A poultry all-hazard threat, vulnerability, and capability assessment with Rockingham County Fire Rescue.

Daniel Robert Dales

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A Poultry All-Hazard Threat, Vulnerability, and Capability Assessment with Rockingham County Fire Rescue.

Daniel Robert Dales

A thesis submitted to the Graduate Faculty of JAMES MADISON UNIVERSITY In Partial Fulfillment of the Requirements for the degree of Master of Science Integrated Science and Technology

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Abstract

Agriculture is argued to be one of our most critical infrastructures and is vital to human health and survivability. Agriculture is economically important in Virginia as it provides over 350,000 jobs and generates $55 billion annually (Virginia Department of Agriculture and Consumer Services). This high criticality lends to significant areas of vulnerability in each sector of agriculture. Rockingham County is of particular importance as the top agriculturally producing county in the state and is ranked 5th in the nation for poultry sales (2007 Census of Agriculture). The desire to uphold this high production calls for a need to better understand what vulnerabilities threaten productivity. An examination was conducted to assess the ability to respond to and recover from any threat on this industry.

This research employs an all hazard approach which examines intentional attacks of both a criminal and terrorist nature. Three specific areas address these concerns. First, the Potential Threat Elements which may attack the poultry industry, and the industry vulnerabilities they may find most attractive, are examined. Second, vulnerabilities of the poultry farms where primary grow operations take place are analyzed. Third, the capability of Rockingham County Fire Rescue to respond to an agricultural incident is discussed.

The Animal Liberation Front was identified as the greatest threat to the industry. Several areas of vulnerability were reported including industry representatives who tend to be resistant to help because they believe it will increase regulation and ultimately their cost of production. Finally, the personnel of Rockingham County Fire Rescue have acknowledged a need for more agricultural incident training including annual exercises to help the agency to prepare for incidents involving poultry as well as other aspects of agriculture.
Introduction

Agricultural security is one of the most important topics in security and counterterrorism today. “Agroterrorism is the deliberate tampering with and/or contamination of the food supply with the intent of adversely affecting the social, economic, physical, and psychological well-being of society” (Levin 2005). Its ease of implementation and potential for massive impacts makes it attractive to domestic and foreign terrorists resulting in a great threat to our communities. Agriculture has been named one of the most vulnerability industries for terrorist activity (NCBRT 2001, 3-15). Former Secretary of Health and Human Services, Tommy Thompson said “I, for the life of me, cannot understand why the terrorists have not attacked our food supply, because it is so easy to do” (Tommy Thompson 2004).

Threats fall into three categories: natural, accidental, and intentional. Natural cases are those which involve no human input and typically result in an infectious disease which spreads throughout a population. An accidental case is similar, but involves some human input. This human error could cause a release of an infectious disease to a population. Intentional cases can be classified as criminal or terrorist. A criminal occurrence has no political or social motivation and likely would be motivated by some other personal gain. On the contrary, terrorism involves some political or social motive.

The FBI definition of terrorism states that terrorism involves some “violation of criminal laws of the United States or of any state” which “appear to be intended to intimidate or coerce a civilian population, to influence policy of a government by mass destruction, assassination, or kidnapping” (Weapons of Mass Destruction, PD3). All terrorism incidents are criminal in nature, but criminal incidents are not necessarily terrorism
unless they involve this political or social motive. This study focuses on intentional attacks on agriculture, with an emphasis on those with terrorist motive.

Agriculture is a lucrative target for a multitude of reasons. Low security on farms makes agriculture an easier target than many traditional targets. Most terrorists aim to carry out their attack while escaping undetected. Farms in America have little security or surveillance when compared to traditional public and private targets. Farms are considered a “soft target” with their limited areas of security and ease of access. A terrorist could easily access an agricultural facility at night to carry out their attack and be clear of the area before they are noticed. Furthermore, depending upon the agent they use, delayed biological effects could give the terrorist ample time to flee. Agriculture may also be an attractive target to those who do not desire to carry out an attack which may be overtly lethal to humans. This is especially true for those who want to show their willingness to kill, but are reluctant to cause human casualties. Some are more likely to carry out their attacks on animals in fear of social, religious, or civilian retaliation if they were to cause human casualties (Moats 2007, 1-4).

Agriculture incidents include targets from the “Farm-to-Fork.” This means that an attack on any sector within this chain can be considered an agriculture incident. For instance, an attack on crops or animals on a farm qualifies. An attack on a restaurant salad bar also qualifies under this definition. The following figure illustrates the sectors of this chain which are vulnerable to attack and how an attack may propagate through the chain (Figure 1). In the first part of the chain, a pathogen or toxin can be introduced directly into a crop or animal population. These toxins or pathogens can then be transferred from crops by consumption from animals. Then, infected crops and animals may be introduced into the
domestic food supply. The toxin or disease (in this case zoonotic) can then be passed on to the public through the food supply.

![Diagram showing disease or toxin propagation through the food supply chain.](image)

**Figure 1. Demonstrates Disease Or Toxin Propagation Throughout The Farm-To-Fork Theory Of Agricultural Terrorism (Wefald 1999, 7).**

Because of the importance and ease of access to the agricultural system, many agencies have reported agriculture to be one of the most vulnerable and critical infrastructures of our time. The National Academy of Sciences has supported this notion through the National Research Council. This council has found that “…because of its size and complexity, the U.S. food and agriculture system is vulnerable to deliberate attacks, particularly with foreign diseases that do not now occur domestically” (National Research Council 2002).

System complexity is one of the major factors in vulnerability. The agriculture system has been defined as one of the most complicated supply chain systems around. This system was designed to produce a large amount of high quality product at a low cost; this
system was not designed to be protected from intentional contamination (Hennessey 2010, 6).

Additionally, the National Research Council reports that even a simple threat on the agricultural system, short of any action, can have a significant negative economic impact. These actions could be considered an act of terrorism. A plausible threat to attack the food supply has the potential to damage our economy as well as reduce the public’s trust in our ability to protect this infrastructure. This psychological impact is imposed by the public’s perception that its government cannot protect its food supply (The National Academy of Sciences 2002).

Agriculture is a great economic asset to local, state, and national economies in the United States. Additionally, agriculture is one of the largest consumers of biotechnology in America. One of the top terrorist motives is to break the infrastructure of a nation through economic collapse. Attacking agriculture is a prime means. Low security in the second layer of agriculture (individual farms) makes an attack rather easy at this level. Since all levels of agriculture are interconnected, if a lower layer of the agricultural chain is attacked, an economic ripple effect would cascade throughout the entire system. It is understood that attacking an individual farm may not be detrimental to the entire system, but if a network of farms is attacked, the ripple effect could have national level consequences. This is especially dangerous with terrorist motive as terrorists tend to seek “multiple incident” type attacks. That being said, any individual attack should not be assumed isolated and shall not be passed off as diminutive (Moats 2007, 5-6).

Agriculture exports will also experience severe effects from an agricultural incident. In 2003 the United States experienced their first case of mad cow disease (Bovine Spongiform Encephalitis- BSE) in Washington State. After this outbreak, Japan, one of the
Top importers of US beef, halted all beef imports from the US. This brought international attention to the US beef industry and US exports declined nearly in half (Mitchell 2004). Japan did continue trade with the US but implemented strict trade agreements; however in 2006 they reinstated the import ban when the US broke these trade restrictions on a single shipment. Sources report billions lost in the cattle industry from this event. These cascading losses were felt all the way down to individual growers and feeders. A major natural, accidental, or intentional outbreak in the US agriculture system would likely cause similar impacts on exports (Marshall 2006).

Foreign Animal Diseases (FADs) are those diseases which are believed to be absent from the United States. These diseases may have been endemic in the past; however scientists now believe every case has been eradicated in the United States. There are a host of reasons why an FAD may become present in the United States. A reason considered by this research is the intentional introduction by a criminal or terrorist. An FAD is an excellent case-in-point which illustrates the dangers of the ripple effect described above.

If a FAD was introduced into a population, the devastation could be extraordinary. An FAD outbreak would likely cascade throughout all five layers of agriculture causing widespread desolation. At the local farm, an FAD could cause widespread death of those infected. Additionally, with the importance of not allowing the FAD to become endemic in the United States, those animals exposed to the disease would also need to be destroyed (culled). Widespread death would cause economic and psychological turmoil on the farm and local community. In the 2001 outbreak of Foot and Mouth Disease (FMD) in Europe (a disease that’s considered a FAD in the United States) at least 60 farmers committed suicide after they were required to cull their entire population (Van Wie 2009). These effects
would also be felt in layers three and four of agriculture. First, grain and feed producers rely on product demand from highly productive farms. As farms begin to lose animals to an FAD, grain and feed producers will begin to lose customers. As with the farms, grain and feed businesses will likely close. These effects will eventually be felt at layer five of agriculture, directly affecting the consumer. As the demand for meat increases the cost of the meat will also spike until the supply is exhausted. Once exhausted, wholesaler profit will also be severely diminished, causing many wholesalers to go under. Finally, retailers would pass their lost profits onto the customers, causing the price of meat to rise even further. In the 2001 FMD natural outbreak in Europe cost at least $16 billion. This was one of the most expensive events in Europe’s history, second to WWII (Van Wie 2009). While this example represents major outbreak, the turmoil is not that farfetched for a terrorist attack if the perpetrators have a good understanding of the agricultural industry and the disease they use.

This thesis involves agricultural incidents (including agroterrorism) with a focus on the poultry industry in Rockingham County, Virginia. Agriculture is the heart of productivity in the Commonwealth of Virginia. Most of our primary production, and much of the state’s economic wealth, comes from the hard work of individual farming families across the Commonwealth. The importance of agriculture, along with low security on farms and in the agricultural industry, makes agriculture a significant target for attack.

There are five layers of the agriculture industry, all at risk of attack. The first layer is the most basic layer which is on individual farms. In layer 1 you look at specific organisms on a farm (i.e. chicken, cow etc.). Layer 1 is the basic building block for the entire agricultural industry. Layer 2 encompasses the farm as a whole, including the interaction of these organisms on the farm and their interconnectivity with agricultural production. Layer
3 involves the interaction of farms in local agricultural communities. This layer includes farms located in the same geographic region. In this layer, a web of support among local agricultural communities is introduced. This can include feed production, farm bureaus, fertilizer and insecticide manufacturing, farm implement manufacturing (tractors, hay bailers, wagons etc.) which support the local agricultural community. Layer 4 brings these local agricultural communities together at the national level. This level also includes ancillary industries to the agricultural communities (i.e. sellers, retailers, federal government and contractors). Layer 5 addresses the international agricultural market including agricultural exports. All five layers build upon each other to form a strong, thriving agricultural community which exports billions in agricultural products annually (Moats 2007, 6-9).

Agriculture is Virginia’s largest and most productive industry. The importance of agriculture to the commonwealth is astonishing. In Virginia, the agricultural industry provides more than 357,000 jobs and generates revenue of $55 billion annually (Virginia Department of Agriculture and Consumer Services). Rockingham County has almost 2,000 farms with over 230,000 acres in farmland (Commonwealth of Virginia 2008).

This study focuses on the poultry industry. The industry is one of the top thriving industries in the commonwealth. Virginia ranks 9th in the country for broiler production with a value of $563.2 million in 2008. Total broiler production was around 1.25 billion pounds in 2008. Virginia also has a thriving egg production with 726 million eggs produced in 2008 (Commonwealth of Virginia 2008).

Rockingham County has been selected for this study as it is a highly economically productive agricultural county in the Commonwealth of Virginia. Rockingham County has long been ranked 1st in the state for profits from agricultural products (2007 Census of
Agriculture). Additionally, Rockingham County has been nicknamed the “turkey capital of Virginia” because it also has the most productive poultry industry in the state. Rockingham County’s poultry production has nationwide impacts as it ranks 5th in the nation for value of poultry sales (2007 Census of Agriculture).

The poultry industry is responsible for raising birds (chickens, turkeys, ducks, and geese) for meat and egg production. In Rockingham County the poultry industry is focused on chicken and turkey for meat. Chicken are the primary production bird in the poultry industry. Historically, chickens were the first animal to be confined in large numbers within automated systems for meat and egg production. The successful production of chicken meat and eggs led to a thriving poultry industry in the United States. In the 20th century the United States poultry industry became a model for agricultural industries globally (Davis 2009, 6-10).

There are two genetic types of chickens used in the poultry industry: broiler birds for meat production and laying hens for egg production. These large production industries are controlled by private companies in a “vertical integration system” which was established post World War II. This vertical system begins with producer companies which own all production sectors within the poultry industry. These production sectors include the birds, hatcheries, feed mills, transportation services, medications, slaughter plants, final processing facilities, and facilitation of buyer delivery. These producer companies will contract with small farms to carry out many of these functions. There are over 25,000 farms in the United States contracted to support the poultry industry. The poultry farmers that work these farms are commonly known as growers. The parent company provides growers with birds which the growers are responsible for raising. The growers supply the land, housing, and
equipment for the birds. They also look after the birds providing them with food, medication, and will dispose of their waste (Davis 2009, 6-10).

While agricultural incidents primarily involve pathogens which infect farm animals, one must not ignore traditional weapons of mass destruction. Farm animals are kept outdoors with little security and often no shelter. It wouldn’t be difficult to use traditional weapons such as conventional (explosives), radiological, or even nuclear weapons. The likelihood of a nuclear or radiological attack against agriculture is very low. An attack of this magnitude would be overkill since much cheaper and simpler means are available. Additionally, these weapons are difficult to acquire. The primary threat to agriculture is considered to be chemical and biological weapons.

Environmental conditions can make it difficult for some of these agents to be effective. The effectiveness of chemical agents usually depends upon their ability to attack the most dangerous route of entry—inhale. Animals are either kept outdoors or indoors where systems are in place to rapidly exchange the air. These environmental conditions make it difficult to attack animals via inhalation. Additionally, the amount of chemical required to affect a larger, heavier animal would be much greater than that of a human. Because of the difficulty of dissemination, and the amount of agent required to attack, chemical agents are not a strong candidate for agriculture (Moats 2007, 14-17).

The same environmental difficulties apply to biological agents. However if dissemination is successful, biological agents would be much more effective against agriculture. The natural curiosity of animals allows for much lower tech dissemination than would be required to infect humans. Additionally, biological agents are cheaper, more lethal, and many carry a contagious factor which makes them a better option for agricultural attack.
Biological agents are easier to obtain due to their wide natural occurrence and use in laboratories for basic research. Unlike chemical agents which remain contained to the area of release, biological agents can proliferate exponentially through populations (Wefald 1999, 3). Because of their ease of production and dispersion, biological agents are the likely agent of choice for attackers (NCBRT 2007, 3-25).

There are a wide range of pathogens which may be used against agriculture including bacteria, viruses, toxins, and some fungal agents. Several bacterial agents are likely candidates for an agriculture attack. For example, “Exotic New Castle Disease” affects poultry and can simply be disseminated by bringing infectious fluids into contact with healthy birds. This disease has higher mortality rates in young and old populations, and has the possibility of being transmitted to humans. Highly pathogenic strains of Avian Influenza are also a biological source which could pose a threat to the poultry industry. This pathogen could have mortality rates up to 100%. These two pathogenic biological agents are examples of a large selection of agents, in addition to the traditional WMD biological agents, which may be used against agriculture (Moats 2007, 17-28).

In the spring of 2002, Rockingham County, VA experienced a natural outbreak of Avian Influenza (AIV) H7N2 Virus. This infection spread to 197 farms resulting in the death (natural and culled) of over 4.7 million turkey and chickens (Akey 2003, 1099). This natural outbreak serves as an excellent example of a poultry disease which could have massive implications if used as a bioweapon.

The first case of AIV was found in a flock of turkeys from North Carolina on February 28th, 2002. This case was identified through a routine surveillance program in Virginia. On March 7th the next case appeared in a 10-house company breeder farm in the
eastern portion of Rockingham County, VA. These birds were displaying common signs and symptoms of AIV and tested positively for AIV on March 7th. On the initial test the birds returned a negative result. However, on a subsequent test on March 11th they tested strongly positive for AIV antibodies. This H7N2 virus was determined to be nearly identical to previous cases found in New York, New Jersey, Pennsylvania, North Carolina, and West Virginia. The breeder voluntarily depopulated his flock on March 15th, eight days after the symptoms appeared (Akey 2003, 1100).

Ring testing was immediately conducted within a 2 mile radius of the index farm. Ring testing is a technique used where veterinary personnel start at the index farm (the source) and begin testing consecutively in rings out from this farm. They continue to test outward from the source until they determine they have reached a buffer zone where they believe there are no organisms which have been exposed. This ring testing proved that the AIV was spreading quickly throughout the vast poultry population in Rockingham County.

On March 18th birds on a secondary farm, which were received from the index farm the day before symptoms appeared, tested positive for AIV. During the next two days three additional farms had turkeys which tested positive for AIV. Over a period of three weeks the AIV spread to neighboring counties with cases doubling weekly (Figure 2). A peak occurred in May 2002 and the final new case of AIV was identified on July 2nd. The Virginia State Veterinarians office had issued orders for the quarantine and depopulation of nearly 5 million birds which were affected (Akey 2003, 1101).
Figure 2. Avian Influenza Virus Positively Identified Flocks in the Shenandoah Valley Virginia from March 3\textsuperscript{rd}, 2002 to July 15\textsuperscript{th}, 2002 (Akey 2003, 1101).

