of those interviewed felt the high turnover rate of contract employees negatively impacted their coordination with DEMA, because they feel they are constantly dealing with new people who do not know the history of emergency management activities in the state. In the most recent recruitment of contract employees, DEMA has invited representatives of the emergency management organizations in each county and Wilmington to participate in the hiring interviews. While the new input from the county and city emergency managers will help ensure the quality of those hired by DEMA, it does not guarantee those hired will remain for a significant period of time.

DEMA has encountered significant complications in the purchasing and bidding process. While DEMA has saved nearly \$1.7 million through centralized, bulk purchasing and purchasing contracts, the demands and problems in purchasing and bidding take up a large amount of time for the staff supporting homeland security. The staff for the SHSGP does purchasing for the grant rather than general purchasing staff for all of DEMA. In the bidding process for contracts, DEMA must work with the Department of Administrative Services, which has recently been incorporated into the new Office of Management and Budget. Communication between DEMA and the Department of Administrative Services has been weak, with the Department of Administrative Services not openly sharing information with DEMA. For example, DEMA only recently learned that it could award contracts based on the best value instead of the lowest bid, which could have improved the quality of purchases made by DEMA for homeland security efforts. While the Department of Administrative Services did not intentionally keep the information from DEMA, the department did not proactively assist DEMA in the purchasing process. Complications in the bidding process and the actions of the Department of Administrative Services delayed the purchase of trailers to house personal protective equipment by one year through re-bidding the contract three times because of a competitor's repeated complaint. DEMA has also experienced roadblocks

from the Department of Administrative Services related to where they can purchase. The SHSGP stipulations expressly permit states to purchase from the Defense Logistics Agency and the Government Services Administration. The state FY 2006 Appropriations Act signed on July 1, 2005, contains a section expressly permitting DEMA to purchase from the Defense Logistics Agency for the SHSGP. The Department of Administrative Services has interpreted part of the Delaware Code to prevent DEMA from purchasing from the General Services Administration catalog, increasing the time it takes for DEMA to conduct purchases. The Governor's Homeland Security Advisor arranged a meeting with DEMA and the Secretary of Administrative Services before his resignation and the barriers were removed. The Secretary of Administrative Services has since changed and the Governor's Homeland Security Advisor left, which has allowed the barriers to purchasing from the General Services Administration catalog to return. It is too early to know if the restructuring that incorporated the Department of Administrative Services into the Office of Management and Budget will be able to eliminate such issues.

A disconnect exists between many local governments and DEMA. Although a representative of the Delaware League of Local Governments serves on the Delaware Homeland Security Terrorism Preparedness Working Group, the connection between local governments and DEMA has not been perfect. DEMA has attempted to keep local governments informed of the activities of the working group by sending minutes to their leadership, but the method has not created open communication between the groups. Eliminating the intermediary in the relationship might improve local governments' feelings of investment and involvement in the process.

The Department of Homeland Security added another grant program specifically to support infrastructure security efforts for FY 2005. The FY 2005 Buffer Zone Protection Program (BZPP) aims to expand the security around critical infrastructures and into the surrounding communities through protective measures.<sup>218</sup> For the award of funding under the BZPP, the Department of Homeland Security asked DEMA to identify the high-risk facilities in the state. DEMA submitted requests for 20 facilities in the state, but only received funding for eight of those facilities. Each of the eight facilities will receive \$50,000, from the total award of \$400,000,<sup>219</sup> for use in critical infrastructure hardening activities. As part of the program requirements, DEMA must submit Buffer Zone Plans (BZP) and equipment plans for the facilities, which will face review from the Office for Domestic Preparedness and the Information Analysis and Infrastructure Protection directorate within the Department of Homeland Security.<sup>220</sup> The BZPP guidelines encourage the use of other federal funding for homeland security to supplement the new grant.<sup>221</sup> DEMA has chosen to take this approach and use portions of the remaining FY 2003 supplemental critical infrastructure preparedness grant to increase the overall funding for hardening activities at the eight approved facilities. Hardening activities for the facilities range from access control to fencing.

### **Delaware Homeland Security Council**

On July 22, 2003, Governor Ruth Ann Minner issued Executive Order 46 creating the Delaware Homeland Security Council.<sup>222</sup> The council was created "to provide advice, counsel, and assistance to the Secretary of Safety and Homeland Security and the Governor's Homeland Security Advisor."<sup>223</sup> Among the responsibilities of the council



are the completion of any homeland security related plans not assigned to another group by statute or executive order, exchange of intelligence and information concerning homeland security, and dissemination of homeland security information to the public and other state agencies.<sup>224</sup> The Secretary of Safety and Homeland Security determines when the council will meet and sets the agenda in cooperation with the Governor's Homeland Security Advisor.<sup>225</sup> At the present, the Governor has not replaced her Homeland Security Advisor, who resigned. The current Secretary of Safety and Homeland Security has only served in the position for a year and has faced considerable distractions with high-profile Delaware State Police problems and the Superintendent of the Delaware State Police's resignation and replacement. Figure 7 outlines the full membership of the council.