While 197 farms were affected in six counties, these numbers could have been much higher. There were 700-800 poultry farms in the area that were at risk of infection. With early recognition and quick vaccination an Avian Influenza Task Force was able to prevent a greater spread. This case lasted approximately four months which was noted as a short turnaround and a successful mitigation from the community. This four month outbreak was estimated to have cost millions to the businesses involved (Table 1). The total estimated cost is as follows (Akey 2003, 1103).
Table 1. Avian Influenza Virus Economic Impact in the Shenandoah Valley Virginia 2002 (Akey 2003, 1103).

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<table>
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<tr>
<td>Poultry Industry/Growers</td>
<td>$130 million</td>
<td>(lost revenue)</td>
</tr>
<tr>
<td>USDA Avian Influenza Task</td>
<td>$14 million</td>
<td></td>
</tr>
<tr>
<td>Force</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commonwealth of Virginia</td>
<td>$1 million</td>
<td></td>
</tr>
<tr>
<td>Indemnity Claims for market</td>
<td>$67 million</td>
<td></td>
</tr>
<tr>
<td>value of flocks ordered</td>
<td></td>
<td></td>
</tr>
<tr>
<td>destroyed (including cost</td>
<td></td>
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<tr>
<td>of cleaning/disinfecting)</td>
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<tr>
<td><strong>TOTAL ESTIMATED COST</strong></td>
<td><strong>$212 million</strong></td>
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This natural outbreak costs over $200 million and drew massive resources from both the state and federal governments for a period of four months. The costs of an intentional attack could be much higher. The AIV case study illustrates mitigation techniques used to detect and control disease outbreaks. A terrorist could use university and outside publications to study these mitigation techniques and determine means of circumventing them. The USDA and Commonwealth of Virginia had a strong knowledgebase of AIV and were relatively prepared for this outbreak. However, both are much less prepared for Foreign Animal Diseases, which would be the vector of choice for an attacker.

Identifying that an agricultural incident has occurred is not an easy task. Agricultural incidents could be mistaken for a multitude of accidents or naturally occurring diseases. It is important to know indicators of an agricultural incident. These indicators include an unusual number of sick or dying animals, sometimes out of the normal illness season, and presence of a disease not endemic to that region. Physical evidence may also be available including signs of forced entry, abandoned dissemination devices, and unscheduled dusting (especially during nighttime hours). These indicators, among a much larger list, prove the importance of noticing something is out of place as early as possible (FDA, FBI, USDA 2008).
As soon as there is suspicion of an agricultural incident arises, scene control needs to be established. The responsibility for scene control lies within local law enforcement. If necessary, law enforcement can reach out to fire rescue and even the National Guard for larger incidents. The most important factor in scene control is controlling what goes on and off the affected farm. Only one entrance should be used, and all persons/equipment must be logged when entering or exiting. The movement of all animals must also be halted to prevent the spread of disease. Controlling the movement of animals is a factor in biosecurity measures. This is especially dangerous with highly contagious diseases. Biosecurity measures are put in place so the disease does not spread to other populations. In the 2001 FMD outbreak in Europe it was estimated the disease spread nearly 500 square miles a day (Van Wie 2009). This is especially important when a zoonotic disease is suspect as these diseases may be transmitted to humans as well (Moats 2007, 71-75).

The National Animal Health Emergency Response Plan (USDA- Animal Plant Health Inspection Service or APHIS) has generated a process for handling the initial response to animal health emergencies. When a farmer identifies a possible disease has emerged, he will contact his local veterinarian. If the local veterinarian identifies a disease anomaly that appears suspicious for any reason, they will contact a state veterinarian, or APHIS who will contact the Area Veterinarian in Charge (AVIC). If a Foreign Animal Disease is suspected, the AVIC will contact a Foreign Animal Disease Diagnostician (FADD). The FADD will then acquire samples from the suspect animal and place the premises on quarantine. Depending upon the disease type and distribution, the FADD may quarantine the neighboring farms as well. The FADD will send the samples of to the lab for confirmed diagnosis and may activate the state animal emergency response plan. If the FAD
is confirmed, the United States Department of Agriculture (USDA) will announce the confirmed cause and take control of the eradication efforts (Moats 2007, 94-96).

If terrorism is suspected, the FBI and USDA- Office of the Inspector General (OIG) will lead the investigative efforts under the guidance of the National Framework Emergency Support Function (ESF) #11. ESF #11 provides guidance for agricultural and natural resource emergencies. Under this ESF, the USDA-OIG leads the investigative efforts with the support of other federal and state agencies, if the event is assumed to be solely criminal. It is the duty of the FBI to determine if the event is considered terrorism and if so, to take control of the investigation. Under ESF #11, APHIS has the responsibility to support mitigation and recovery efforts by providing disease inspection, quarantine, fumigation, disinfection, sanitation, extermination, and carcass disposal. Additionally, APHIS will enforce interstate quarantines if the disease spread is believed to have crossed state lines. ESF #11 only provides guidance for which federal agencies hold responsibilities, but encourages support from state, local, and private resources (Moats 2007, 130-134).

As defined by the ESF #11, APHIS has the responsibility for many of the operations following an animal health emergency. Some of their most important mitigation responsibilities include surveillance, containment, euthanasia/depopulation, and cleaning. APHIS veterinarians conduct surveillance through the entire incident monitoring for disease spread. They will monitor for disease spread throughout the livestock population, and human population if a zoonotic disease is suspected. APHIS will also oversee the eradication of the disease, which may call for euthanasia of the animals. Euthanasia is only performed by trained teams with techniques which have been approved by the agricultural community and defined as humane. These humane options include narcotics, gas
asphyxiation, foam suffocation etc. Finally, APHIS will oversee the cleaning and disinfecting of equipment and personnel to prevent the spread of disease. These teams contain trained personnel with representatives from: veterinarian, epidemiology, environmental, and hazardous material teams (Moats 2007, 143).

As stated above, the initial response will be conducted by local authorities. These authorities will have the best understanding of the area and the local agricultural operations. However, in rural agricultural communities, the local first responders often lack funding and training to prepare themselves for an agricultural emergency. For example: volunteer fire departments usually have inconsistent training and older equipment which may not be adequate to handle a WMD attack on agriculture. While local authorities are a great asset in initial response, state and federal assistance will undoubtedly be necessary.

Because of the growing threat of agricultural incidents and the importance of the poultry industry in Rockingham County, this study will test the vulnerability of the industry in this county. This assessment will be conducted in three phases. The first phase will utilize a threat and vulnerability assessment of the poultry industry. Several processing plants and feed mills have been selected to conduct this assessment which was created by the U.S. Department of Justice (DOJ). In respect of security privacy, the names of the companies will not be used in this report. This assessment was intended specifically for chemical, biological, radiological, nuclear, and explosive (CBRNE) incidents, however this assessment will be adapted to consider all intentional hazards against the industry. The second phase will test the vulnerability of several grower’s (contracted by the companies tested in phase 1) operations and farms. Finally, a capability assessment will be conducted to
test the readiness of Rockingham County Fire and Rescue to respond to an agricultural incident.
Methods

Phase 1: Threat and Vulnerability Assessment - Industry

This assessment is borrowed from the U.S. Department of Justice (DOJ). The assessment consists of two areas for evaluation: threats and vulnerabilities. The threat assessment reviews intelligence information about individuals or groups which may pose a threat to a specified jurisdiction (Incident Command 2008, TAA19).

The threat assessment begins with the identification of Potential Threat Elements (PTEs). These PTEs are determined using a Department of Defense (DOD) threat analysis methodology and are defined by: “Any group or individual in which there are allegations or information indicating a possibility of the unlawful use of force or violence, specifically using CBRNE hazards, against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of a specific motivation or goal, possibly political or social in nature.” It is noted that CBRNE hazards are those which have been defined as Chemical, Biological, Radiological, Nuclear, or Explosives which have been, or may be, weaponized (Incident Command 2008, TAA18).

Four PTEs have been selected for this assessment. The first PTE is the People for the Ethical Treatment of Animals (PETA). This organization is very active in the animal agricultural industry, however is not deemed a violent threat. This PTE is included in the assessment as a baseline for comparison for our more violent organizations. The second PTE is the Animal Liberation Front (ALF). This too is an active organization in the animal agriculture industry; however they practice more violent activities and are considered a domestic terrorist. ALF is expected to be our highest risk PTE. The next PTE is Islamic extremism. Al Qaeda is the focus under this PTE and is defined as the international
terrorist. Finally, Disgruntled Employees are considered a threat to the agricultural industry. This PTE assumes no association with any other organization and serves as our lone offender. These four PTEs have been selected as representative of violent and non-violent entities both domestic and abroad.

An intelligence acquisition process is necessary to develop the PTEs. The US Department of Homeland Security (DHS) Incident Command: Capabilities Actions and Response Planning manual stresses the importance of this process as the foundation of this threat assessment. This manual recommends collection of law enforcement information and government/military intelligence for the development of the intelligence profile for each PTE. Due to the classified nature of much of this information, the intelligence gathering process for this assessment was conducted with collection of research, primary literature, and news sources readily available to the public.

The Department of Justice Assessment and Strategy Development Tool Kit identifies five threat factors (Table 2) which are used to rate each PTE. The DOJ assessment looks at vulnerabilities specifically related to intentional incidents involving CBRNE materials. While this assessment does acknowledge CBRNE attacks in an agricultural setting, these threats are analyzed as they relate to all-hazards. (Incident Command 2008, TAA19-20).
Table 2. Potential Threat Element Factors (Incident Command 2008, TAA19-20)

<table>
<thead>
<tr>
<th>Existence</th>
<th>The PTE is present in the specified jurisdiction, or has the potential for easy access to the jurisdiction. The criminal/terrorist element must exist with allegations that this PTE may unlawfully use force or violence against people or property.</th>
</tr>
</thead>
<tbody>
<tr>
<td>History</td>
<td>The PTE has a violent criminal history or terrorist activity.</td>
</tr>
<tr>
<td>Intentions</td>
<td>The PTE has credible sources which report their intentions to use threats, force, or violent acts against the jurisdiction.</td>
</tr>
<tr>
<td>CBRNE Capability</td>
<td>The PTE has credible sources which report they have the training, skills, and financial means or access to resources necessary to develop or purchase CBRNE hazards. This capability is specified in which they possess a quantity or potency sufficient to produce mass casualties.</td>
</tr>
<tr>
<td>Targeting</td>
<td>The PTE has credible sources which report its preparations for criminal activity directed at targets identified within the jurisdiction.</td>
</tr>
</tbody>
</table>

Each threat factor carries a specific score if the PTE meets the requirements for that category. These scores are independent of severity for each factor; either the PTE receives the full score or no score at all. The sum of all of the threat factor scores gives the overall Threat Level. The following values will be assigned to each PTE if they meet the requirements as defined above in each category: existence-1; history-1; intention-2; capability-2; targeting-4. The unique category value will be assigned if the PTE meets the threat factor and a 0 will be assigned if they do not. The threat level is then calculated on a scale of 1-10 with 10 being the highest threat level. The highest Threat Level of all the PTEs will serve as the Jurisdiction Threat Level. This value will then be used in the vulnerability part of the assessment.

Once the PTEs are defined and a Jurisdiction Threat Level is established, a vulnerability assessment will be conducted for the jurisdiction. This vulnerability assessment will look at the target attractiveness, its vulnerability, and the potential impact on the community if it was attacked. Seven areas will be reviewed in the vulnerability assessment in
accordance to the US DOJ assessment: Level of Visibility, Criticality of Target Site, Value of Target, Access to Target, Target Threat of Hazard, Target Site Population Capacity, and the Potential for Mass Casualties. Each facility will receive a score in each of these categories as described below (Incident Command 2008, TA20-21).

**Level of Visibility.** This vulnerability category addresses how well known the target is in the community (Table 3). The target may be classified (essentially invisible to general public) or may be a well known. A PTE will be able to slide into an open, well-known building better than one whose identity is classified. The scoring is defined by the following (Incident Command 2008, TA21).

<table>
<thead>
<tr>
<th>Level of Visibility</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Invisible (location classified)</td>
<td>0</td>
</tr>
<tr>
<td>Very Low Visibility (probably not aware of existence)</td>
<td>1</td>
</tr>
<tr>
<td>Low Visibility (existence is probably not well known)</td>
<td>2</td>
</tr>
<tr>
<td>Medium Visibility (existence is probably known)</td>
<td>3</td>
</tr>
<tr>
<td>High Visibility (existence is well known)</td>
<td>4</td>
</tr>
<tr>
<td>Very High Visibility (existence is obvious)</td>
<td>5</td>
</tr>
</tbody>
</table>

**Criticality of Target Site.** This criterion measures the impact of loss to the community if the target were attacked (Table 4). Because these poultry facilities are large employers in Rockingham County the loss on the local community would be greater than that on a national level. This area takes into account the targets usefulness to the community, economy, and government. The scoring is defined by the following (Incident Command 2008, TA22):
Table 4. Vulnerability Assessment: Criticality Factors
(Incident Command 2008, TA22).

<table>
<thead>
<tr>
<th>Criticality of Target Site</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Describes the asset’s usefulness to the population, economy, or government and whether the asset is critical to the community of basic community infrastructure and the impact of loss</td>
<td></td>
</tr>
<tr>
<td>Not Useful (Loss would have no impact on community)</td>
<td>0</td>
</tr>
<tr>
<td>Somewhat Useful (Loss would be noticeable but have little impact on community)</td>
<td>1</td>
</tr>
<tr>
<td>Moderately Useful (Loss would inconvenience some but have a short recovery)</td>
<td>2</td>
</tr>
<tr>
<td>Significantly Useful (Loss would result in economic damages, loss of life, or a long recovery period)</td>
<td>3</td>
</tr>
<tr>
<td>Highly Useful (Loss would result in severe damage to community, a longer recovery period, and/or large financial losses; large impact on population)</td>
<td>4</td>
</tr>
<tr>
<td>Critical (Loss would be devastating to community; a long recovery period; severe impact on population)</td>
<td>5</td>
</tr>
</tbody>
</table>

Value of the Target. This criterion considers how attractive a target is to a PTE (Table 5). This is determined by the facility’s function, symbolic importance, or both. The monetary value of the target can also increase its attractiveness to a PTE. The more important a facility is, the more attractive it is to the PTE. The more attractive the facility is the higher rating it should receive. The scoring is defined by the following (Incident Command 2008, TA23):

Table 5. Vulnerability Assessment: Target Value (Incident Command 2008, TA23).

<table>
<thead>
<tr>
<th>Value of Target</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evaluates the usefulness of the target to serve the means of the potential threat elements identified in the threat assessment</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>0</td>
</tr>
<tr>
<td>Very Low</td>
<td>1</td>
</tr>
<tr>
<td>Low</td>
<td>2</td>
</tr>
<tr>
<td>Medium</td>
<td>3</td>
</tr>
<tr>
<td>High</td>
<td>4</td>
</tr>
<tr>
<td>Very High Visibility</td>
<td>5</td>
</tr>
</tbody>
</table>
**Access to the Target.** This criterion looks at several security features of the facility that may slow or hinder a PTE’s attack (Table 6). It looks at fencing, physical security, controlled facility access, protected air sources, and the distance at which visitors can park from the building. All of these factors affect the PTE’s ease of carrying out an attack. The scoring is defined by the following (Incident Command 2008, TA25):

**Table 6. Vulnerability Assessment: Target Access (Incident Command 2008, TA25).**

<table>
<thead>
<tr>
<th>Access to the Target</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fenced, guarded, protected air; controlled access by pass only; no vehicle parking within 125 feet</td>
<td>0</td>
</tr>
<tr>
<td>Guarded/protected air; controlled access of visitors and non-staff personnel; no parking within 125 feet</td>
<td>1</td>
</tr>
<tr>
<td>Protected air; controlled access of visitors and non-staff; no unauthorized vehicle parking within 125 feet</td>
<td>2</td>
</tr>
<tr>
<td>Unprotected air; Controlled access of visitors; no unauthorized vehicle parking within 125 feet</td>
<td>3</td>
</tr>
<tr>
<td>Unprotected air; open access to all personnel; no unauthorized parking within 125 feet</td>
<td>4</td>
</tr>
<tr>
<td>Unprotected air; open access to all personnel; vehicle parking within 125 feet</td>
<td>5</td>
</tr>
</tbody>
</table>

**Target Threat of Hazard.** This criterion looks specifically at the presence of CBRNE materials at the facility (Table 7). It determines if CBRNE materials are on location, if their access is controlled, and if there is enough that could be used in attack. PTEs will evaluate the presence of CBRNE materials on location to assist in their attack. These materials could be used as the primary weapon or used as an auxiliary weapon to their initial attack. The scoring is defined by the following (Incident Command 2008, TA26):
Table 7. Vulnerability Assessment: Target CBRNE Threat (Incident Command 2008, TA26).

<table>
<thead>
<tr>
<th>Target Threat of Hazard</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assesses the presence of CBRNE materials in quantities that could be useful as weapons if they came under control of the potential threat elements</td>
<td></td>
</tr>
<tr>
<td>No CBRNE material present</td>
<td>0</td>
</tr>
<tr>
<td>CBRNE material present moderate quantities under positive control in secure locations</td>
<td>1</td>
</tr>
<tr>
<td>CBRNE materials present in moderate quantities and controlled</td>
<td>2</td>
</tr>
<tr>
<td>Major concentrations of CBRNE materials that have established control features and are secured in the site</td>
<td>3</td>
</tr>
<tr>
<td>Major concentrations of CBRNE materials that have moderate control</td>
<td>4</td>
</tr>
<tr>
<td>Major concentrations of CBRNE materials accessible to non-staff personnel</td>
<td>5</td>
</tr>
</tbody>
</table>

**Target Site Population Capacity.** This criterion begins to look at the direct impact on the company and its employees if attacked (Table 8). A PTE will look at facility capacity when determining if they will attack. PTEs prefer facilities with a large number of victims, so a higher target population capacity receives a higher rating. The scoring is defined by the following (Incident Command 2008, TA27):


<table>
<thead>
<tr>
<th>Target Site Population Capacity</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum number of individuals at the potential target site at any given time</td>
<td></td>
</tr>
<tr>
<td>0 to 100</td>
<td>0</td>
</tr>
<tr>
<td>101 to 250</td>
<td>1</td>
</tr>
<tr>
<td>251 to 500</td>
<td>2</td>
</tr>
<tr>
<td>501 to 1,000</td>
<td>3</td>
</tr>
<tr>
<td>1,001 to 5,000</td>
<td>4</td>
</tr>
<tr>
<td>Greater than 5,000</td>
<td>5</td>
</tr>
</tbody>
</table>

**Potential for Mass Casualty.** This criterion looks at the direct impact on the community (Table 9). It evaluates the facility location in relation to the existing population in the community. Several factors are involved when looking at the destruction path from a
facility that is attacked. It is good to have an understanding of the population number of the surrounding area to understand the potential for mass casualty if a large CBRNE weapon is used. The scoring is defined by the following (Incident Command 2008, TA28):


<table>
<thead>
<tr>
<th>Potential for Mass Casualty</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 100</td>
<td>0</td>
</tr>
<tr>
<td>101 to 250</td>
<td>1</td>
</tr>
<tr>
<td>251 to 500</td>
<td>2</td>
</tr>
<tr>
<td>501 to 1,000</td>
<td>3</td>
</tr>
<tr>
<td>1,001 to 5,000</td>
<td>4</td>
</tr>
<tr>
<td>Greater than 5,000</td>
<td>5</td>
</tr>
</tbody>
</table>

Five facilities in Rockingham County have been selected for this vulnerability assessment. For industry privacy and security these facilities will not be named, nor will their location be disclosed. First, two poultry processing plants have been selected. These facilities will be referred to as Processing Plant 1 and 2 (P1, P2). Three feed mills have also been selected. These facilities will be referred to as Feed Mill 1, 2, and 3 (F1, F2, F3).

Each facility will receive a total vulnerability rating score from 0-35. A facility which is the least vulnerable will score 0 and the facility which is the most vulnerable will score 35. A Target Vulnerability Rating conversion will reduce some of the subjectivity from the vulnerability assessment process (Table 10). The vulnerability score will correspond to a Target Vulnerability Rating as defined by the following (Incident Command 2008, TA40):
Table 10. Vulnerability Assessment: Target Vulnerability Rating Scale (Incident Command 2008, TA40).

<table>
<thead>
<tr>
<th>Target Vulnerability Assessment Key</th>
<th>Target Vulnerability Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL SCORE</td>
<td>RATING VALUE</td>
</tr>
<tr>
<td>0 to 2</td>
<td>1</td>
</tr>
<tr>
<td>3 to 5</td>
<td>2</td>
</tr>
<tr>
<td>6 to 8</td>
<td>3</td>
</tr>
<tr>
<td>9 to 11</td>
<td>4</td>
</tr>
<tr>
<td>12 to 14</td>
<td>5</td>
</tr>
<tr>
<td>15 to 17</td>
<td>6</td>
</tr>
<tr>
<td>18 to 20</td>
<td>7</td>
</tr>
<tr>
<td>21 to 23</td>
<td>8</td>
</tr>
<tr>
<td>24 to 26</td>
<td>9</td>
</tr>
<tr>
<td>27 to 29</td>
<td>10</td>
</tr>
<tr>
<td>30 to 32</td>
<td>11</td>
</tr>
<tr>
<td>33 to 35</td>
<td>12</td>
</tr>
</tbody>
</table>

The highest Individual Target Vulnerability Rating assessed will become the Jurisdiction Vulnerability Rating. This rating is based on of the most vulnerable facility as the “worst case scenario.” Finally, the Jurisdiction Risk Rating is determined using this Jurisdiction Vulnerability Rating and the Jurisdiction Threat Rating from before (Table 11) (Incident Command 2008, TA41-TA42):
Table 11. Jurisdiction Vulnerability Rating Scoring (Incident Command 2008, TA42)

<table>
<thead>
<tr>
<th>Jurisdiction Threat Rating</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

This risk rating is then characterized by category. The potential categories are: very low, low, medium, high, and very high (Table 12). These categories coincide with the U.S. Department of Homeland Security (DHS) National Advisory system (Figure 9). The association of the Jurisdiction Risk Rating and DHS category are as follows (Incident Command 2008, TA43):


<table>
<thead>
<tr>
<th>Jurisdiction Risk Rating</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-5</td>
<td>Very Low</td>
</tr>
<tr>
<td>6-10</td>
<td>Low</td>
</tr>
<tr>
<td>11-15</td>
<td>Medium</td>
</tr>
<tr>
<td>16-20</td>
<td>High</td>
</tr>
<tr>
<td>21-22</td>
<td>Very High</td>
</tr>
</tbody>
</table>

Assessment Example. This assessment can be used for nearly any type of facility. For example, this vulnerability assessment may be used to test the vulnerability of a major city subway system. It may have been previously determined that terrorist use of explosives is the top threat on this system today. In this example we may have determined a score of
“8” for this PTE to develop our Jurisdiction Threat Rating. After the vulnerability assessment we may have determined the Target Vulnerability Rating of this subway system to be a “20” after assessing each of the factors listed above. To reduce subjectivity of the assessment, Target Vulnerability Rating is converted to a “7” (Table 10). This value is used, along with the Jurisdiction Threat Rating to develop our Jurisdiction Vulnerability Rating of “15” (Table 11). Finally, this value coordinates with a “medium” Jurisdiction Risk Rating (Table 12). This means that this subway system is of medium risk of an attack involving explosives.

**Phase 2: Vulnerability Assessment- Farms**

The National Defense University (NDU) identifies five areas which are vulnerable to agroterrorism. These five areas include field crops, farm animals, food items in the processing and distribution chain, market-ready foods at the wholesale or retail level, and agricultural and food processing facilities (NCBRT 2007, 3-3). This study does not focus on crops, and retail level production is not considered unique to Rockingham County or this research. Phase 1 examined the processing facilities and one of the sectors of the distribution chain. In Phase 2 the vulnerability assessment is expanded to the last area of vulnerability; the birds in the grow process.

To test the vulnerability of farms the CARVER + Shock program (FDA and APHIS) will be used. CARVER is an assessment tool that measures Criticality, Accessibility, Recuperability, Vulnerability, Effect, and Recognizability of the agricultural system (NCBRT 2007, 4-28). The assessment scores will be provided as the following: Criticality- estimate of economic damage an attack would cause to your operation; Accessibility- ease of which an attacker could reach a process and contaminate it; Recuperability- estimate of the amount of
time before sales from your operation can return to normal after attack; Vulnerability-likelihood that an attack would achieve the attacker’s immediate goals. Shock is the factor of agricultural incidents which encompasses the health, economic, and psychological impacts of an attack. In other words, Shock looks at the physical and direct impact of the public (NCBRT 2007, 5-11). This program was designed to assess the potential for a successful terrorist attack on farms and where vulnerabilities exist to lead to terrorism (FDA 2009, 3).

Three farms were selected for this part of the assessment. Each farm is operated by a different grower and follows oversight from one of two poultry companies associated with the facilities examined in Phase 1. Farm visits were conducted at each of these farms. Both a subjective and objective assessment was conducted on-site. In the subjective assessment the evaluator examined personnel, operation, access, visibility, and control issues which may affect the vulnerability of the farm. The farm is also evaluated for assessment factors which will be used by the CARVER program. Operation maps of the farms were generated including: birds, buildings, equipment, feed, water supply, chemicals, storage, and farm access. This information is then used to generate an operation map in the CARVER program (Figures 3-5).
Figure 3: Farm A CARVER Operation Map.

Figure 4: Farm B CARVER Operation Map.
The program then produces a list of questions based on this operational map created by the user. For Farm A these questions were answered primarily by the grower (Appendix B). The questionnaires for Farms B and C were completed by the evaluator due to issues reaching agreement with the industry. Only those results which relate to an attack involving a “highly contagious disease” which affects the entire flock are used. The assessment generated by CARVER was used to make recommendations on how to decrease vulnerability at the farm level.

**Phase 3: Fire Rescue Capabilities Assessment**

The final phase of this study involves a capability and needs assessment of the fire rescue system in Rockingham County. The capability assessment evaluates the ability of a jurisdiction to handle an agricultural incident. The needs assessment uses data from this capability assessment to determine where the jurisdiction needs personnel, equipment, training, or other support to increase their capability to handle attack (NCBRT 2007, 5-12).
Fire rescue was selected for this assessment because they can expect extensive involvement in the event of an agricultural incident. Fire rescue responsibilities may include establishing and maintaining an Incident Command System (ICS), working in Personal Protective Equipment (PPE) around animals, agent identification, decontamination, animal euthanasia, and carcass disposal. Fire rescue is often recognized as a “catch all” because they assume responsibility for most of the non-traditional emergency incidents. For this reason it is imperative that the capabilities of fire rescue to respond to agricultural incidents be examined.

An assessment was generated in collaboration with Chief Robbie Symons for fire rescue and distributed to all of the Fire Captains in the county. This assessment consists of two parts: a self preparedness declaration and a basic agricultural incident knowledge assessment (Appendix C). The self assessment gives the Fire Captains the opportunity to evaluate their own personal level of preparedness in regards to incidents involving agriculture. Additionally, the captains have the opportunity to request any additional training or equipment, or any other concerns they have which may affect or improve their preparedness level.

The second part of this survey is a basic agriculture knowledge assessment. This short assessment asks questions relating specifically to fire rescue knowledge of agricultural emergencies and their responsibilities when responding. This assessment was used to determine the knowledge level of responders and to evaluate training needs in the future.
Results

Phase 1: Threat and Vulnerability Assessment- Industry

Five threat factors were analyzed for each Potential Threat Element (PTE). Each PTE was scored individually with the highest possible score (10) as the highest threat level. ALF received the highest score of the four PTEs based on these threat factors (Table 13).

Table 13. PTE Threat Factor Results.

<table>
<thead>
<tr>
<th>PTE</th>
<th>Existence (1)</th>
<th>Violent History (1)</th>
<th>Intentions (2)</th>
<th>CBRNE Capability (2)</th>
<th>Targeting (4)</th>
<th>Threat Level (1-10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PETA</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>ALF</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>Islamic Extremist</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Disgruntled Employee</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
</tbody>
</table>

Each facility was assessed for seven areas of vulnerability. The facilities with the highest total score are deemed most vulnerable. According to these vulnerability factors P2 is the most vulnerable facility (Table 14).

Table 14. Individual Target Vulnerability Scores.

<table>
<thead>
<tr>
<th>Target</th>
<th>Visibility</th>
<th>Criticality</th>
<th>Value</th>
<th>Access</th>
<th>Target Hazard</th>
<th>Site Population</th>
<th>Mass Casualty</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>5</td>
<td>24</td>
</tr>
<tr>
<td>P2</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>25</td>
</tr>
<tr>
<td>F1</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>16</td>
</tr>
<tr>
<td>F2</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>15</td>
</tr>
<tr>
<td>F3</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>14</td>
</tr>
</tbody>
</table>

The Target Vulnerability Ratings were determined using Table 10. In this table the Total Vulnerability Score for each facility corresponds to a Target Vulnerability Rating. A Target Vulnerability Rating was provided for each facility (Table 15).
Table 15. Individual Target Vulnerability Ratings.

<table>
<thead>
<tr>
<th>Target</th>
<th>Total Vulnerability Score</th>
<th>Target Vulnerability Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>24</td>
<td>9</td>
</tr>
<tr>
<td>P2</td>
<td>25</td>
<td>9</td>
</tr>
<tr>
<td>F1</td>
<td>16</td>
<td>6</td>
</tr>
<tr>
<td>F2</td>
<td>15</td>
<td>6</td>
</tr>
<tr>
<td>F3</td>
<td>14</td>
<td>5</td>
</tr>
</tbody>
</table>

The highest Target Vulnerability Rating will be added to the Jurisdiction Threat Rating to develop The Jurisdiction Risk Rating. This will be developed further in the discussion section.

**Phase 2: Vulnerability Assessment- Farms**

Farm A. The first poultry farm was a smaller, two house operation in Broadway, VA. The poultry operation is completely surrounded by a wire fence. The entryway to the operation is shared by a neighbor farm, but there are also two gates which must be opened for one to access this operation by vehicle. All company and contracted vehicles that enter the farm either self-disinfect or are disinfected before entering the operation. The drivers of these trucks are not allowed in the chicken house at any time. The grower limits access into the chicken house to himself, or those who are approved to enter after washing and donning a disposable suit. All operations are dictated and overseen by representatives from the parent company (Farm A Grower 2011).

This grower processes 108,000 chickens a year. These chickens are delivered when they are one day old and typically are shipped out of the grower’s operation after five weeks. Individual culls, or sick birds, are sacrificed unless the entire population gets sick. The birds that die before week five are composted in the litter building. This grower only processes
broilers - no breeding or laying hens. These birds are fed solid agar (corn and soybean mill) which are provided by the company. Several feed storage containers are onsite. Feed is delivered to these containers by the parent company and controlled on a computer based system which monitors feed consumption in the operation. A water source is adjacent to the chicken house. The water source is connected to a well which is several hundred yards from the poultry operation (Farm A Grower 2011).

Farm chemicals, equipment, and fuel are stored onsite. A litter storage shed is adjacent to the first chicken house. This shed stores all of the litter that will be used in the chicken houses. The opposite end of this building is also used for composting. When the grower finds a dead bird he will turn these birds into mounds of old litter to compost. Next to the litter storage building is a covered area where the grower stores his tractors and other farm equipment. Adjacent to the equipment area is a shed which contains small quantities of pesticide and herbicide. Several propane tanks are located throughout the operation. The grower declares up to 4,000 gallons of propane may be on site at any time (Farm A Grower 2011).
Farm A Carver. The following graphs were automatically generated by the CARVER program based off a 218 questionnaire completed by the Farm A Grower (Figure 6).

Figure 6. Graphical representation of the attractiveness of each item in the operation for an attack involving a highly contagious disease which infects the entire population. The blue bars represent importance (criticality + recuperability) and the red bars represent ease of attack (accessibility + vulnerability).

Farm B. This farm is in Hinton, VA and is well protected from the public eye; the property is not visible from the public road. A sign is located along the road designating the grower’s company affiliation. This two-house poultry operation is located at the end of a driveway atop a small hill; the driveway is shared with an adjacent farm which is visible from the roadway. To enter the poultry farm one must pass through fencing which has a sign denoting the “disease free area.” As with most poultry operations, the grower is only responsible for providing housing, food, and water for the chickens. All other operations are dictated by the parent company (Farm B Grower 2011).
This grower runs a 54 day cycle with one new flock of broilers per cycle. This grower receives chicks hours after their birth and keeps them on site for 34-36 days. On average, 10-120 culls are removed from the operation each day. Culls are composted in an outdoor, open shelter exclusive for carcass composting. The grower has never had a need for veterinary services and could not comment on how this issue would be handled by the company. Feed is delivered and controlled by the parent company. There is one well on-site which provides water via an automated system for the birds (Farm B Grower 2011).

The only chemical that is stored in bulk on-site is a poultry litter treatment. This is a dry chemical stored in 50 pound bags which helps reduce ammonia levels in the litter. On site visit the grower had 450 pounds stored in the chicken house, and claims to have up to 1,500 lbs stored at any given time. Two tanks of liquid propane are located between the two, 2000 sq ft chicken houses. These 500 gallon tanks are filled to 80% capacity to leave room for expansion.

**Farm B Carver.** The following charts were generated based off a 188 questionnaire developed through the CARVER program after visiting and speaking with the Farm B Grower. This grower choose not to answer the questionnaire; questions were filled out by the surveyor (Figure 7).
Figure 7. Graphical representation of the attractiveness of each item in the operation for an attack involving a highly contagious disease which infects the entire population. The blue bars represent importance (criticality + recuperability) and the red bars represent ease of attack (accessibility + vulnerability).

**Farm C.** The final poultry farm visited was in Singers Glen, VA and is the largest of the three operations. While larger, this operation proved to be very similar to the others. This grower has two single story chicken houses and a one two story chicken house in operation. This grower also has another single story chicken house under construction. This operation is in a more rural area of the county and is completely surrounded by a wire fence. The farm is located along a county road with strong visibility from the roadway. The grower also owns a house on the property which he rents out. The grower does not let anyone in his operation other than his family, the parent company, and approved contractors. Only the grower and his family are allowed interaction with the birds during grow operations (Farm C Grower 2011).

Currently this grower produces about 385,000 adult birds a year with that number expected to grow when the new chicken houses is operational. This grower also receives birds at one day old and keeps them approximately 4-6 weeks. Culls are removed daily from the chicken houses and veterinary services will only be required in the event of an entire
population illness. This grower practices onsite composting for culls. Composting is conducted in the litter barn with waste litter is used for these composting operations. This grower only raises broilers which are fed solid agar and watered by an on-site well which is shared by the rental house on property. Feed, water, and ventilation are controlled by a computer system installed by the parent company. A litter broker will clean waste litter directly from the chicken houses to be taken to an offsite location. No waste, other than that used to compost, is stored on site (Farm C Grower 2011).