**Figure 7. Membership of the Delaware Homeland Security Council<sup>226</sup>**

Membership	
Secretary of the Department of Safety and Homeland Security	Governor's Homeland Security Advisor
Adjutant General of the National Guard	Chief Information Officer
Director of Public Health	Director of the Delaware Emergency Management Agency
Director of the Division of Motor Vehicles	Superintendent of the Delaware State Police
Chair of the Public Health Emergency Planning Commission	Executive Secretary of the Delaware Volunteer Firemen's Association
Chair of the Delaware Police Chiefs' Council	A federal representative for Homeland Security
Other representatives of local, county, and emergency management organizations	

### **Delaware State Emergency Response Commission**

Another statewide group, under administrative control of DEMA, has a role in emergency planning. The Delaware State Emergency Response Commission (SERC) grew out of Title III of the Superfund Amendments and Re-authorization Act (SARA), known as the Emergency Planning and Community Right-to-Know Act (EPCRA).<sup>227</sup> The EPCRA aimed to provide open access for the public to information and resources regarding hazardous and toxic substances in their own communities in order to prepare and protect themselves from a potential release.<sup>228</sup> The act required the creation of a State Emergency Response Commission (SERC) to oversee implementation of the act's provisions.<sup>229</sup> Businesses using, storing, or having released hazardous chemicals must furnish the SERC with reports on such information.<sup>230</sup> In turn, the SERC must create procedures to receive those reports and make them available to requesting members of the public.<sup>231</sup> In Delaware, reading rooms with information allow the public to access the information. Each SERC had to create smaller emergency planning districts, called Local Emergency Planning Committees (LEPC), to carry out specific duties coordinated by the SERC.<sup>232</sup> Wilmington, New Castle County, Kent County, and Sussex County became emergency planning districts with LEPCs.

The Delaware Code sets forth the membership of the SERC as shown in Figure 8.<sup>233</sup> Under the bylaws of the SERC, the Secretary of Safety and Homeland Security serves as the chair and the Director of the Division of Air and Waste Management within the Department of Natural Resources and Environmental Control serves as the vice-chair.<sup>234</sup> The SERC meets quarterly to conduct its business.<sup>235</sup> In addition to the four

LEPCs, the SERC has four standing committees, namely Finance and Budget, Information and Technology, Planning and Training, and Decontamination Trailers.<sup>236</sup> The bylaws also direct the Delaware Emergency Management Agency (DEMA) to supply administrative support for the SERC.<sup>237</sup>

**Figure 8. Membership of the Delaware State Emergency Response Commission<sup>238</sup>**

Members	
Secretary of Safety and Homeland Security	Representative air transportation industry
Director of the Division of Air and Waste Management, Department of Natural Resources and Environmental Control	Representative highway transportation industry
Secretary of Transportation	Representative water transportation industry
Superintendent of the Delaware State Police	Representative hazardous materials shipper industry
Director of the Delaware Emergency Management Agency, Department of Safety and Homeland Security	Representative hazardous materials consignee industry
State Fire Marshall	Representative of the Delaware State Firemen's Association
Director of the Division of Public Health, Department of Health and Social Services	Chairman of the City of Wilmington LEPC
Director of the Delaware State Fire School	Chairman of the New Castle County LEPC
Representative of the State Fire Prevention Commission	Chairman of the Kent County LEPC
Representative rail transportation industry	Chairman of the Sussex County LEPC

In some cases, the LEPC has its own staff paid for by the respective city or county. For example, New Castle County has two part-time, contract planners supported by county funds. One part of the stated mission of the SERC says it “shall foster inter-governmental coordination at the local, state and federal levels.”<sup>239</sup> Despite the mission of intergovernmental coordination, the resources and functions of the SERC and individual LEPCs have not been uniformly integrated into the existing emergency management structure. In Kent County, the director of the Division of Emergency Management also serves as the chair of the Kent County LEPC and in Sussex County the LEPC representative is co-located with the emergency operations and 911 center. In New Castle County, however, the contract planners of the LEPC work from a location other than the Office of Emergency Preparedness, even though the two groups have similar and interdependent responsibilities. The integration of the LEPC with the Kent County Division of Emergency Management and proximity of the LEPC with the Sussex County emergency managers allow for more effective coordination of activities and communication between groups than the structure of the New Castle County LEPC and Office of Emergency Preparedness. Although the impetus for the SERC and the SHSGP program are different, their activities can greatly benefit each other in the long run through sharing of information, best practices, and coordinated exercises.

One of those interviewed explained that emergency managers could benefit from increased communication between other organizations in the state, such as the State Emergency Response Commission and the Community Awareness and Emergency Response group in Delaware City. The chemical industry in Delaware City participates in emergency preparedness drills and exercises, but has not consistently provided after-

action reports (AAR), explaining the successes, failures, and areas of improvement found during events, to county officials. Without knowing the gaps discovered in the exercises by the chemical companies, the emergency managers cannot plan and prepare appropriately to be able to fill those gaps in the event of a real incident.