This grower does not store chemicals or litter on location. For financial reasons, the grower only purchases these items as needed in a quantity required for current operations. The litter barn stores fresh litter, waste litter (compost pile), and a farm tractor. A separate building contains a 100 KW generator with 27 gallons of fuel for approximately 1,650 hours of power to all chicken houses. Several propane tanks are located adjacent to the chicken houses. There may be up to 3,000 gallons of propane on site at any given time (Farm C Grower 2011).

**Farm C Carver.** The following charts were generated based off a 163 questionnaire developed through the CARVER program after visiting and speaking with the Farm C Grower. This grower choose not to answer the questionnaire; questions were filled out by the surveyor (Figure 8).
Phase 3: Fire Rescue Capabilities Assessment

The survey distributed to fire rescue Captains was split into two categories: agricultural incident preparedness and agricultural incident knowledge. The first question in the agricultural incident preparedness survey asked what the crew felt their average level of agricultural incident training was. Of the five crews surveyed, two declared no agriculture training, one with awareness training, and two with technician level training. When asked how often crews trained for agriculture incidents one crew states they train annually, and the rest of the crews state they never participate in agriculture training. The crew that claims to train annually states that this training is merely an informal discussion. The next question asked if crews had the equipment and/or training to handle agriculture incidents. Most crews didn’t feel they were equipped or trained to handle these incidents. One crew felt they have the training but no equipment, and one crew felt they had the equipment but no training. One crew believes they have a moderate understanding of their responsibilities at an agriculture incident but the rest of the crews declare they have little or no understanding.
of their responsibilities. All crews stated they were not prepared to handle an agriculture incident themselves and would benefit from a unified command structure. They feel a unified command structure could better help them understand their expectations and responsibilities at an agricultural incident. Crews feel they would be better prepared to handle these incidents if they had at least awareness level training. They state their greatest inadequacy is lack of training to understand what qualifies an agricultural incident as terrorism, and how they are supposed to respond. The final question asked Captains to put their crew in a preparedness level category. One Captain placed his crew in the awareness category and the rest placed themselves in the limited capability category.

The second part of this capability assessment involved a basic knowledge evaluation of the crews. In this assessment 29 points were available. All crews completed this assessment and the average score was a 21 out of 29 points which results in a 73% accuracy. For fairness and confidentiality of crews, individual scores are not reported. The questions that were most missed are as follows:

- Question 1: All crews understood it would be their responsibility to establish and maintain ICS. Most crews also understood they would be required to decontaminate people, animals, and equipment. Some crews understood that they would be required to work in personal protective equipment (PPE) and identify unknown agents. However, no crews understood that they may be used for animal euthanasia and carcass disposal.

- Question 2: Most crews did not know that explosives are considered a weapon of mass destruction.
• Question 3: Only two crews understood that FBI always has primary investigative authority over incidents of suspected terrorism.

• Question 4: Two crews understood that one entrance/exit is desirable to monitor what moves on and off the farm. The rest of the crews believed separate entrances and exits are more important to prevent cross contamination.

• Question 19: Only two crews recognized the farm-to-fork theory which means that any of the selections provided could be considered an agricultural incident.
Discussion

Phase 1: Threat and Vulnerability Assessment - Industry

Threats

The first step of the threat and vulnerability assessment was to develop a list of potential threat elements. The PTEs selected are those organizations which were deemed a potential threat to the poultry industry. The potential threat elements selected were: People of the Ethical Treatment of Animals (PETA), Animal Liberation Front (ALF), Islamic Extremists (e.g. Al Qaeda), and Disgruntled Employees.

PETA. PETA is the largest animal rights organization in the world. PETA identifies four areas of focus on which they observe unethical treatment of animals on factory farms, clothing trade, laboratories, and the entertainment industry (About PETA 2010). According to the PETA website they “maintain a creed of nonviolence and does not advocate actions in which anyone, human or nonhuman, is injured” (Does PETA Advocate Violence? 2010). In the existence category it was determined that PETA does have access to this jurisdiction; however, they have no intentions of unlawful use of force or violence. Other than violent individuals whom associated with PETA, the organization has no violent history. PETA also shows no intentions or targeting as they have no documented terrorist intentions or activity against the poultry industry. Finally, PETA has no capability or intentions to acquire and use CBRNE. PETA is observed as an activist in the poultry industry but is not observed as a significant PTE in this assessment thus a score of 0.

ALF. The Animal Liberation Front is an organization similar to PETA whose primary goal is to reduce animal suffering. Unlike PETA, ALF is known to use violence against civilian targets to further their objective which classifies them as a domestic terrorist
organization (Reichard 2007, 22). This justifies their existence and violent history. ALF alludes to their intentions through statements released by their Press Officer Lindy Greene. In a press release on their website Greene States “Even the ALF… have recently employed arson or explosives in the commission of underground direct actions.” Greene states that ALF has a moral obligation to use violence, as a last resort, in the protection of animal interests. She notes that as a society we are not hesitant to use violence to protect humans, and it is the duty of ALF to do the same for animals. ALF has also been reported to send members to infiltrate laboratories and animal processing facilities. By employing themselves in these facilities they are able to get insider information and develop plans for future actions (Leader 2003). ALF does not consider themselves terrorists; rather they define themselves as “visionaries and freedom fighters” (Greene 2010). Greene’s press statements are a self-admittance to their intentional threat and use of violence. Her statements also support multiple reports of ALF using, or intending to use, explosive and incendiary weapons. Also, similar to PETA, ALF targets those who, in their opinion, abuse animals for food, clothing, research etc. However, where PETA received a 0 in this category for lack of violent or terrorist activities, ALF is an identified domestic terrorist and has declared they will use violence in furtherance of their objective. ALF has gone public with their anger towards the poultry industry. In January 2007 a large fire spread through the Tegel poultry processing plant in Hornby, New Zealand. While ALF did not take responsibility for this fire, they confessed that they were “overjoyed” with the incident. They quickly posted a release on their website which states that ALF is delighted these facilities were destroyed and that no more chickens will see their death in the near future. ALF describes a process that exposes birds to toxic fumes, waste, and abuse from workers. The final destination of these birds involves their throats being slit and their bodies dropped in scalding hot water to remove
their feathers. ALF describes these conditions to declare war on the poultry industry to end bird suffering (Chicken Factory Burned 2010). This is one example of ALF’s obvious targeting of the poultry industry giving ALF a total score of 10.

In a discussion with Lt. Jeff Rhodes (local poultry farmer and Asst. Fire Marshal with the City of Harrisonburg) he notes that domestic terrorism is of increasing importance in the security of our community at the local level. He discussed ELF (Earth Liberation Front- a close relative of ALF) and ALF as being genuine, documented threats to the Rockingham County community. He affirmed that reliable sources have reported members of both organizations present in Rockingham County. In his opinion, these organizations are the largest threat to the poultry industry- much more so than international terrorist organizations (Rhodes 2011).

ALF is related to a sister organization known as the Earth Liberation Front (ELF). The two organizations are known as highly active domestic terrorists. According to the FBI, these two organizations have been responsible for 600 attacks which cause $43 million in damages (Leader 2003). ALF and ELF follow a principle called “leaderless resistance.” This principal was developed by the Ku Klux Klan (KKK) and Aryan Nations as a technique where terrorist groups can carry out violent acts while reducing the involvement of law enforcement. These groups are able to effectively resist law enforcement involvement by organizing with no central authority. With no central authority it is much harder to track those responsible for their violent actions. On ELF’s website they explain the importance of this theory to their operation: “By operating in cells (small groups that consist of one to several people), the security of group members is maintained. Each cell is anonymous not only to the public but also to one another. This decentralized structure helps keep activists
out of jail and free to continue conducting actions.” With many domestic terrorists employing this practice, and many targeting those who work in the ecosystem and agriculture, domestic terrorists are highly dangerous and very difficult to catch (Leader 2003).

Islamic Extremists. Islamic extremism is one of our most dangerous international terrorist threats to the United States. Islamic extremist groups dedicate their cause to Jihad, or the holy war which they believe to be the cause of Islam. Al Qaeda is on the forefront of Islamic extremist terrorism with estimates of 15,000 known members worldwide. Al Qaeda, under direction of Osama Bin Laden, has taken responsibility for a number of terrorist attacks on the United States, most notably the attack on September 11th, 2001. Islamic extremism (e.g. Al Qaeda) has an overwhelming existence and violent history (Encyclopedia of Bioterrorism Defense 2005, 17).

Al Qaeda’s past operations show their modus operandi to be the use of conventional weapons on high profile targets. However, vulnerabilities exist in targets with a lower profile whose attractiveness to terrorist organizations is increasing. These targets (critical infrastructure sectors including agriculture and food) may be part of a shift in operations (Al Qaeda: An Organization to be Reckoned With 2006, 37).

There are several arguments for why Al Qaeda may use agriculture for bioterrorism. First, agriculture is an easier target for bioterrorism, and if successful, Al Qaeda would get much attention for the first successful bioterrorism attack on U.S. soil. Al Qaeda is also known as an apolitical terrorist organization. This means their primary motive is to destroy their adversaries through a host of methods including killing its citizens and destroying its infrastructure. As an apolitical terrorist organization, Al Qaeda has shown definite interest in methods of attack which destroy a nation’s infrastructure. As discussed a vast economic
impact is likely with an agriculture attack. Al Qaeda would seek this economic impact as part of their larger scheme to destroy the infrastructure of the United States. “It is very important to concentrate on hitting the American economy with every available tool… the economy is the base of its military power… The United States has a great economy, but it is fragile” –Osama Bin Laden (Ungerer 2006, 147). Troops in Afghanistan have also located documents from which Al Qaeda discuss agriculture as a potential target (NCBRT 2007, 4-4). Sources are confident that agriculture is one of the potential future targets of Al Qaeda (Encyclopedia of Bioterrorism Defense 2005, 14).

As stated above, Al Qaeda has an extensive history of use of conventional weapons (explosives and incendiaries). Rumors are emerging that Al Qaeda is now expanding its weapon research to chemical, biological, and radiological type weapons. The Al Qaeda training manual has no specific instructions for the production and use of such weapons. The only reference in the manual is on the extrication process of the toxins such as Ricin and Abrin. Additionally, there have been several reports (journalists and other less-credible sources) of Al Qaeda interest in CBRNE type weapons; none of which have been confirmed by credible government or military sources. One incident was noted by General Richard Meyers, militarily spokesperson in Afghanistan. He reported in March 2002 that U.S. forces had discovered what they believed to be an amateur bioweapons laboratory. There were traces of Bacillus anthracis (anthrax bacterium) and ricin toxin in several hideouts known to be inhabited by Al Qaeda. They reported the amounts which were detected were so minimal that there was no threat of a major bioweapon production. While credible sources report that Al Qaeda has interest in acquiring WMD capability, they have not reported any activity of major concern to date (Encyclopedia of Bioterrorism Defense 2005, 19-20).
That being said, Al Qaeda does have an extensive history of a CBRNE weapon: conventional explosives. Al Qaeda has taken responsibility for at least 15 attacks involving explosives since 1993. Some of their more well known attacks on include: 1993- bombing of the World Trade Center (New York, NY, USA) killing six; 2000- bombing of the USS Cole (Port of Aden, Yemen) killing seventeen; 2002- vehicle bomb near U.S. Consulate (Karachi, Pakistan) killing eleven; and the 2003-truck bombing of UN Headquarters (Baghdad, Iraq) killing 23.

Al Qaeda likely views agriculture to be a good target, and may be in the process of developing weapons and plans to conduct an attack. However, no overwhelming evidence (written plans, surveillance, drawings etc.) can be found from credible sources to prove that Al Qaeda is actively targeting agriculture. Military intelligence has not discovered any detailed plans or information sensitive to agriculture within Al Qaeda. This lack of credible evidence of these activities shows no agricultural targeting. Islamic Extremism receives a total score of 6.

Disgruntled Employee. Disgruntled Employees are those who may still be employed, or have been recently released, and hold some vendetta against the agricultural facility that employed them. While the occurrences are low, Disgruntled Employees have attacked the agricultural sector in the past which gives them a low score for existence and history. In 1996 a disgruntled laboratory employee intentionally introduced *Shigella dysenteria* infecting twelve people (Terrorist Threat to Food 2002, 5). In 2004 nearly 100 people in Michigan were affected by nicotine poisoning from eating ground beef from which a Disgruntled Employee had poisoned (Nicotine Poisoning After Ingestion of Contaminated Ground Beef 2003). Finally, in the early 2000’s on a poultry farm in McGaheysville, VA, a
recently fired employee dumped 5 gallons diesel fuel into the water source for chickens. That water source is still not acceptable for use today in poultry operations (Farm A Grower 2011).

With low occurrence of Disgruntled Employee actions (when compared to our terrorist organizations) there is not much credible evidence of overwhelming intentions or targeting from Disgruntled Employees. These lone offenders may have the intentions of conducting such attacks, and may have diagrams and plans drafted, however these pieces of evidence must have not been retrieved with enough threat to warrant publication suggesting little or no significant attack planning.

Finally, these employees may have access to CBRNE materials in the workplace; however they likely lack the ability to use these materials as a weapon. A Disgruntled Employee will not have the money, resources, skills, and training to produce these weapons in quantities which may be used against the agricultural industry or otherwise as a weapon. However they are still considered a threat to individual farms and producers.

**Vulnerability**

**Processing Plant 1.** The first poultry facility is located along a main street in a small town. Its facility and grounds take up an entire block. The facility has large, distinct signage on all sides of the building. Additionally, the odor of cooked chicken can be identified several blocks away. This facility is highly visible and its existence is well known.

This facility was determined to be significantly useful to the community. The company is one of the largest employers for this town and generates much revenue. There would be over 500 jobs lost if this facility was destroyed. There are many businesses within
several hundred feet of this facility, with one business physically attached to the building. A long recovery period would be expected for this facility and those adjacent.

This facility would be one of the better targets for a PTE. They could expect to induce hundreds of casualties with a significant economic impact on the community. The impact would remain local with some effects felt at the state level. While an attack on this facility would likely reach national news (especially if suspected to be terrorism), a single facility attack would not be expected to cause widespread panic in the nation. This facility was assessed to have a medium importance.

Accessibility proved to be the most difficult area to assess for all of the facilities. There is some ambiguity with this rating because some of the security information (standard operating procedures, security procedures etc.) is not readily accessible to the public. This ambiguity is expected to be resolved by the design of the scoring system at the end of this assessment. Three areas were observed for Accessibility: parking, access, and ventilation. At this facility there is parking within 125 feet of the building. The location of this building makes it difficult to limit unauthorized traffic around the building. There is a parking lot across the street from the facility which has vehicles parked within 55 feet of the roast and breading pack-out area. Additionally, the attached business has customer parking within 45 feet of the breading pack-out area. There is one parking lot adjacent to the facility but this parking lot is designated for employees only. During the site visit, the only vehicles at this location were operated by the business. Additionally, there are “no parking next to building” signs on the sides of the building where a vehicle may pull off the public road. It was noted that public roadways allow vehicles to drive within 25 feet of the building. Visitor parking was 150 feet away located at an evacuation area. Access to the building interior is well
protected. There is one main entrance to the building which is protected by a gate and guard shack. Finally, this facility, along with all facilities assessed in this study, has no protection of its air source and no filtration internal to the system.

Major concentrations of CBRNE materials are present. This facility reports approximately 80,000 pounds of anhydrous ammonia on location which has been deemed the greatest CBRNE threat (P1 Rockingham County Fire Rescue Pre-Plan 2009). This chemical agent can be weaponized as an inhalational hazard with 330 parts per million (ppm) exposure considered immediately dangerous to life and health (IDLH) (Wiser Hazmat 2010). The facility also has small quantities of corrosives including: sulfuric acid, sodium hydroxide, and alkaline cleaners (Saxton 2009, 1-8). There is also small a quantity of No. 2 fuel oil which may be used in explosives (Saxton 2009, 4). Both documents suggest that these chemicals are locked away or under the control of authorized employees. Specific locking and personnel authorization information was not available.

The Target Site Population Capacity shows there may be up to 500 people on site at one time. They estimate to have 350 employees working during the day and 275 working at night (P1 Rockingham County Fire Rescue Pre-Plan 2009).

The last factor assessed for P1 was the Potential for Mass Casualty. As stated above this facility is located in the center of a town with a population greater than 5,000 people within a one-mile radius. The total Vulnerability Rating for this facility is 24 which corresponds to a Target Vulnerability Score of 9 (Table 10). This Target Vulnerability Score will be used in the next step after all the facilities have been reviewed.

**Processing Plant 2.** This facility is also located in a small town situated along a primary highway. It has several hundred employees and is one of the largest employers in
the town. There are several signs on the side of the building identifying the facility and a chain-link fence line which surrounds the building. Its visibility is high and existence is well known.

Similar to P1, this facility is significantly useful to the community. With over 1100 employees this facility has the potential for a significant loss of life if attacked. It is highly productive and offers many jobs to the town and surrounding community. If attacked, it would be considered a significant economic loss to the entire county. A long recovery period would be required to revive this facility and the surrounding town. Facility reconstruction and employee hire and training would require extensive effort. Nonetheless, this town would forever be considered a terrorist target making the recovery process longer and more arduous.

This plant has a high employment capacity and strong importance to this town’s economy. This facility also caters to non-native speakers. They post “se habla español” outside of the building to try and attract people who may be reluctant to apply because of their poor English. This facility is considered highly valuable to the increasing Hispanic population in the county.

Parking is the first area of concern when looking at access. As stated above, this facility is located adjacent to a primary county highway. Vehicles may be parked along the shoulder of this highway and be within 60 feet of the evisceration area of the plant. Additionally, there is visitor parking prior to the facility guard shack within 100 feet of the main entrance. While one can walk right up to many parts of the building, all doors are closed. Access to the office building is protected by a guard shack and gate. Additionally, the main processing area is located across the road and protected by a guard shack. Access
to these parking areas, as well as the building, is limited by chain-link fence. An enclosed, protected walkway connects the two buildings. During a site visit it was noted that outside storage of bird trailers was not fenced or protected. With unprotected and unfiltered air sources, these collaborative factors give this facility a high Access to Target rating.

These first four assessment areas (Tables 3-6) scored the same for P1 and P2. The last three areas had significant differences in their vulnerability scores. For CBRNE Target Hazard P2 has a higher rating. The P2 facility has 30,000 lbs of anhydrous ammonia on location (P2 Rockingham County Fire Rescue Pre-Plan 2009). This corrosive chemical can be fatal if used as an inhalation agent (Wiser Hazmat 2010). The chemical is stored outside of the engine room and the physical containers may be accessible to the public (McPike 2009). This facility also has No. 2 Oil which is located outside south of the garage (McPike 2009). In addition, there are small quantities of other corrosives including ferric chloride, nitric acid, peroxyacetic acid, sodium hydroxide, and sulfuric acid. All of these are located inside of the facility behind closed doors (McPike 2009). Because this facility has larger amounts of CBRNE type materials which are located outdoors, this facility receives a high Target Threat of Hazard rating.

The P2 facility has approximately 675 employees during the day and 550 at night (P2 Rockingham County Fire Rescue Pre-Plan 2009). This makes P2 moderately vulnerable with respect to its Target Site Population Capacity.

Finally, the Potential for Mass Casualty is less in this facility than P1 because it is located adjacent to the town, not directly within it. Additionally, the town which it is adjacent to is smaller than that of P1. The P2 facility has a mass casualty with the potential of 1,001-5,000 community victims within a one-mile radius.
With a Total Vulnerability Score of 25, this facility is the most vulnerable of those examined. This vulnerability score translates to a Target Vulnerability Rating of 9 (Table 10).

**Feed Mill 1.** The first feed mill proved a lower vulnerability than both of the processing plants. The feed mill did have a Visibility rating as high as the processing plants however. This is because this facility is located in the downtown area of a small city. The facility is not well marked in terms of company identity and function, but its existence is well-known. The criticality of this facility is somewhat less than the processing facilities because the feed mills do not produce the actual product that the general public consumes. The biggest hit would be felt on the growers within the industry. Additionally, this feed mill only offers a small number of jobs and does not generate as much revenue. An incident at a feed mill could cause a cascading affect throughout the system, but if this one facility was attacked the impact would not be overwhelming on the community. Because the criticality is low, the number of employees is low, and there is not much economic profit from this facility, the value of this target to serve the motives of a PTE is also very low, rated at a 2. As far as a direct impact on agriculture, this facility is not much a value to the PTE. A PTE would also be more attracted to the government facilities in the same area if they were trying to generate a geographical impact in the city. Similar to the processing facilities, this feed mill has a high Access rating. There is parking at an adjacent business which is 40 feet from the broiler room at this facility. There are several parking areas close to the building which are marked for employees and have towing enforcement signs. With the small number of employees at this location, it is likely they will recognize a car that doesn’t belong in their parking area. This facility is located on a corner of two roads and a railroad. The heavy traffic in the area, with many non-descript parking spots close to the building raises the Access value for this facility. Accessing the facility appears to be controlled. All doors are
closed and marked for employees only, with one visitor entrance clearly marked. One
potential point of entry is through the open bay which trucks use to fill their feed. However,
with the small number of employees the tight visitor access will likely be controlled by the
personnel working this area. The air at this facility is also not protected or filtered.

There are various 55 gallon drums of corrosives located in the broiler room (F1
Rockingham County Fire Rescue Pre-Plan 2001). However there are no CBRNE materials
present in large quantities.

The facility has a total of 18 occupants during the day and 10 at night (F1
Rockingham County Fire Rescue Pre-Plan 2001). This small number of occupants gives it a
0 for Target Site Population Capacity. Lastly, as we stated this facility is located in the
downtown area of a small city. There are more than 5,000 people within a one-mile radius.

This feed mill only received a Total Vulnerability Score of 16. This value
corresponds with a Vulnerability Rating of 6 (Table 10).

**Feed Mill 2.** This feed mill is located directly across from F1 and shares the same
Visibility factors. It is located downtown in a small city, its existence is obvious, but there
are few markings on the building to define what it is.

This facility has the lowest Criticality of all of the facilities assessed. An attack would
only have a direct impact on the poultry industry. It is noted that this feed mill is only one
amongst a network of many mills in the county. If this one is lost there would not be too
much damage to the industry. Additionally, this facility has the lowest number of employees
among all the facilities which also drives down its Criticality. With a lower number of
employees and less economic profit this facility was determined to be somewhat useful. The
loss of this facility would be noticeable but would have little impact on the community; especially the general public.

As with Criticality, the value of this facility is low in the community. It does not generate much revenue and provides less than a dozen jobs. A PTE would be unlikely to use this target as it would find the other facilities in the poultry industry more attractive as they carry much greater vulnerability and risk. This facility receives a very low Value of Target rating.

This target has access issues similar to F1. There are several areas within 125 feet where unauthorized vehicles can park. There is a business across the street where vehicles can be parked within 115 feet of the mill’s storage towers. There is a second parking lot where vehicles can park at this same distance, or even a few feet closer. There is parking on premises, within 60 feet of the building; however this parking lot is marked employee-only with towing enforcement. With the small number of employees a car that’s out of place would likely be recognized quickly. Access to the building is restricted and all doors are closed and marked for employees only. There is no guard shack or fencing around the facility. There is, however, a separate building for visitors which has an enclosed bridge into the facility. Finally, the air is also unprotected and unfiltered at this facility.

There are small amounts of pesticide and insecticide present but they are very minimal and reported as not on premises on a daily basis (F2 Rockingham County Fire Rescue Pre-Plan 2001).

The Site Population Capacity is rated a 0 because there are only 11 employees total: 10 during the day and 1 at night.
This facility also receives a high Potential for Mass Casualty rating because it is located downtown in a city with more than 5,000 people per one-mile radius.

This feed mill received a Total Vulnerability Score of 15 which is comparable to the feed mill located on the adjacent property. A score of 15 provides a Vulnerability Rating of 6 (Table 10).

**Feed Mill 3.** This facility is less visible than the other facilities because it is located outside of a downtown area and is located several hundred feet off the road. There is a small sign along the road identifying its existence but the facility is not as overtly obvious as the others. Still, there are company logos on several tall towers so this facility receives a medium Visibility rating. Its existence is probably well known.

This facility rates a low Criticality like the other feed mills. The operation at this facility is larger than the other two, and there are more jobs available to the public. However, its Criticality is still considered to be low because the impact of facility loss would only be felt in the industry and no direct impact would be passed on to the public. Its loss would be an inconvenience to the industry but the resiliency of the industry would allow for a short recovery.

This target is not useful to a PTE. It is further away from population and business than the other feed mills and does not have a high inherent population or value. This facility rates very low relative to Target Value.

Access to this target is more restricted than the other feed mills. The primary advantage this facility has is limited vehicle access. There is a single lane access road to the facility which is guarded by a gate and guard shack. All parking on premises is authorized by
entry through this guard shack. There is no unauthorized parking in the area for at least 150 feet. Two guard shacks on premise have a moderately broad view of the grounds. With controlled access and security personnel on site this facility seems to be difficult to access. It appears the infrastructure is in place to protect this facility; however site visits revealed that the guard shack is not always manned. Finally, unprotected air and no filtration give this facility an average Access rating.

No. 2 fuel is stored on location, but no significant CBRNE material is present (F3 Rockingham County Fire Rescue Pre-Plan 2004). All three feed facilities received a 0 in the Target Threat of Hazard category.

All three feed facilities also received a 0 for Site Population Capacity. F3 has approximately 37 occupants during the day and eight at night (F3 Rockingham County Fire Rescue Pre-Plan 2004). F3 is also located in a small city with more than 5,000 people in a one-mile radius.

F3 received the lowest Total Vulnerability Score of the three with a total of 14. This facility receives a lower Vulnerability Rating of 5 (Table 10).

The Jurisdiction Vulnerability Rating is generated using the Jurisdiction Threat Rating and the highest Target Vulnerability Rating. ALF gave us the highest Jurisdiction Threat Rating of 10. P2 gave us the Highest Vulnerability Rating of 9. These two values combine to an overall Jurisdiction Risk Rating of 19 (Table 11). This rating falls in the category of High Risk (Table 12). According to the DHS National Advisory system the poultry industry in Rockingham County is at high risk of attack and should be on orange alert for risk of terrorist attacks (Figure 9).
This National Advisory System provides a good illustration of the threat today, but it is noted that this system is currently seeing changes. The U.S. Department of Homeland security has started a 90 day implementation period beginning January 27th, 2011 to switch to a new National Terrorism Advisory System. Currently this new system is still in implementation and the old DHS National Advisory System will remain in effect until the switch over projected for late April 2011 (National Terrorism Advisory System 2011).

**Phase 2: Vulnerability Assessment- Farms**

**Farm A.** The farm is fenced off and well off the road. There is a sign designating grower name and company affiliation along the road. However, to one with limited knowledge of poultry operations it may not be clear which farm belongs to the owner as several farms share the same driveway. Vehicular access to the farm is well guarded by two gates. A sign at the gate denotes the operation as a “disease free area” to encourage restricted access from possible disease carrying organisms. Additionally, the grower’s home is located on a hill a few hundred yards from the operation. The grower is easily able to
watch for unauthorized vehicle traffic from his home. The chicken houses are also equipped with locked, alarmed doors (Farm A Grower 2011).

Four liquid propane tanks are located within 20 feet of the primary chicken house along the driveway through operations. This location may be advantageous to an attacker who would be interested in using these tanks as an incendiary weapon or to induce a BLEVE (boiling liquid expanding vapor explosion). The grower was not concerned with this phenomenon as these tanks were designed to withstand considerable fire and heat exposure. He recalled an incident where one of his buildings burnt down exposing the tanks to significant heat. The only damage found on the tank was on the lid (Farm A Grower 2011).

Contamination of the feed would not be difficult. The grower admits it would be hard for him to see someone on the farm at nighttime. An attacker would easily be able to walk up to the feed storage tanks and introduce a host of agents. These units have a door on the top to access the feed. This door has no locking mechanism. (Farm A Grower 2011).

This grower states his greatest fear is that an attacker would cut the power source in his operation. He states in the hot summer months, if power was cut to his ventilation system, birds would die within minutes. If an attacker were to get into the locked control room and successfully disable the alarm, it would be very easy to kill the ventilation system and subsequently the entire population (Farm A Grower 2011).

On site visit the grower made comments about future expansion and biosecurity improvements. First, the grower is planning to move all chicken houses to the backside of the property. This improves biosecurity as visitors and delivery personnel do not have to drive past the chicken houses on their visit. This allows the grower to limit the access to the
chicken house area. The grower has also recommended improvements in his biosecurity measures within the chicken houses. Currently all visitors to the chicken houses are required to wear disposable suits into the building. The grower plans to install a small washing station (with shower) so that visitors with questionable contamination may shower before they don their disposable suit and interact with the birds (Farm A Grower 2011).

Farm A CARVER. The CARVER program returns results on farm Importance and Ease of Attack. Within importance includes Criticality and Vulnerability. Ease of Attack defines the areas of Accessibility and Recuperability. For Farm A the three most attractive areas for attack are the broilers, water supply, and new poultry. These three items in the operation are considered by this assessment to be the most paramount to the operation. Their scores will be examined in detail.

With a total score of 30 (40 being the highest, or most vulnerable, score) broilers proved to be the most attractive area of attack. The broilers had the highest scores in Accessibility and Recuperability. CARVER suggests many areas where the grower can reduce this Ease of Attack rating. First and foremost, the grower needs to limit access to the farm. This grower has done a good job isolating his farm off of the road and fairly well out of the public view. However, he shares a driveway with an adjacent farm and access to the farm is isolated to a single open gate area. Visitor access is well controlled beyond this point and visitors are accompanied by farm personnel the entire time they are on the farm. The farmer also discussed many options to improve his visitor access in the future. However, if money and resources permit this grower can improve his access by replacing his wire fence with a security fence and locked gate at the entrance. Access to the building is controlled by locked and alarmed doors. However, these simple hollow frame doors are only locked by
the doorknob. This grower should consider stronger dead bolt locks on all buildings in the operation. Once visitors are on premise they should be required to wear disposable clothing and footwear. The grower is taking good steps in planning to build a “wash in” station near the entrance to the farm to ensure visitors are clean and in the proper attire.

Watering and new poultry received the same scores in both areas. They both received the higher scores in Accessibility and Recuperability, but lower scores in Criticality and Vulnerability. For watering, Accessibility is high due to the Ease of Access to the watering system. The farmer has a well on site which is used for the poultry operation. This well is open and easily accessible to those who can make access. Also, all control mechanisms are located near the entrance which is exposed to visitors in an area which was once covered by a building which had burned down. To better protect this vital water source the grower needs to make it a priority that he secures these water controls within a structure. The grower does have redundancy on site as a second well close by could be used for the operation. However, this well is also shared by the farm residents. A second water source dedicated solely to the operation could help reduce this vulnerability. Finally, the CARVER program recommends reducing the vulnerability at watering. This vulnerability can be reduced by making the watering system in the chicken house less accessible to visitors. Also, the grower can reduce vulnerability by cleaning the water system on a daily or weekly basis.

Finally, new poultry coming onto the farm exhibit an added area of vulnerability. CARVER’s greatest recommendation is to limit those numbers of people who have access to the new birds. Also, for those new birds that die, rather than immediately composting, CARVER recommends testing birds, even in instances of seemingly usual disease.
CARVER also ranks the highest risk areas under each of the assessment areas. For this farm the feed storage was rated highest for Criticality. This means if an attacker were to target the feed storage on the farm they could cause more severe economic damage than if they had attacked any other item. The food storage area also ranked highest for the Accessibility score. This poses a particularly high vulnerability. Food storage is highly critical and highly accessible; this makes it a top target. The broilers ranked highest in Vulnerability and Recuperability. This means the birds are most vulnerable to attack, or would meet the needs of the attacker the best, and would take the most time to replace to normal operation.

Overall CARVER identifies vulnerabilities in accessibility to the farm with the top targets being the water supply, broilers, and feed storage. These areas are the most fundamental to the operation.

**Farm B.** This operation is well hidden off the roadway on a small hill. A long, tight driveway among several residential and farming buildings would make it difficult for a quick in-and-out type attack. The sign along the roadway makes it clear a poultry operation is on site, but the grower has done a good job to make this site not easily accessible. The “disease free area” sign at the entrance encourages protection of the live animals from accidental introduction of disease.

The two propane tanks are located within 20 feet of the two chicken houses. This appears to be the industry standard as heating of the poultry houses is intensely important, especially in the coldest days of winter. On site visit the outdoor temperature was 28˚F. The propane tanks feed five heaters in each chicken house which kept the interior temperature at a warm 86˚F. These tanks are less visible to visitors as they are located
behind four large feed tanks. This liquid propane source could be better protected if they are permanently buried in the ground.

This grower also stated his greatest fear would be loss of ventilation or heat. This comment raises more concern for the location of the propane tanks outdoors. Once this fuel is in the building the heating source is controlled by an automated panel within the chicken house control room. This door is locked from public access. Ventilation is also controlled out of this room. The grower states that in the heat of the summer if his ventilation system was compromised he would notice culls within 20 seconds (Farm B Grower 2011).

Contamination of the feed at this operation would also be relatively easy. The four feed tanks are the first thing you see when coming onto the farm. They are also partially visible from the roadway. The feed in these tanks could be accessed by opening the unlocked hatch on top.

This grower spent much time talking about how important his poultry operations are to his family. His operation is responsible for much of his income to support a wife and three small children. He states if his poultry operation was shut down for as little as one 54 day cycle his family could incur serious financial burden. When asked, this grower stated the greatest affect an agroterrorist could have on him and his family is economic turmoil (Farm B Grower 2011).

**Farm B CARVER.** Farm B CARVER results showed broilers and water supply to be top of the attractiveness of attack list. The broilers at Farm B show a higher vulnerability than Farm A with a total score of 33. Broilers received high scores in Accessibility and Recuperability, but they also received a high score in Vulnerability. Similar to Farm A,
access to visitors needs to be better controlled. While the farm is well off the roadway, it
does share a common driveway and is surrounded by a wire fence which is open to drive
through. Better access control measures can reduce the access score and limit the
Recuperability concerns. Similar to Farm A, better constructed doors with dead bolts can
decrease accessibility issues. To reduce vulnerability to the broilers, CARVER suggests
limiting access to the chicken house only to farm operators and those who will be entering
to collect the birds. Visitors, vendors, etc. should have little or no access to the building.
This was especially noted as the grower invited the evaluator into the chicken house with a
live flock. Finally, the grower should implement a stringent pest, parasite, and animal
control program to better protect the flock.

Watering was the second most attractive area to an attacker. In operation this item
was rated higher, or more attractive, than watering in Farm A. This farm also has one well
on site. However, this farmer has no redundancy in his water supply. This means if the one
site is compromised there is no water source available to the birds. The grower can reduce
his vulnerability by either drilling a secondary well or bringing in an access point to the
county water system. Vulnerability can also be reduced by controlling public access to the
source.