## Delaware State Police

The Criminal Intelligence Section of the Delaware State Police has responsibility for collecting, analyzing, and disseminating intelligence information related to organized crime and terrorism.<sup>240</sup> In particular, the analysis unit and intelligence investigators/counter-terrorism unit have responsibilities related to terrorism activities.<sup>241</sup> In 2002, the newly created counter-terrorism unit began investigating terrorism activities with the state of Delaware.<sup>242</sup> The counter-terrorism unit works closely with a number of law enforcement groups at the federal, state, and local levels. According to the unit's website, the information they gather can only be disseminated to law enforcement agencies under federal law.<sup>243</sup> In 2003, the analytical unit formed to support the counter-terrorism unit.<sup>244</sup> Two troopers work in the unit, maintaining informational databases and conducting database queries.<sup>245</sup> In addition, the unit produces a weekly intelligence bulletin with information on domestic and international terrorism, including tactics and weapons used by those arrested.<sup>246</sup> The bulletin goes out to troopers so they have information to protect themselves and know what to expect.<sup>247</sup> The unit maintains the databases listed in Figure 9. In addition, the analytical unit assisted the Delaware Emergency Management Agency in identifying and determining the vulnerabilities of critical infrastructure in Delaware. The Criminal Intelligence Section also has a detective assigned as the critical infrastructure liaison.

**Figure 9. Databases Maintained by the Analytical Unit, Crime Intelligence Section, DSP<sup>248</sup>**

Databases	
Regional Information Sharing System (Riss.net)	Joint Regional Informational Exchange System (JRIES)
Anti-Terrorism Information Exchange (ATIX)	Financial Crimes Enforcement Network (FinCEN)
Computer Aided Management of Emergency Operations (CAMEO)	Electronic Trace Summary System (ETSS)
El Paso Intelligence Center (EPIC)	Law Enforcement Online (LEO)
Accurint	Choice Point
CrimeIntel	

Some of those interviewed expressed concern over the sharing of intelligence information, particularly to emergency management agencies. Generally, emergency managers receive intelligence information given to DEMA by the Delaware State Police. Interviewees questioned the helpfulness of the information they receive, which they feel has been filtered to point of not being useful. While many feel informal relationships with members of the Delaware State Police would allow them access to intelligence if a threat were imminent, they do not feel the formal intelligence sharing system would permit them access to information they need for planning. Interviewees also expressed concern over the usefulness of information shared through Riss and ATIX, explaining that much of the information they receive is too vague, equally available through the

media, or better information is available through professional organizations to which they belong.

### *County Level*

Emergency management districts in the state of Delaware have traditionally been broken into one district for each county and the city of Wilmington. Each district has an emergency management organization. The Office of Emergency Preparedness in New Castle County, housed under the New Castle County Police Department, began in 1981 when the second reactor started up at the Salem Creek Nuclear Power Plant across the Delaware River in New Jersey.<sup>249</sup> Another unit opened in Hope Creek in 1986.<sup>250</sup> The Office of Emergency Preparedness began operations with only one full-time staff member in 1981 and now has five full-time employees, one planning coordinator, two planners, and two administrative staffers. The New Castle County Office of Emergency Preparedness subscribes to the all-hazards approach to emergency management, which integrates all potential hazards into comprehensive planning. The New Castle County Office of Emergency Preparedness acts as the point of contact for the county with DEMA for the State Homeland Security Grant Program, initiating and coordinating requests to the Delaware Homeland Security Terrorist Preparedness Working Group (DHSTPWG). In the case of an emergency, the Office of Emergency Preparedness provides on-scene support for incident command system operations, acting as a liaison with the public and other state and county agencies. The Office of Emergency Preparedness contracts with the American Red Cross for sheltering operations in the event of an emergency requiring shelter for members of the public. The office has pre-designated locations for shelters around the county arranged with the American Red Cross. Within the county, the Critical Incident Working Group has been established. The Chief Administrative Officer of New Castle County serves as the chair of the working group, with county managers meeting monthly. The Office of Emergency Preparedness serves primarily the unincorporated portions of the county with municipalities having responsibility for emergency preparedness within their boundaries.

In Kent County, the Division of Emergency Management functions under the Department of Public Safety.<sup>251</sup> Like the New Castle County Office of Emergency Preparedness, the Kent County Division of Emergency Management prepares for natural and man-made hazards, including chemical releases, radiological incidents, and severe weather.<sup>252</sup> Unlike in New Castle County, the director of the Kent County Division of Emergency Management chairs the Local Emergency Planning Committee, eliminating barriers to communication between the two entities.<sup>253</sup> The Division of Emergency Management has an excellent working relationship with the Delaware National Guard. Under a newly organized system, the National Guard assigns vehicles with drivers to the Division of Emergency Management for events like winter storms, floods, and hurricanes. The drivers and vehicles stay at the Emergency Operations Center and operate at the disposal of the division. A National Guardsman is permanently stationed at the Emergency Operations Center, which allows for the continuation of National Guard chains of command. The Emergency Operations Center provides meals, places to sleep, and outlets for relaxation during the period drivers are off-duty. In contrast to the original system where Kent County had to contact DEMA and DEMA had to request

assistance for them from National Guard Headquarters, the new systems allows for immediate response to an emergency. The division also participates in the Delaware Department of Transportation's (DelDOT) Traffic Management Teams. Kent County Division of Emergency Management has a copy of DelDOT's security plan and communication on how to execute the plan. Although the Division of Emergency Management could benefit from an additional position, assistance from the emergency medical services and 911 center has helped the division complete its duties.