CARVER provided the same rankings for this farm as it did for Farm A. Those
items which ranked the highest, or of most concern in each category are: Criticality- feed
storage, Accessibility- feed storage, Vulnerability- broilers, and Recuperability- broilers. Feed
storage is proving to be one of the most critical items in the poultry operation. The
CARVER results are also showing that this is the area which is most easily accessible to an
attacker. Additionally, broilers are the most vulnerable and would require the most time and
effort to replace in the operation. These two areas will be the focus of the vulnerability assessment and mitigation recommendations.

**Farm C.** This farm, as opposed to the others, is located directly adjacent to the roadway. Granted, this is an infrequently traveled roadway at the base of a mountain; however a passerby can easily see and identify all facilities in the operation. The grower did discuss this area of vulnerability on site visit. Because of the seclusion and low population in this area, residents can effectively police the area as a community. The grower states a non-recognizable vehicle on the roadway or in a driveway would be noticed within hours by the residents. The grower even proclaimed that one of the residents had mentioned my vehicle when I pulled into the area. While not a formal type of security, this small-town community policing has been effective in this area for a number of years (Farm C Grower 2011).

The grower does not live on this property, but does own a rental home on the property which is currently occupied. This rental home has full view of the two story chicken house and the new construction chicken house; however its view of the two single story houses is blocked by the adjacent structures to the dwelling house. This house does provide some diversion to intruders as there is someone physically on site at night.

The chicken houses are protected by locked, alarmed doors which could also be better secured with deadbolts. The entire operation is isolated by wire fencing which does not provide much of a physical barrier to intrusion. The location of the propane tanks also poses some risk for BLEVE damage to the chicken houses. This risk can be mitigated by burying permanent tanks which may be buried. It was also noted that there are no “disease free area” signs that the first two farms displayed. These signs primarily offer protection
from accidental incidents rather than the intentional incidents that are of concern in this research.

This farm has the same feed tanks as the first two. However, with the larger operation this grower has several more tanks. With easy access to food by opening the top, unlocked latch, an attacker could affect much more birds on this operation by attacking the feed source. This is a widely vulnerable area among all three farms which could be easily mitigated by locking the feed access.

**Farm C CARVER.** Farm C CARVER results are very similar to those from Farms A and B. Broilers and watering are listed as the top two most attractive items for attackers. However, Farm C returns watering as slightly more attractive than the broilers. Farm C had an overall score between Farms A and C with summing up to a 32. Watering received the highest scores in Accessibility and Recuperability. Again this grower can limit his vulnerability by limiting access to the well onsite. CARVER also recommends a filtering process in a secure location. With only one well on site used by the poultry operation and nearby rental home, the lack of redundancy increases vulnerability on this farm. This farm is widely open with easy access to the water supply. The grower should either secure the water supply in a structure or implement regular security walk through so that one may not have uninterrupted access to the water supply. Access can also be better controlled by constructing a security fence to replace the existing wire fence. The access is lower at this farm because there is no dedicated driveway onto the operation.

For broilers CARVER rated Accessibility, Vulnerability, and Recuperability high. This farm has several more chicken houses than the other farms with many more birds on farm at any time. Accessibility issues described above can be mitigated to limit access to the
farm, and ultimately to the birds. This farmer does limit visitor access well. He only allows vendors to designated areas on the farm, and only his family and he are allowed in any live bird house. Pest, parasite, and animal control programs can limit the vulnerability factor in the chicken houses. With the large operation, and much of the grower's annual income dependent upon his bird populations, Recuperability is an area of vulnerability that is more difficult to control. To reduce this factor the grower needs to better secure each building to protect the live birds. This grower has one new chicken house, but the rest are considerably older. To decrease Recuperability concerns the grower should invest in updating security measures to better protect the live flock. Improving doorways (including modern jams and doors) with deadbolts will help limit access to the birds. As the operation grows, the grower may consider splitting his operation between two farms. In keeping all of his flocks in one location he is subjecting himself to the possibility of losing the entire population in one attack. This would make recuperability after the attack much more difficult.

The CARVER rankings for Farm C are the same as the first two with watering and broiler production proven to be the top areas for concern in the operation. The top ratings for each category are: Criticality- feed storage; Accessibility- feed storage; Vulnerability- broilers; Recuperability- broilers.

**Phase 3: Fire Rescue Capabilities Assessment**

In the final phase, a capabilities assessment was distributed to station Captains in Rockingham County Fire Rescue. These Captains were instructed to fill out the questionnaire (Appendix C) with their entire crew. This interview was intended to get an overall impression of the crew’s knowledge and understanding of incidents involving agriculture.
Two crews believed themselves to have technician level training to handle agricultural incidents. This determination was made because these crews have hazardous materials (hazmat) technicians in their personnel. While the technician level training will help them better handle the hazardous materials in the incident, this training is not specific to agriculture incidents. A hazmat technician will be comfortable going down range (into a hot zone) to control a chemical leak. However, they would likely not be comfortable going down range to take samples from infected cattle, for example. This agriculture specific technician training is needed to consider a crew prepared to the technician level for agriculture incidents. The majority of the crews declared either no training or only awareness level training. These results show an apparent inconsistency in crew’s understanding of their training level for agriculture incidents. None of the crews have had specific agriculture training lending us to believe the overall agriculture incident training within this department is either awareness level or below. It is noted that all crews are well prepared for general response and hazardous materials incidents. Crews could greatly benefit from [at a minimum] awareness level agriculture training so they can better apply the skill sets they already have.

The 73% accuracy on the knowledge assessment was higher than expected for personnel with little to no training on agricultural incidents. This assessment was designed to show the participant that they already have the skill set to handle these incidents; they just may need to better understand how to apply those skills. The average score on this assessment proves that the personnel could benefit from training to help them better understand how to apply their skill set. Crews could also benefit from more regular agriculture training on duty. Additionally, personnel should be encouraged to complete operations (or higher) level training on agriculture incidents. Once all crews have the
agriculture training, they should be involved in an annual exercise which may be led by those personnel who took the higher level courses on the topic. After all personnel have been trained for agricultural incidents they should have a better understanding of how they can apply their previous training to these unique incidents.

Many crews felt they did not have the equipment necessary to handle an agricultural incident. This declaration supports the need for agriculture training on the crews. In fact, the resources and equipment required for an agriculture incident does not extend much beyond what they already have on their fire and hazmat apparatus. Additional training in this field will teach personnel how to use the equipment they already have to handle agriculture incidents.
Conclusions and Recommendations

Four Potential Threat Elements were deemed unique to this research. PETA received an overall score of 0. This PTE is of little measurable threat to the agricultural industry. They do not exist as a violent threat, have no intentions of using violence against agriculture, and have no capability of using CBRNE weapons. PETA is not considered a threat.

Disgruntled Employees are also considered a low threat. They do exist as a threat and do have a history of violence in the agricultural sector. However, their intentions and targeting are not well documented (due to limited existence) and their capability to produce CBRNE weapons is not profound. Disgruntled Employees should not be ignored, but resources should be placed on the other more serious PTEs defined.

Islamic extremists, the international terrorist, are considered a significant threat to agriculture. They exist as a violent threat, show a history of violence involving CBRNE, and have intentions of using such weapons against agriculture to create a huge economic impact. However, there is little credible documentation on their specific planning in these attacks which drops their threat level to a 6.

Finally, as we expected ALF is our top threat to agriculture. This violent domestic terrorist organization has used CBRNE materials in the past and has intentions of using violence against those who mistreat animals or use them for human consumption/pleasure. ALF is actively targeting the agriculture sector and deemed a great threat. This is the highest threat level possible, and is the highest level calculated in the present assessment. In terms of the DOJ Risk Assessment, our Jurisdiction Threat Rating will be the highest calculated at a level 10. This Jurisdiction Threat Rating was used at the end of the vulnerability assessment in calculating a high Jurisdiction Risk Rating.
Many questions cannot be answered by the facility vulnerability assessment, but this assessment is a good tool to generate a list of areas where the industry is doing the right thing to protect itself, and areas where it needs improvement. All facilities received a somewhat high rating for Visibility. This factor is inherent to the industry in this county as it is one of the strongest and most prevalent industries in the county. The easiest improvement the industry can make is to limit their signage to reduce visibility. If the threat level becomes imminent, and drastic measures are necessary, eliminate all signage. Nevertheless, while this is an area of vulnerability to the industry this is not an area where they need to focus much of their attention. The industry can simply accept their visibility and focus their efforts elsewhere on how to prevent penetration within that visibility.

Higher Criticality and Value of Target were noted among the processing facilities with generally low Criticality amongst the feed mills. The nature of the poultry industry with its interconnectedness (Farm-to-Fork) makes Criticality affect all sectors. By definition agriculture is critical infrastructure. It includes supply chains for feed, animals and animal products, crop production, seed and fertilizer production, postharvest food supply chains including processing, packing, and retail sales, and finally the use in food services and human consumption. This vast, complex system known as agriculture will remain highly critical. This is another factor that the industry cannot prevent as their criticality and value are vital to their success (Incident Command 2008, TA4-TA5).

Limiting access to the target is probably the most important area that the industry can make improvements on. Three individual areas were looked at under this category: parking, access, and air ventilation. First, facilities should not let any unauthorized vehicles within 125 feet of their structure. This distance is analyzed because it is the Bureau of
Alcohol Tobacco and Firearms (ATF) lethal explosive blast range from an average size vehicle explosive (Incident Command 2008, TA35). P1 and P2 are both located in the center of small towns with vehicles standoff distances less than that. Additionally it was noted that P1 has an attached business with vehicles authorized to park just 45 feet away from the breaded pack-out and cooler area. This facility has done well in implementing their own visitor parking 150 feet away, but they need to consider adjacent businesses whose parking they cannot control. F1 and F2 also have open access parking lots to visitors. While they are marked as tow away zones they are easily accessible by the public. Ideally these facilities should have fenced parking areas with physical security.

Personnel access is well-secured at most of the facilities. At each facility visitors must physically be granted access by personnel to get into the building. F3 had the most impressive access control features. This facility was well off the road, with one entrance and exit which was controlled by a guard shack. However, as noted on multiple visits, this guard shack was often not attended. The infrastructure must be in place to limit access to these facilities, and common practice must be in place and followed 24/7 for the best security.

Finally, air intake protection is essential to avoid aerosol type hazards. HEPA filtration is ideal in the air ventilation systems; however this can be expensive and arduous to maintain. At a minimum, these facilities need to protect and isolate their open air sources on the outside of the building. The general public should not be able to access the air intakes to any of these buildings. One idea would be to relocate all air handling equipment to the roof or some other location with restricted access. A less expensive option would be to hide the existing air handling equipment and install visible false air intakes to divert attacker attention.
Target Threat of Hazard is another area where these facilities can reduce their risk and vulnerability. Unfortunately these facilities require chemicals for production, so they cannot eliminate vulnerability by doing away with them. However, these chemicals need to be heavily guarded on the premises. Ideally they need to be inside the facility under lock and key. P2 had the highest rating in this area because they had CBRNE materials located outdoors. It would be advantageous for these companies to construct a secure hazard containment facility.

Population Capacity is a factor that’s difficult for facilities to reduce their vulnerability. The processing facilities have a high number of employees on location, which is required to keep their productivity high. They can reduce their vulnerability by having more shifts with less number of people physically on duty at a time. As stated previously, this industry is designed to increase productivity and profit at a low cost. It is unlikely they will reduce their staff for vulnerability issues. The staff would not be reduced as long as profit is high.

Finally, all facilities are in locations that increase Potential of Mass Casualty. They are all located within small towns or cities with thousands of people within a one-mile radius of the facility. There are other poultry facilities in the county which are located in largely rural areas. This is the ideal location to reduce their vulnerability in terms of community mass casualty.

It was not determined that the poultry industry in Rockingham County, VA is ill-prepared or in immediate danger of attack. Rather, the poultry industry in this area (and agriculture in general) represent a newly recognized probable target; especially for terrorist organizations like ALF. With the importance of the poultry industry in Rockingham County
and the Commonwealth of Virginia, there needs to be much attention paid to these facilities which are inherently vulnerable to attack.

The primary area of concern identified in the farm assessment was Ease of Access. All three farms have individual access control which makes them less vulnerable. Farm A is located well off the road and is not visible to the general public. Farm B is located atop a hill with a difficult driveway to access including several occupied buildings to pass by. Farm C is located in a very remote area of the county where the traffic is usually from the locals and everyone’s actions are well policed by the community. Overall I was impressed with the visibility control on these farms. However, some vulnerabilities do exist on the farms. All farms had fencing surrounding the property. This wire fence was minimal, and mostly served the purpose of identifying the property boundaries. There are also no physical barriers to pass to get on the farm with a vehicle. Installing a security fence and a physical gate at the entrance will decrease the farm’s access vulnerability. It is understood that this measure may be too costly for the grower. As a minimum I recommend installing at gate at the entrance to deter unauthorized vehicles from getting close to the structures.

All of the farms had locking doors on the buildings. This is positive, however they were merely a conventional door knob lock on a hallow door. For a determined attacker this would pose little complication. Replacing these doors with a solid wood or metal door with a mechanical dead bolt would greatly increase security.

The two areas on the farms that proved to be most vulnerable were the broilers and the water supply. The broilers are the single most important asset to the farm. As discussed above, the easiest way to protect these birds is to install a better door and lock system on the chicken house. Additionally, only those who absolutely need to interact with the birds
during the growing process should come in contact with the birds (ideally only the grower). Access to family, visitors, vendors etc. should be prohibited unless absolutely necessary.

This issue is especially concerning as I had growers whom invited me into the chicken house with live birds in grow operation. I was not asked to follow any biosecurity protective measures (i.e. wash hands, cover boots/clothing etc.) before entering the structure. If it is absolutely necessary these individuals shall follow a strict biosecurity protocol before entering the chicken house. The Farm A Grower has the best idea to implement a wash in/wash out station for all visitors entering the facility. While this is a costly addition, it’s one that every grower should consider in the future with growth of their operation.

Water supply was another area of vulnerability that all growers need to evaluate. Most grow operations have an on-site well for a water supply. The most prominent issue in the water supply vulnerability is lack of redundancy. Only one farm had a plan for secondary water. The Farm A Grower has a secondary well on-site which can be used if the first well is compromised. He stated this importance in sharing the story about another grower whose water supply was compromised with an intentional dumping of diesel fuel. If the farm only has one water supply, and that supply is compromised, a vital component to the bird’s life is quickly taken away. The simple solution to this problem is increasing redundancy. Growers should have immediate access to a second well or city/county water supply in the event that their original supply is compromised.

One of the top fears the growers discussed was fear of losing ventilation in the summer and fear of losing heat in the winter. If either of these systems were to fail, death of birds could occur within minutes. Controlling access to these systems is most important. All farms have the controls in a locked room in each chicken house. This room contains the
electrical and programming access to these instruments but does not prevent someone from physically tampering with them. Securing the outdoor power supply would be the best way to prevent tampering with the ventilation system. The heating system can be better protected by burying permanent propane tanks instead of the above ground tanks that are currently used.

Finally, CARVER ranked the feed storage as most critical to the operation. It also determined the feed supply to be the most easily accessible in the operation. The feed storage tanks have an obvious vulnerability issue as they offer very little tamper prevention measures. All growers need to better secure their feed storage. It would be impractical to try and hide these large tanks or to secure them inside a building. Therefore the growers need to focus their efforts on security the tanks in place. They all declared that these tanks have a hatch on the top that has no locking mechanism and can be easily accessed by anyone who wishes to gain access to the feed. This greatly increases the vulnerability as CARVER sees this area to be of high criticality as it is used daily by the birds. Securing these tanks with a locking mechanism will help reduce the criticality/accessibility gap.

Throughout the vulnerability assessments of the industry and farms a significant hesitation to assistance was noted. Initially, both the industry representatives and growers were eager to work with researchers. However, once the assessments were being conducted a hesitation arose with both. When first speaking with the industry, representatives did not want the researcher to come onto property and examine security procedures. While we understand it is important for them to protect their security information, their hesitation extended beyond protecting this information. Industry representatives essentially shut down communication and would not provide anything to the researcher near the end of the
assessment. A similar situation was experience on the farms. Growers were apprehensive to give too much information, and 2 of 3 of the growers refused to fill out the survey. When prompted to complete the survey the growers stated the survey was in too much detail and they felt it would make their farms look weak and vulnerable.

Researchers met with Matt Lohr, Commissioner of the Virginia Department of Agriculture and Consumer Services (VDACS), to discuss why these representatives exhibited this hesitation. Mr. Lohr states that industry and grower’s greatest fear is increased regulation, which will lead to increased cost in production. They believe that academia is a subset of government with the power to influence increased regulation. Growers must already provide an initial investment of nearly $500,000 and are only awarded small payment for each bird they grow. Increasing regulation leading to increased cost can seriously hamper grow operations (Lohr 2011).