Sussex County administers emergency management through the Emergency Operations Center (EOC), which also supports 911 communications and countywide fire service.<sup>254</sup> The Sussex County Emergency Operations Center prepares for and responds to events from hurricanes to chemical spills.<sup>255</sup> The county owns the Emergency Operations 911 Emergency Command post for use when on-scene damage assessment is needed or as a backup 911 center in the case of the loss of a major telephone trunk line.<sup>256</sup> The Sussex County EOC acts as the primary emergency management agency for unincorporated areas in the county. The EOC will be moving into a new building being built for it in the future. The county hired consultants to design the center to meet the current and projected needs of the EOC and 911 center. The county government has been supportive of the EOC and 911 center and their needs, given the population growth in the county. As the fastest growing county in the state, Sussex County will face new challenges, like adequate transportation infrastructure to reach those in need of assistance. Sussex County EOC participated in the security plan process for DelDOT because of the expansion of the county and demands that will be placed on it in the future. During the avian influenza outbreak in Sussex County, the EOC found out that the Department of Agriculture and poultry industry had an emergency operations plan for such an event, but had not shared that plan with the EOC or other first response agencies near poultry farms. At the time this report was written, Sussex County EOC had not received after-action reports regarding the response to the outbreak.

### ***Municipal Level***

In general, the municipalities in Delaware do not have dedicated offices for emergency management or an overall emergency manager. The city of Wilmington represents the exception in municipal emergency management. As the largest municipality in the state, Wilmington has both an Office of Emergency Management and a Local Emergency Planning Committee. The Office of Emergency Management coordinates the efforts of the other departments within the city with a role in emergency management.<sup>257</sup> While the lack of a central emergency management office or dedicated staff person may make economic sense for municipalities with only a few hundred residents, larger cities like Dover, Newark, and Georgetown could find use for an emergency manager. With no central conduit for emergency management activities within a city or town, departments often conduct emergency management functions individually and without true integration in planning and preparation. Within the functions of a city, the police department would typically act as the first response unit along with fire and emergency medical services. Following an emergency, the city's public works department has the responsibility for debris removal and cleanup. Where the fire service operates as a volunteer fire department, communication between police

and public works becomes more difficult. The internal government structure of a city can impede the development of comprehensive preparation for emergency management and operations. In the city of Dover, for example, the public works department reports to the city manager and the police department reports to the mayor. No direct link exists between the response and recovery outside of the city's Emergency Operations Plan. The Emergency Operations Plan includes a role for public works, but was written several years ago by the police department. Currently, an officer in the police department updates the plan, but the public works department does not actively participate in the update. The plan exists, but has not been tested.

On the municipal level, public works departments own and operate a large portion of critical infrastructure, such as water and sewer systems. Water systems in particular depend on other critical infrastructures to operate, namely electricity and chemicals for processing. The water systems typically can operate without chemicals in a crisis, forcing residents to boil water. Water systems cannot operate, however, without electricity. One public works department in the state had to forgo an early request for fencing around its water treatment plant and electronic access control in favor of funding for its electrical system, even though both facilities truly needed funding. Portable generators were requested and approved for several water systems in the state out of the FY 2004 State Homeland Security Grant Program (SHSGP), so they would have backup power generation. Currently, funding for FY 2004 has not begun, with the state still working off of the FY 2003 grant, leaving water treatment plants in the state vulnerable to power failure from any source. Public works departments in the state also face problems as a discipline when competing for the SHSGP. The types of projects needed by the public works discipline often require extensive planning, expense, and often construction. Hardening of a critical water system may require the erection of a building around a well to prevent access, which involves a large investment and an extended timeframe for implementation as compared to purchases for equipment available for use the day they arrive. Although the mitigating factors of critical infrastructure hardening may significantly reduce the potential impact of an attack or the potential injuries inflicted on first responders, such projects quickly deplete the available funds.

In addition to being a new discipline in the fray, public works departments exist more predominantly north of the Chesapeake and Delaware Canal, even though many of the smaller municipalities south of the canal own water and wastewater systems and other public works operations. Smaller towns in the state with public infrastructure lack the financial and personnel resources to plan for and deal with vulnerabilities in their systems. Local governments participating in the Delaware League of Local Governments will now have assistance in conducting vulnerability assessments with the DLLG hiring a staff member for that purpose, using funds from the SHSGP. The assistance of the DLLG consultant will provide a much-needed service, especially to smaller municipalities with fewer staff members, but conducting the assessments and convincing municipalities to implement change will take time and leave those facilities open to attack. Several of those interviewed felt the most significant failure on the municipal level involves the lack of formal mutual aid agreements and memoranda of understanding between municipalities. The Delaware General Assembly passed Senate Substitute 1 (SS1) for Senate Bill 153 (SB153) at the end of the 2005 legislative session, which establishes an intrastate mutual aid compact between all political subdivisions in the

state. Use of such arrangements would have a significant impact on emergency management throughout the state, with less money required to reach equivalent goals. In the area of public works, for example, heavy equipment for debris removal and specialized equipment for response to a terrorist attack cost significant amounts of money and may only prove useful in a handful of cases. Rather than having each municipality request such equipment and possibly only one municipality receive approval, several municipalities in a general geographic area could band together with a memorandum of understanding and request the equipment for the entire region, saving money and benefiting more citizens.

### ***Port of Wilmington***

The Port of Wilmington relies heavily on its internal security activities and a relationship with Wilmington for protection of its infrastructure. Remarkably, the Port has little to no direct contact with the Delaware Emergency Management Agency or the Delaware State Police. The Port has more interaction with Wilmington's Police and Fire Departments and the federal government, than the state. The state has not provided any funding for infrastructure security at the Port of Wilmington from its annual budget or the State Homeland Security Grant Program. In the first round of the federal Port Security Grants, the Diamond State Port Corporation received an award, but has not received an award during the last two years. The Port primarily deals with the Transportation Security Administration of the Department of Homeland Security on matters of security, because of its Port Security Grant award and participation in the Transportation Worker's Identification Card pilot program. When attempting to contact the Delaware Emergency Management Agency, the Port has encountered difficulty in reaching someone with an understanding of the Port's role in the state and infrastructure. After continued calls to DEMA, officials at the Port were able to speak to someone with an understanding of the Port, but the frustration of the communication has colored the relationship between the Port and DEMA. Complications in communication between DEMA and the Port arise from the lack of information transfer. For example, the Port submits information on its federal grants to the Division of Revenue, but the Division of Revenue does not pass the information on to DEMA. The Port has conducted its own internal security drills and will have a full-scale exercise run by the United States Coast Guard on May 31, 2005, but has not participated in any exercises with DEMA.

## **Conclusions and Options for Change**

The federal focus on terrorism has greatly impacted the functions of state and local governments. The federal government has placed many mandates on state and local governments, some funded and others unfunded. These mandates have precipitated many changes, from large to small. In Delaware, the focus on terrorism has manifested itself in many ways. The smaller changes included changing the name of the Department of Public Safety to the Department of Safety and Homeland Security. More significant changes have included additional units within the criminal intelligence section of the Delaware State Police, the formation of the DHSTPWG, and additional contract staff at DEMA to support the SHSGP. Despite the additional structures and funding to support the new emphasis on terrorism, the most likely threats to the state remain the same. In Wilmington, the primary concern for the safety of citizens is crime reduction and ending drug and gang violence. For New Castle County, industrial accidents at the Salem Nuclear Plant, Valero Delaware City Refinery, or OxyChem Plant present the greatest risk to the population. On the whole, natural hazards and accidents pose the most significant risk to the state, if only from their frequency. Tropical cyclones, flooding, and winter storms regularly occur in Delaware, with considerable impact of the economy and individual communities. Although the most likely threats to Delaware have not significantly changed with the focus on terrorism, the state has little choice but take advantage of the new resources to aid all-hazards emergency management and infrastructure protection. With the recommended changes, Delaware could become one of the more advanced states in infrastructure security and in adapting to federal mandate without compromising its needs.

Throughout the interview process, interviewees gave suggestions on how to improve infrastructure security in the state. While the suggestions for improvement covered a wide variety of changes, they generally fell into the categories of changes related to money and organization/operations. It is important to note that interviewees have differing, often conflicting, perspectives on infrastructure security improvements based on their unique experiences. The expansiveness of the recommendations demonstrates the need for a neutral forum of open dialogue between stakeholders to consider changes and improvements to the current system. Many of those interviewed felt Delaware had the ability to become the model for the country, but also felt changes were needed to reach that status.

### ***Organizational and Operational Changes***

The organizational and operational changes suggested by interviewees typically involved integration, outreach, and sharing. One interviewee suggested uniform integration of the Local Emergency Planning Committees (LEPCs) into emergency planning jurisdictions, in order to remove geographic and cultural barriers between the emergency management officials and LEPCs. In Kent County, the director of the Division of Emergency Management also serves as the chair for the LEPC. In Sussex County, the LEPC representative is located in the same building as the director of emergency management. While the formal relationship between the LEPC and the emergency management organization leadership may be the strongest integration, the co-



location of the two groups may provide sufficient intercommunication. A much more complicated suggestion was made to integrate DEMA operations into the traditional emergency management functional areas of preparation, mitigation, response, and recovery. The change would require organizing DEMA based on functional areas, rather than types of hazards. One benefit of such reorganization would be to eliminate duplicated positions in each hazard area, but would require a broader area of expertise for each planner. In addition, the alignment of resources by function could allow more comprehensive, robust planning. Accounting for employee time spent on various federally funded programs would be more complicated, but not impossible.