This research concludes with a capability assessment of Rockingham County Fire Rescue. We found several areas of vulnerability with considerable hesitation from the industry to make security changes. Additionally, a gap in response preparedness exists as vulnerability in itself. This makes it extremely important for our first responders to be prepared for these incidents. Overall there were no broad gaps in training as most crews understand they would be able to use their current skill set in an agricultural incident. There also appears to be no lack of equipment to handle these incidents. Where this department can make improvements is to train all personnel specifically for agricultural incidents. This will give them the knowledge on how to use their existing skills to compliment what they learn in the agriculture class to handle these incidents. The U.S. Department of Homeland Security offers several mobile and resident agriculture classes free of charge to local
responders. It would be encouraged that all personnel receive awareness level training (available online) at a minimum. Additionally, senior firefighters and line officers should attend the operations and technician level training so they would be more prepared to take command of these incidents. Once all personnel are exposed to some level of agricultural incident training they should be involved in annual skills exercises. It would be important for traditional responders to work with non-traditional responders from the industry in these exercises. Agriculture is extremely important to this county so fire rescue personnel should make it a priority to prepare themselves to respond when this asset is threatened.
### Appendix A - Abbreviation List

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>(AIV)</td>
<td>Avian Influenza Virus</td>
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<tr>
<td>(APHIS)</td>
<td>Animal Plant Health Inspection Service</td>
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<td>(ATF)</td>
<td>Alcohol Tobacco Firearms</td>
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<td>(AVIC)</td>
<td>Area Veterinarian in Charge</td>
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<tr>
<td>(ALF)</td>
<td>Animal Liberation Front</td>
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<tr>
<td>(BLEVE)</td>
<td>Boiling Liquid Expanding Vapor Explosion</td>
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<tr>
<td>(BSE)</td>
<td>Bovine Spongiform Encephalitis</td>
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<tr>
<td>(CARVER)</td>
<td>Criticality, Accessibility, Recuperability, Vulnerability, Effect, Recognizability</td>
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(P1) Processing Plant 1
(P2) Processing Plant 2
(PETA) People for the Ethical Treatment of Animals
(PTE) Potential Threat Element
(PPE) Personal Protective Equipment
(PPM) Parts Per Million
(USDA) United States Department of Agriculture
(VDACS) Virginia Department of Agriculture and Consumer Services
Appendix B- Farm A CARVER Questions

Farm A
Interview Category Interview Report

[Operation] Which of the following products do you wish to analyze?

Poultry

[Operation] How many live birds do you have on this site?

108,000

[Operation] How many live birds do you sell from this operation in the course of one year?

6,000

[Operation] Can you unambiguously identify each of your birds?

Yes

[Operation] What percentage of your income comes from the sale of live birds from this operation?

65%

[Operation] How long could you stay in business without the sale of live birds or bird products?

6 months

[Operation] How well can you trace your live birds after sale?

☑ Individual animals to the final consumer

☒ By lot to slaughterhouse

☐ By lot to auction barn

☑ By lot to the feedlot

☐ By lot to my customer

☒ Not at all

[Plant and Animal Health] What do you do with sick animals? (Check all that apply.)

☐ Quarantine and treat

☐ Sell

☒ Slaughter on site

☐ None of the above

[Plant and Animal Health] Do you have sick animals tested?

☐ Always

☒ Only when there is obvious signs of an unusual disease

☐ Never

[Plant and Animal Health] How do you dispose of dead animals? (Check all that apply.)

☐ Cremate

☐ Bury on site

☐ Bury off site

☐ Sent to renderer

☒ Treated like waste

☐ Other disposal

☐ No disposal

☒ None of the above

[Plant and Animal Health] Do you have dead animals tested?

☐ Always

☒ Only when there is obvious signs of disease

☐ Only when there is obvious signs of an unusual disease

☐ Never
[Plant and Animal Health] Do you vaccinate animals?
- Yes
- No

[Plant and Animal Health] What vaccination records are kept? (Check all that apply.)
- For individuals
- For groups
- None of the above

[Plant and Animal Health] What records do you maintain for plant or animal health management (as applies)? (Check all that apply.)
- Invoices with dates
- History of purchase
- Source of purchase
- Arrival date
- Medical records
- Medical history
- Veterinary treatment history
- Vaccination records
- None of the above

[Plant and Animal Health] Do you have a stringent pest, parasite, and animal control program, using chemical or physical measures?
- Yes
- No

[Plant and Animal Health] Do you limit disease outbreaks or infections through chemical sterilization procedures, disinfecting containers, culling affected organisms, or use of antibiotics or pesticides?
- Yes
- No

[Plant and Animal Health] What wild animal control do you use? (Check all that apply.)
- Traps
- Poison
- Cats / dogs
- Hunting
- Passive (i.e., walls or fences)
- None of the above

[Plant and Animal Health] How do you dispose of wild animal carcasses? (Check all that apply.)
- Cremate
- Bury on site
- Bury off site
- Send to renderer
- Treated like waste
- Other disposal
- No disposal

[Plant and Animal Health] Do you have unexpected animal carcasses tested?
- Always
- Only when there is obvious signs of disease
- Never

[Plant and Animal Health] Do you control for insects and birds?
- Yes
- No
[Plant and Animal Health] Do you control weeds or other unwanted plants with herbicide?
○ Yes
○ No

[Management] Does your operation have a plan to notify the county agent or state department of agriculture about disease outbreaks or invasive species?
○ Yes
○ No

[Management] Once food safety concerns have been raised, how long would it take your operation to make a decision and stop sales or shipment of the product?
○ Same day
○ 1 to 2 days
○ 1 week
○ 1 month
○ More than 1 month

[Management] How many people work at this site?

[Management] On average, how long do employees work for your company (from the time hired to the time they quit, get laid off or fired, or retire)?
○ Less than 1 month
○ 1 to 6 months
○ 6 to 12 months
○ More than 1 year

[Management] How many employees have quit, been laid off or fired, or retired during the past three years?

[Management] Does your operation use seasonal or temporary workers?
○ Yes
○ No

[Management] Do you have a policy in place to contact sick employees?
○ Yes
○ No

[Management] Are background checks required for employment?
○ Yes

[Management] Is random drug testing conducted?
○ Yes
○ No

[Security] Whom do you allow to enter this operation during working hours? (Check all that apply.)
○ Visitors
○ Customers
○ Vendors
○ None of the above

[Security] Do you require workers to be in uniform?
○ Yes
○ No
[Security] Does your operation have a security plan?
   ☑ Yes
   ☐ No

[Security] Are employees trained to notice and report unusual events to management?
   ☑ Yes
   ☐ No

[Security] Are employees allowed to take items not associated with their job into the work site?
   ☑ Yes
   ☐ No
Farm A
Interview Category Interview Report

[Practices] Do any of your animals have fence contact with animals belonging to other operations?
   - Yes
   - No

[Security] Is this fence intended to keep out intruders?
   - Yes
   - No
Farm A
Interview Category Interview Report

[Practices] Does the company perform routine maintenance on the ventilation and water systems of the building?
- Yes
- No (maintenance occurs only when something breaks)
- Not applicable

[Security] To whom do you give access to this building? (Check all that apply.)
- The general public
- Delivery drivers
- Vendors
- Customers
- Temporary laborers
- Long-term laborers
- All managers
- None of the above

[Security] How do you control access to this building during working hours? (Check all that apply.)
- Doors are locked when not in use
- Windows are locked or alarmed at all times
- Visitors must sign in and out
- Workers must sign in and out
- All doors are alarmed or guarded at all times
- None of the above

[Security] Do you have any of the following inside the building during working hours? (Check all that apply.)
- Workers at points of entry
- Dogs
- Guards at points of entry
- Contraband detection
- None of the above

[Security] What kinds of security do you have inside the building during off hours? (Check all that apply.)
- Doors are locked
- Windows are locked or alarmed at all times
- All doors are alarmed
- Guards are on random patrol of the building
- None of the above
Farm A
Interview Category Interview Report

[Security] Are any of the following present with the animals at all times? (Check all that apply.)
- Herdsmen / Drivers (as appropriate)
- Guard dogs
- None of the above

[Security] How long might an individual have access to the animals without attracting attention?
- More than 1 hour
- 30 min-1 hour
- 15-30 min
- 5-15 min
- 1-5 min
- <1 min
- <30 sec
- <15 sec
- never

[Security] How visible is someone near the animals?
- Both identity and activity are completely visible at all times.
- Identity, but not activity, are completely visible at all times.
- Only the fact that someone is there may be apparent to observers.
- Others might not know that someone is present.

[Security] How well is the herd monitored?
- Under visual observation at all times.
- Monitored by remote camera at all times.
- Intermittently monitored by remote camera.
- Video recording equipment is in place.
- Someone with the animals may be completely unobserved.

[Practices] What shelters are available to the animals?
- Animals are indoors at all times.
- Animals are outdoors at all times.
- Animals may select shelters or outdoors.

[Product] Assume that a single incident of contamination occurred at this location/operation/material, etc. What percent of the total annual production for the entire operation could be directly affected by this hypothetical incident?

10%

[Product] If your animals were killed, how long would it take to purchase alternate animals?
- 1 to 2 weeks
- 2 weeks to 1 month
- 1 to 3 months
- 3 to 6 months
- 6 to 9 months
- 9 months to 1 year
- 1 to 2 years
- >2 years
- Animals used in this operation cannot be replaced (e.g., they are a unique breed).

[Product] If most of your animals were killed, how long would it take to restore your herd from the survivors?
- <1 month
- 1 to 6 months
- 6 months to 1 year
- 1 to 2 years
- > 2 years
[Animal Health] Are animals added to an existing flock or herd, or is the entire flock or herd acquired and sold or delivered as a unit?
- Animals are added to existing flock or herd.
- Entire flock or herd is treated as a unit.

[Animal Health] Are new animals examined or tested by a veterinarian?
- Yes
- No

[Animal Health] How are newly received livestock inspected by operations staff? (Check all that apply.)
- Physically
- Visually
- Diagnostic lab testing
- None of the above

[Animal Health] What do you do when some animals in a shipment are sick?
- Accept entire shipment without isolating sick animals.
- Accept shipment, but isolate sick animals.
- Accept shipment, but isolate all animals.
- Refer sick animals to the veterinarian.
- Euthanize sick animals.
- Reject sick animals without isolating other animals in the shipment.
- Reject sick animals and isolate other animals in the shipment.
- Reject entire shipment.
Farm A
Interview Category Interview Report

[Security] Are any of the following present with the animals at all times? (Check all that apply.)
- Herdsmen / Drivers [as appropriate]
- Herdsmen / Drivers [as appropriate]
- Guard dogs
- None of the above

[Security] How long might an individual have access to the animals without attracting attention?
- More than 1 hour
- 30 min-1 hour
- 15-30 min
- 5-15 min
- 1-5 min
- <1 min
- <30 sec
- <15 sec
- never

[Security] How visible is someone near the animals?
- Both identity and activity are completely visible at all times.
- Identity, but not activity, are completely visible at all times.
- Only the fact that someone is there may be apparent to observers.
- Others might not know that someone is present.

[Security] How well is the herd monitored?
- Under visual observation at all times.
- Monitored by remote camera at all times.
- Intermittently monitored by remote camera.
- Video recording equipment is in place.
- Someone with the animals may be completely unobserved.

[Practices] What shelters are available to the animals?
- Animals are indoors at all times.
- Animals are outdoors at all times.
- Animals may select shelters or outdoors.

[Product] Assume that a single incident of contamination occurred at this location/operation/material, etc. What percent of the total annual production for the entire operation could be directly affected by this hypothetical incident?

5%

[Product] If your animals were killed, how long would it take to purchase alternate animals?
- 1 to 2 weeks
- 2 weeks to 1 month
- 1 to 3 months
- 3 to 6 months
- 6 to 9 months
- 9 months to 1 year
- 1 to 2 years
- >2 years
- Animals used in this operation cannot be replaced (e.g., they are a unique breed).

[Product] If most of your animals were killed, how long would it take to restore your herd from the survivors?
- <1 month
- 1 to 6 months
- 6 months to 1 year
- 1 to 2 years
- > 2 years
Animal Health: Does inspection of the animals occur at this point?
- Yes
- No
Farm A
Interview Category Interview Report

[Security] How visible is someone in this area?
- Both identity and activity are completely visible at all times
- Identity, but not activity, are completely visible at all times
- Only the fact that someone is there may be apparent to observers
- Others might not know that someone is present

[Security] How well is this area monitored?
- Under visual observation at all times
- Monitored by remote camera at all times
- Intermittently monitored by remote camera
- Video recording equipment is in place
- Someone in this area may be completely unobserved

[Security] Is the material in storage inspected?
- Yes
- No

[Security] To whom do you give access to this storage? (Check all that apply.)
- All employees
- Long-term laborers
- Visitors
- Customers
- Vendors
- None of the above

[Security] Do any of the following obstacles prevent someone from contaminating the material in this storage? (Check all that apply.)
- Access points locked with a key
- Storage is alarmed
- Storage is behind a safety barrier (guard rail, wall)
- Storage is equipped with temperature indicators that alarm if the temperature changes
- Material is stored in tamper-evident containers
- None of the above

[Security] How long would it take to contaminate the material in storage without leaving evidence that could cause immediate suspicion?
- More than 1 hour (or impossible)
- 30 min-1 hour
- 15-30 min
- 5-15 min
- 1-5 min
- <1 min
- <30 sec
- <15 sec
- The product is accessible at all times

[Security] How long might an individual have access to the storage without attracting attention?
- More than 1 hour
- 30 min-1 hour
- 15-30 min
- 5-15 min
- 1-5 min
- <1 min
- <30 sec
- <15 sec
- Never
[Practices] How easy would it be to decontaminate the storage area used for this task?

- Storage can be cleaned using concentrated chemical cleaners, steam, or heat
- Storage can be cleaned using standard chemical cleaners
- Storage can be cleaned with hot soapy water or alcohol
- Storage can be cleaned with water only
- Storage must be cleaned with compressed air or special chemicals

[Practices] How easy is it to replace the storage area used for this task?

- Storage is easily replaceable
- Storage requires some installation of pre-fabricated buildings, fences, or equipment
- Storage and equipment is of standard design, but removal and installation would be costly or time-consuming
- Storage is a custom design that could be rebuilt by company employees with some difficulty
- Storage is a custom design that cannot be built by company employees

[Practices] Is the storage ever completely emptied?

- Yes
- No

[Practices] How many days of feed are stored on the premises?

- Less than 1
- 1 to 2
- 3 to 5
- 5 to 7
- More than 7

[Practices] How close are animals able to get to the storage of their feed?

- Adjacent
- In the same building
- <100 feet away
- >100 feet away

[Practices] Is the feed storage facility equipped with filters?

- Yes
- No

[Practices] Which of the following animals get into the feed storage? (Check all that apply)

- Cats/dogs (pets)
- Cats/dogs (strays)
- Birds
- Insects
- Skunks
- Rodents
- None

[Product] Assume that a single incident of contamination occurred at this location/operation/material, etc. What percent of the total annual production for the entire operation could be directly affected by this hypothetical incident?

10%

[Product] If this area were contaminated or sabotaged, would you be able to continue to produce your product?

- Yes
- No
Farm A
Interview Category Interview Report

[Security] Does more than one person accompany the animals at all times during this process?
- Yes
- No

[Security] How long might an individual be unobserved with the animals without attracting attention during this process?
- More than 1 hour
- 30 min-1 hour
- 15-30 min
- 5-15 min
- 1-5 min
- <1 min
- <30 sec
- <15 sec
- Never

[Security] How visible is someone near the animals during this process?
- Both identity and activity are completely visible at all times.
- Identity, but not activity, are completely visible at all times.
- Only the fact that someone is there may be apparent to observers.
- Others might not know that someone is present.

[Security] How well is the herd monitored during this process?
- Under visual observation at all times.
- Monitored by remote camera at all times.
- Intermittently monitored by remote camera.
- Video recording equipment is in place.
- Someone with the animals may be completely unobserved.

[Practices] What shelters are available to the animals?
- Animals are indoors at all times.
- Animals are outdoors at all times.
- Animals may select shelters or outdoors.

[Practices] What feed is provided for the animals? (Check all that apply.)
- Pasture grass.
- Grain.
- Hay.
- Silage.
- Manufactured feed.
- Ruminant animal protein.
- Non-ruminant mammalian protein.
- Non-mammalian animal protein.
- Vitamins and minerals.
- Other
- None of the above

[Practices] Where does your animal feed come from? (Check all that apply.)
- Own operation.
- Other farming operation.
- Processing plants or feed mills.
- Range or pasture.
- Commercially purchased in bulk or bag.
- Other
- None of the above
[Practices] Does any of the feed contain pesticides?
  ☐ Yes
  ☐ No
  not shared

[Practices] Are all feedstuffs examined for manure, mold, foreign matter, and other spoilage before feeding?
  ☐ Yes
  ☐ No

[Practices] Is feed handling equipment cleaned or disinfected after each use?
  ☐ Yes
  ☐ No

[Practices] Is different equipment always used for feed handling and manure or carcass handling?
  ☐ Yes
  ☐ No

[Practices] Do feeders also perform mucking?
  ☐ Yes
  ☐ No

[Product] Assume that a single incident of contamination occurred at this location/operation/material, etc. What percent of the total annual production for the entire operation could be directly affected by this hypothetical incident?
  ☐ 10%

[Product] If your animals were killed, how long would it take to purchase alternate animals?
  ☐ 1 to 2 weeks
  ☐ 2 weeks to 1 month
  ☐ 1 to 3 months
  ☐ 3 to 6 months
  ☐ 6 to 9 months
  ☐ 9 months to 1 year
  ☐ 1 to 2 years
  ☐ >2 years
  ☐ Animals used in this operation cannot be replaced (e.g., they are a unique breed).