In the area of outreach, suggestions were made for liaisons to stakeholders from within DEMA. First, liaisons were recommended to local governments. Among the duties of the liaison would be giving informational presentations on and assisting local governments in preparing requests for funding under the SHSGP. A similar suggestion was to have dedicated liaisons within DEMA to the disciplines represented in the DHSTPWG. In both situations, the addition of dedicated liaisons to stakeholder groups could improve trust and working relationships between the groups. The change would require additional positions at DEMA and additional state investment to pay for the positions. The complication in adding liaisons to the disciplines could cause duplication in efforts with the DHSTPWG, but elimination of the working group would not save the money or necessarily provide the buy-in that currently exists.

Many of the changes suggested involved sharing, from information to resources. In the area of information, several interviewees felt intelligence could be better shared from the Delaware State Police to emergency management agencies and other selected stakeholders. The interviewees explained that without timely, useful intelligence information emergency planning does not accurately deal with real threats and can leave the public vulnerable. One interviewee said a consensus has not been reached on what information needs to be classified and, therefore not shared, and what information needs to be considered sensitive, but available to a limited group of stakeholders. Beyond intelligence information, a lack of consistent information on the federal funds coming into the state exists. One interviewee suggested a better system for transferring such information, either through Department of Revenue dissemination or direct contact from individual agencies. Knowing what funding has been awarded in the state and for what purpose can help prioritize needs and appropriately distribute remaining funds.

Several interviewees cited sharing of resources as an area for improvement. One example given of a resource that could be shared is DelDOT's road sensors used to measure weather conditions. The interviewee explained that weather information could be helpful in a response effort involving the accidental or intentional release of a harmful agent. Linking the DelDOT data with other emergency management data could reduce the risk of error and injury during a response effort. The lack of formal mutual aid agreements was repeatedly described as a problem. The passage of SS 1 for SB 153 should help correct the problem, but the true impact is too early to determine. One suggested improvement involved both the sharing of information and resources. Many industries have private security organizations protecting their property and interests. The security of those facilities is also important to the state. The interviewee suggested that the Delaware State Police and other law enforcement agencies in the state participate in training with private security personnel to ensure uniform industrial security. In addition

to the actual training knowledge, partnering could allow for relationship building between law enforcement and private security and promote sharing of best practices and intelligence from both groups.

The simplest organizational change suggested by most of those interviewed was the position of the Governor's Homeland Security Advisor. While structural changes may be able to break down barriers between state agencies, the advisor as the representative of the Governor could serve the same purpose with less dramatic change. A homeland security advisor dedicated to open communication with stakeholders and willingness to cut across state agencies to bring together the variety of resources available could eliminate the compartmentalized activities of different agencies.

### ***Funding Changes***

The majority of recommended changes involved money, from the amount available to uses. Some of those interviewed felt the current state contribution to infrastructure security, particularly the 800 MHz radio system, was appropriate, while others felt the state should contribute more. Although interviewees had many areas they felt the state could assist financially with infrastructure security, most supported state assistance to DEMA to correct the current problem with contract worker turnover. One interviewee expressed the potential for the state to fill the funding gap between the cost of a project when submitted for federal approval and the cost when the funding actually arrives. The extended time between federal approval and arrival of federal funding often means the cost for the resources needed to complete the project has increased and less can be bought with the money. State funding could help bridge the funding gap, but would cause significant changes in the annual budget. Another interviewee suggested that municipalities should provide more funding to protect infrastructure within their jurisdictions, particularly public resources. The interviewee explained that waiting for federal funding to cover infrastructure improvements could leave public resources vulnerable to a variety of negative events. Instead, the interviewee felt municipalities need to invest their own resources in infrastructure security. As with the addition of state funds for infrastructure security, increased municipal funds would require a reworking of budgets and potential cuts in other programs or the need to raise additional revenue.

Most recommended improvements offered by interviewees related to the SHSGP. Two of those recommendations would require change on the national level, making them more difficult to achieve. Each of the changes would assist in improving long-term planning with the grant money. First, a recommendation was made to have the grants span multiple years and resemble federal transportation grants. Currently, the grants represent only one fiscal year and there is no guarantee of funding for each successive year. Several interviewees stated that the lack of knowledge of future funding impedes comprehensive, long-term planning. Second, the suggestion was made that the criteria need to stop changing so dramatically from year to year because it makes the planning process too cumbersome and provides no consistency.

Two changes were recommended for how the state manages the distribution of the grant. One interviewee supports a change in the method of selecting projects for funding. Rather than having the entirety of the grant decided through the current DHSTPWG process, a third of the grant would be decided competitively, in a way similar to the

federal selection process. The new process would require written proposals submitted to a selection panel, then formal presentations to the panel by the finalists to defend their proposals. While this process could open funding up to those approved for federal funding but not represented on the DHSTPWG, like the Port of Wilmington, it would reduce the amount available for distribution by the working group. More than one interviewee suggested that the SHSGP be subcontracted to counties and municipalities. DEMA has begun to subcontract to a few groups, which relieves some of its burden. The concern with subcontracting is fewer savings from bulk purchasing through the state contract. An interviewee suggested a solution was to allow subcontracted counties and municipalities to use the state contract.

Interviewees had many opinions on how the grants should be spent. Among the suggestions for equipment purchases were radiation detection sensors for every law enforcement agent and first responder in the state, GIS software and training for modeling conditions, and equipment to digitize important public documents. Several people said more money needs to be devoted to training and exercising. Among the suggestions for change in training, some said money needs to be available for overtime to allow for training because those in need of training often cannot be spared from the normal workweek activities. In addition, some suggested federal limitations preventing the payment of volunteer firefighters need elimination because they impede important training; firefighters opt to train for the events they are more likely to encounter on a routine basis. Some questioned the ability of those receiving specialized equipment, such as personal protective equipment, to effectively use it without adequate training. Likewise, more money for exercises was often suggested, in part because responders need to practice use of their equipment in life-like situations to ensure proper use in real events. Interviewees recommended both additional tabletop exercises (TTX) and full-scale exercises (FSE), because they can show areas of deficiency and allow for correction before real events. For full-scale exercises, wider participation was recommended, as well as multiple scenario, multiple location exercises to test resources. A common request from interviewees was to have after-action reports from all incident exercises, whether conducted by the Division of Public Health, DEMA, DelDOT, or private industries. The complication with more training and particularly more exercises is they require a considerable amount of resources. A small full-scale exercise could easily cost a million dollars, quickly depleting federal funds.

Determining organizational and policy changes that would enhance infrastructure security at any particular time must take into account other critical elements that exist in the decision-making environment in which Delaware officials must operate. Not only are various aspects of federal security policies less than optimal for efficient and effective programs at the state level, but they, as well as the nature of the risks and threats, change significantly from year to year.

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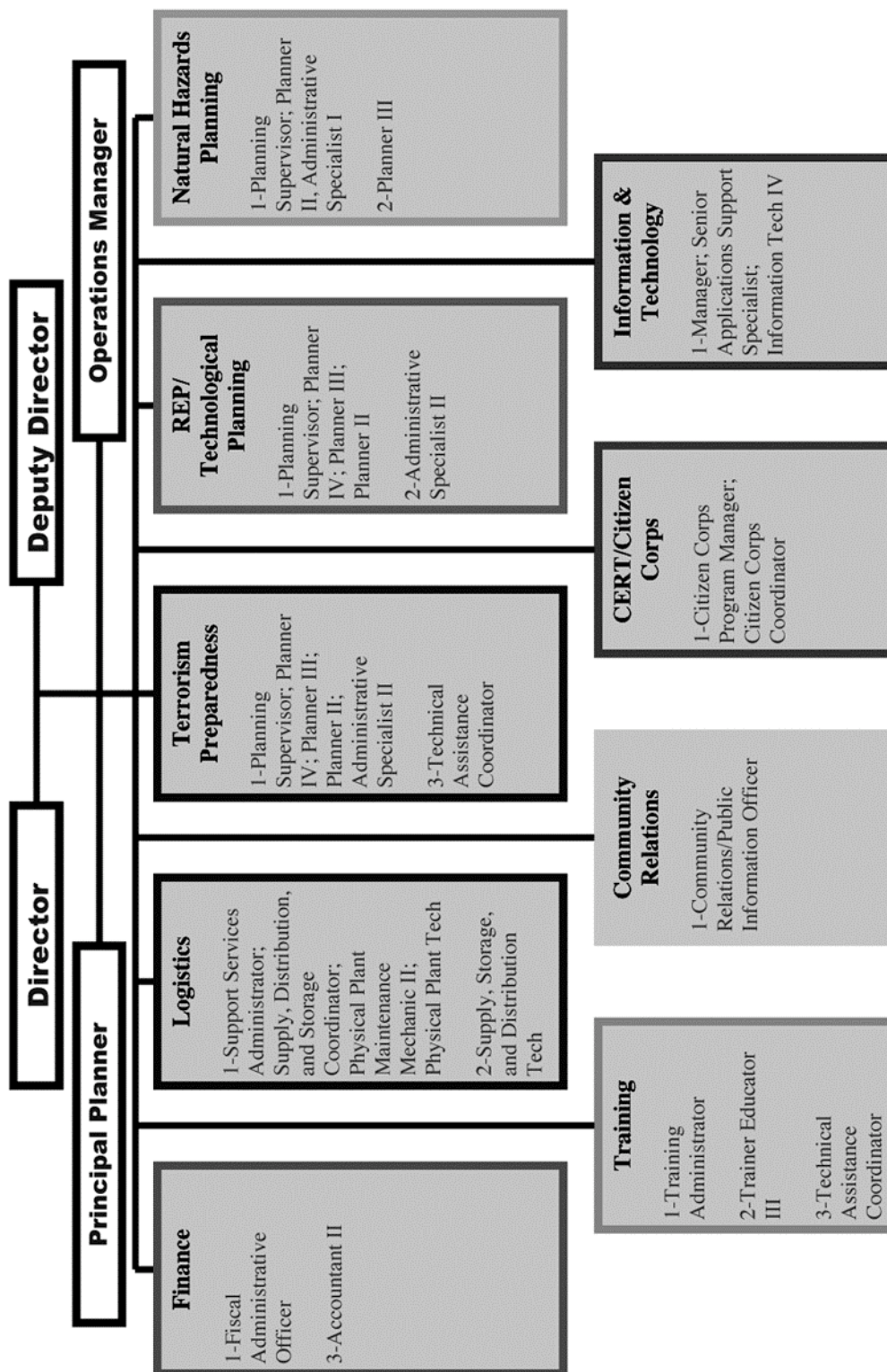
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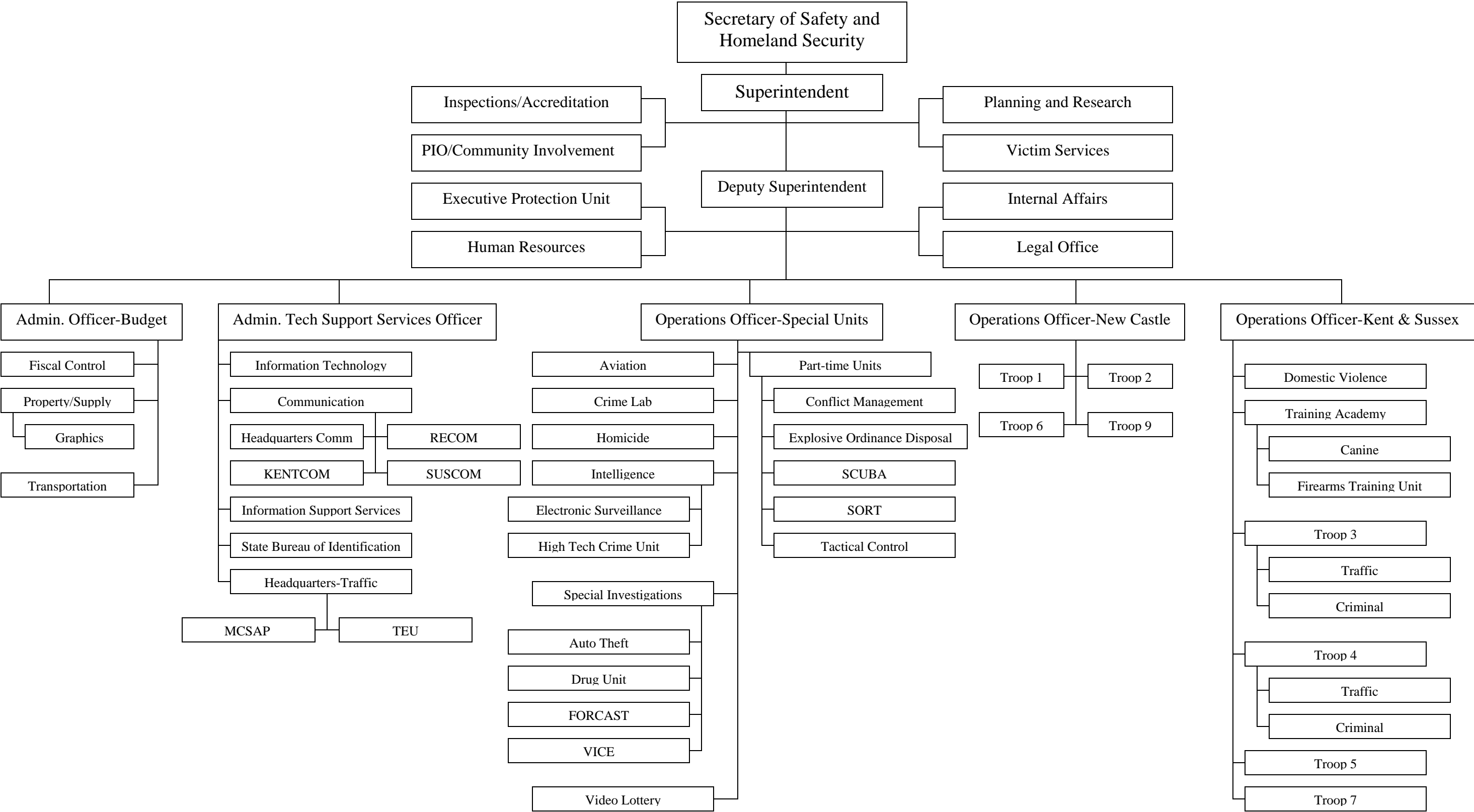
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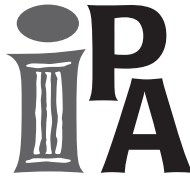
## Appendix I – Organizational Chart: Delaware Emergency Management Agency



Appendix II – Organization Chart: Delaware State Police



Source: Delaware State Police  
<http://www.state.de.us/dsp/dspto2004.pdf>

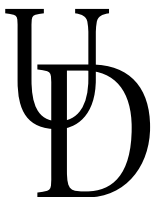


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