[Product] If most of your animals were killed, how long would it take to restore your herd from the survivors?
  ☐ <1 month
  ☐ 1 to 6 months
  ☐ 6 months to 1 year
  ☐ 1 to 2 years
  ☐ > 2 years

[Animal Health] When does inspection occur? (Check all that apply.)
  ☐ Daily
  ☐ Weekly
  ☐ Monthly
  ☐ Semi-annually
  ☐ Annually
  ☐ Every time product is taken to market
  ☐ None of the above
Farm A
Interview Category Interview Report

[Security] Is this material inspected upon receipt?
☑ Yes
☐ No

[Security] Is this material source closely identified with your operation in the public mind?
☑ Yes
☐ No

[Security] Is this material source famous in its own right?
☑ Yes
☐ No

[Security] Is this material source open to the public?
☑ Yes
☐ No

[Security] Is access to this water source controlled?
☑ Yes
☐ No

[Security] How long would it take to contaminate the water without leaving evidence that could cause immediate suspicion?
☑ More than 1 hour (or impossible)
☒ 30 min-1 hour
☐ 15-30 min
☐ 5-15 min
☐ 1-5 min
☐ <1 min
☐ <30 sec
☐ <15 sec
☐ The water is accessible at all times.

[Security] How long might an individual have access to the water without attracting attention?
☑ More than 1 hour
☒ 30 min-1 hour
☐ 15-30 min
☐ 5-15 min
☐ 1-5 min
☐ <1 min
☐ <30 sec
☐ <15 sec
☐ never

[Practices] Where do you get water for your operation? (Check all that apply.)
☐ Ponds/lagoons
☐ Wells on site
☐ Reservoirs
☐ Industrial (gray) waste water
☐ Rivers/streams
☐ Irrigation system (ditches, etc.)
☐ City water supply
☐ Waste water lagoon
☐ Other
[Practices] What water treatment is performed on site? (Check all that apply)
- Water filters
- Water is chlorinated on site
- Water supplies are protected from fecal contamination
- None of the above

[Product] Assume that a single incident of contamination occurred at this location/operation/material, etc. What percent of the total annual production for the entire operation could be directly affected by this hypothetical incident?

[Product] If this material source were contaminated or sabotaged, how long would it take to change to a different source (e.g., get a new supplier)?
- 1 to 2 weeks
- 2 weeks to 1 month
- 1 to 3 months
- 3 to 6 months
- 6 to 9 months
- 9 months to 1 year
- 1 to 2 years
- >2 years
- I could not find an alternative source.
Farm A
Interview Category Interview Report

(Security) Does more than one person accompany the animals at all times during this process?
- Yes
- No

(Style) How long might an individual be unobserved with the animals without attracting attention during this process?
- More than 1 hour
- 30 min-1 hour
- 15-30 min
- 5-15 min
- <5 min
- <1 sec
- <15 sec
- never

(Style) How visible is someone near the animals during this process?
- Both identity and activity are completely visible at all times.
- Identity, but not activity, are completely visible at all times.
- Only the fact that someone is there may be apparent to observers.
- Others might not know that someone is present.

(Style) How well is the herd monitored during this process?
- Under visual observation at all times.
- Monitored by remote camera at all times.
- Intermittently monitored by remote camera.
- Video recording equipment is in place.
- Someone with the animals may be completely unobserved.

(Practices) What shelters are available to the animals?
- Animals are indoors at all times.
- Animals are outdoors at all times.
- Animals may select shelters or outdoors.

(Practices) How often are watering cups, tanks, and troughs cleaned and disinfected?
- Daily
- Weekly
- Monthly
- Never

(Product) Assume that a single incident of contamination occurred at this location/operation/material, etc. What percent of the total annual production for the entire operation could be directly affected by this hypothetical incident?

10%

(Product) If your animals were killed, how long would it take to purchase alternate animals?
- 1 to 2 weeks
- 2 weeks to 1 month
- 1 to 3 months
- 3 to 6 months
- 6 to 9 months
- 9 months to 1 year
- 1 to 2 years
- >2 years
- Animals used in this operation cannot be replaced (e.g., they are a unique breed).
[Product] If most of your animals were killed, how long would it take to restore your herd from the survivors?

- < 1 month
- 1 to 6 months
- 6 months to 1 year
- 1 to 2 years
- > 2 years

[Animal Health] When does inspection occur? (Check all that apply.)

- Daily
- Weekly
- Monthly
- Semi-annually
- Annually
- Every time product is taken to market
- None of the above
Farm A
Interview Category Interview Report

[Practices] Does the company perform routine maintenance on the ventilation and water systems of the building?
  ☐ Yes
  ☐ No (maintenance occurs only when something breaks)
  ☑ Not applicable

[Security] To whom do you give access to this building? (Check all that apply.)
  ☑ The general public
  ☑ Delivery drivers
  ☑ Vendors
  ☑ Customers
  ☑ Temporary laborers
  ☑ Long-term laborers
  ☑ All managers
  ☑ None of the above

[Security] How do you control access to this building during working hours? (Check all that apply.)
  ☑ Doors are locked when not in use
  ☑ Windows are locked or alarmed at all times
  ☑ Visitors must sign in and out
  ☑ Workers must sign in and out
  ☑ All doors are alarmed or guarded at all times
  ☑ None of the above

[Security] Do you have any of the following inside the building during working hours? (Check all that apply.)
  ☑ Workers at points of entry
  ☑ Dogs
  ☑ Guards at points of entry
  ☑ Contraband detection
  ☑ None of the above

[Security] What kinds of security do you have inside the building during off hours? (Check all that apply.)
  ☑ Doors are locked
  ☑ Windows are locked or alarmed at all times
  ☑ All doors are alarmed
  ☑ Guards are on random patrol of the building
  ☑ None of the above
Farm A
Interview Category Interview Report

[Security] How visible is someone in this area?
- Both identity and activity are completely visible at all times
- Identity, but not activity, are completely visible at all times
- Only the fact that someone is there may be apparent to observers
- Others might not know that someone is present

[Security] How well is this area monitored?
- Under visual observation at all times
- Monitored by remote camera at all times
- Intermittently monitored by remote camera
- Video recording equipment is in place
- Someone in this area may be completely unobserved

[Security] Is the material in storage inspected?
- Yes
- No

[Practices] How easy would it be to decontaminate the storage area used for this task?
- Storage can be cleaned using concentrated chemical cleaners, steam, or heat
- Storage can be cleaned using standard chemical cleaners
- Storage can be cleaned with hot soapy water or alcohol
- Storage can be cleaned with water only
- Storage must be cleaned with compressed air or special chemicals

[Practices] How easy is it to replace the storage area used for this task?
- Storage is easily replaceable
- Storage requires some installation of pre-fabricated buildings, fences, or equipment
- Storage and equipment is of standard design, but removal and installation would be costly or time-consuming
- Storage is a custom design that could be rebuilt by company employees
- Storage is a custom design that cannot be built by company employees

[Practices] Is the storage ever completely emptied?
- Yes
- No

[Product] Assume that a single incident of contamination occurred at this location/operation/material, etc. What percent of the total annual production for the entire operation could be directly affected by this hypothetical incident?
- %

[Product] If this area were contaminated or sabotaged, would you be able to continue to produce your product?
- Yes
- No
Farm A
Interview Category Interview Report

[Security] How visible is someone in this area?
○ Both identity and activity are completely visible at all times
○ Identity, but not activity, are completely visible at all times
○ Only the fact that someone is there may be apparent to observers
○ Others might not know that someone is present

[Security] How well is this area monitored?
○ Under visual observation at all times
○ Monitored by remote camera at all times
○ Intermittently monitored by remote camera
○ Video recording equipment in place
○ Someone in this area may be completely unobserved

[Security] Is the material in storage inspected?
□ Yes
□ No

[Security] To whom do you give access to the equipment storage? (Check all that apply.)
□ All employees
□ Long-term laborers
□ Visitors
□ Customers
□ Vendors
□ None of the above

[Security] Do any of the following obstacles control access to the equipment? (Check all that apply.)
□ Storage is locked with a key
□ Storage is alarmed
□ Storage access is behind a safety barrier (guard rail, wall)
□ The contamination points of the equipment are locked
□ The contamination points of the equipment are alarmed
□ None of the above

[Security] How long would it take to contaminate the equipment without leaving evidence that could cause immediate suspicion?
○ More than 1 hour (or impossible)
○ 30 min - 1 hour
○ 15-30 min
○ 5-15 min
○ 1-5 min
○ <1 min
○ <30 sec
○ <15 sec
□ The product is accessible at all times

[Security] How long might an individual have access to the storage without attracting attention?
□ More than 1 hour
□ 30 min - 1 hour
□ 15-30 min
□ 5-15 min
□ 1-5 min
□ <1 min
□ <30 sec
□ <15 sec
□ Never
[Practice] How easy would it be to decontaminate the storage area used for this task?
- Storage can be cleaned using concentrated chemical cleaners, steam, or heat
- Storage can be cleaned using standard chemical cleaners
- Storage can be cleaned with hot soapy water or alcohol
- Storage can be cleaned with water only
- Storage must be cleaned with compressed air or special chemicals

[Practice] How easy is it to replace the storage area used for this task?
- Storage is easily replaceable
- Storage requires some installation of pre-fabricated buildings, fences, or equipment
- Storage and equipment is of standard design, but removal and installation would be costly or time-consuming
- Storage is a custom design that could be rebuilt by company employees with some difficulty
- Storage is a custom design that cannot be built by company employees

[Practice] Is the storage ever completely emptied?
- Yes
- No

[Product] Assume that a single incident of contamination occurred at this location/operation/material, etc. What percent of the total annual production for the entire operation could be directly affected by this hypothetical incident?
- %

[Product] If this area were contaminated or sabotaged, would you be able to continue to produce your product?
- Yes
- No
Farm A
Interview Category Interview Report

[Security] How visible is someone near this equipment?
- Both identity and activity are completely visible at all times.
- Identity, but not activity, are completely visible at all times.
- Only the fact that someone is there may be apparent to observers.
- Others might not know that someone is present.

[Security] How well is this equipment monitored?
- Under visual observation at all times.
- Monitored by remote camera at all times.
- Intermittently monitored by remote camera.
- Video recording equipment is in place.
- Someone near the equipment may be completely unobserved.

[Security] Is the equipment inspected routinely?
- Yes
- No

[Security] How long would it take to contaminate this machinery without leaving evidence that could cause immediate suspicion?
- More than 1 hour (or impossible)
- 30 min – 1 hour
- 15-30 min
- 5-15 min
- 1-5 min
- <1 min
- <30 sec
- <15 sec
- The product is accessible at all times.

[Security] How long might an individual have access to the machinery without attracting attention?
- More than 1 hour
- 30 min – 1 hour
- 15-30 min
- 5-15 min
- 1-5 min
- <1 min
- <30 sec
- <15 sec
- never

[Practices] How easy would it be to decontaminate the machinery?
- Equipment can be cleaned using concentrated chemical cleaners, steam, or heat.
- Equipment can be cleaned using standard chemical cleaners.
- Equipment can be cleaned with hot soapy water or alcohol.
- Equipment can be cleaned with water only.
- Equipment must be cleaned with compressed air or special chemicals.
- Equipment is difficult or impossible to clean.

[Practices] How easy is it to replace the equipment used for this task?
- Equipment is disposable and off-the-shelf.
- Equipment is of standard design and easily installed.
- Equipment is of standard design, but removal and installation would be costly or time-consuming.
- Equipment is a custom design that could be rebuilt by company employees.
- Equipment is a custom design that cannot be built by company employees.
- Equipment is difficult or impossible to replace.
[Practices] Which of the following precautions does the company take before using this machinery? (Check all that apply.)
- Equipment is cleaned and disinfected
- Equipment is inspected
- Routine maintenance is performed
- None of the above

[Product] Assume that a single incident of contamination occurred at this location/operation/material, etc. What percent of the total annual production for the entire operation could be directly affected by this hypothetical incident?
- Less than 5 %
- More than 5 %

[Product] If this equipment were contaminated or sabotaged, would you be able to continue to produce your product?
- Yes
- No
Farm A
Interview Category Interview Report

[Security] Does inspection of the vehicle occur at this step?
  ○ Yes
  ○ No

[Security] How visible is someone in this area?
  ○ Both identity and activity are completely visible at all times.
  ○ Identity, but not activity, are completely visible at all times.
  ○ Only the fact that someone is there may be apparent to observers.
  ○ Others might not know that someone is present.

[Security] What information about the route of the vehicle is readily available on the internet? (Check all that apply.)
  ○ Maps of the routes that the vehicle navigates.
  ○ Locations of stopping points
  ○ Pictures of the vehicle
  ○ None of the above

[Security] What is the robustness of the Cargo area to decontamination?
  ○ It can be cleaned using concentrated chemical cleaners, steam, or heat.
  ○ It can be cleaned using standard chemical cleaners.
  ○ It can be cleaned with hot soapy water or alcohol.
  ○ It can be cleaned with water only.
  ○ It must be cleaned with compressed air or special chemicals.

[Security] How easy is the cargo area to replace?
  ○ It can be replaced within a day.
  ○ It is of standard design and relatively easily installed.
  ○ It is of standard design, but removal and installation would be costly or time-consuming.
  ○ It is a custom design that could be rebuilt by company employees.
  ○ It is a custom design that cannot be built by company employees.

[Security] During transport, how long might an individual have to contaminate the product?
  ○ More than 1 hour
  ○ 30 min-1 hour
  ○ 15-30 min
  ○ 5-15 min
  ○ 1-5 min
  ○ <1 min
  ○ <30 sec
  ○ <15 sec
  ○ The product is accessible at all times

[Security] During transport, how long would it take to contaminate the products without leaving evidence that would cause immediate suspicion?
  ○ More than 1 hour (or impossible)
  ○ 30 min–1 hour
  ○ 15-30 min
  ○ 5-15 min
  ○ 1-5 min
  ○ <1 min
  ○ <30 sec
  ○ <15 sec
  ○ Negligible time, because the product is open and accessible at all times.
[Security] Do any of the following obstacles control access to the product during transportation? (Check all that apply.)
- The substance transported is completely enclosed (e.g., no large air holes).
- The substance transported is stored in sealed packaging.
- The vehicle is locked with a key.
- At least one person remains with the vehicle at all times.
- More than one person remains with the vehicle at all times.
- The vehicle is alarmed.
- None of the above

[Security] Is access to the cargo area restricted while it is empty?
- Yes
- No

[Security] How close are the drivers of the vehicle required to stay during stops?
- All crew must be with the vehicle.
- At least one crew member must be with the vehicle.
- All crew must be in sight of the vehicle.
- At least one crew member must be in sight of the vehicle.
- The crew are not required to stay within sight of the vehicle during stops.

[Practices] How long does the vehicle stop?
- Less than 5 minutes
- 5 to 10 minutes
- 10 to 30 minutes
- Half an hour to an hour
- More than an hour
- Unknown

[Practices] Does the vehicle run on a formal schedule while empty?
- Yes
- No

[Practices] Is the cargo area secured with tamper-evident locks or seals while the vehicle is empty?
- Yes
- No

[Product] Assume that a single incident of contamination occurred at this location/operation/material, etc. What percent of the total annual production for the entire operation could be directly affected by this hypothetical incident?
Farm A
Interview Category Interview Report

[Security] Does inspection of the vehicle occur at this step?
- Yes
- No

[Security] How well is this area monitored?
- Under visual observation at all times.
- Monitored by remote camera at all times.
- Intermittently monitored by remote camera.
- Video recording equipment in place.
- Someone in this area may be completely unobserved.

[Security] If this area were contaminated or sabotaged, would you be able to continue to transport products?
- Yes
- No

[Security] What is the robustness of this area to decontamination?
- Equipment can be cleaned using concentrated chemical cleaners, steam, or heat.
- Equipment can be cleaned using standard chemical cleaners.
- Equipment can be cleaned with hot soapy water or alcohol.
- Equipment must be cleaned with compressed air or special chemicals.

[Security] How easy is the equipment at this area to replace?
- Equipment is disposable and off-the-shelf.
- Equipment is of standard design and easily installed.
- Equipment is of standard design, but removal and installation would be costly or time-consuming.
- Equipment is a custom design that could be rebuilt by company employees.
- Equipment is a custom design that cannot be built by company employees.

[Security] During operations, how long might an individual be unobserved in this area?
- More than 1 hour
- 30 min to 1 hour
- 15-30 min
- 5-15 min
- 1-5 min
- <1 min
- <30 sec
- <15 sec
- never

[Security] During operations, how long would it take to insert a product contaminant at this point without leaving evidence that would cause immediate suspicion?
- More than 1 hour (or impossible)
- 30 min to 1 hour
- 15-30 min
- 5-15 min
- 1-5 min
- <1 min
- <30 sec
- <15 sec
- Indefinite time because the product is open and accessible at all times
[Security] How visible is someone in this area?
- Both identity and activity are completely visible at all times.
- Identity, but not activity, are completely visible at all times.
- Only the fact that someone is there may be apparent to observers.
- Others might not know that someone is present.

[Security] Does inspection of the cargo occur at this step?
- Yes
- No

[Security] Who loads the vehicle?
- The vehicle crew
- Employees of the company sending the cargo.
- Both crew and employees of the company sending the cargo.

[Security] Is the material being transported in sealed packaging?
- Yes
- No

[Practices] Is cargo from multiple businesses combined during transportation?
- Yes
- No

[Product] Assume that a single incident of contamination occurred at this location/operation/material, etc. What percent of the total annual production for the entire operation could be directly affected by this hypothetical incident?

less than 5% of annual production
Appendix C- Fire Rescue Interview

Agroterrorism Preparedness Questions. These questions will be used to evaluate your crew’s preparedness to respond to agroterrorism incidents. Please use this opportunity to discuss any training or equipment needs to better prepare for this type of response.

1. What is the average level of agroterrorism training on your crew? (choose one)
   - None __  Awareness__  Operations__  Technician__  Advanced__

2. How often is agroterrorism training conducted on your crew? (choose one)
   - Never__  Annually__  Bi-Annually__  Monthly__  Every shift__

3. Describe the type of agroterrorism training you have conducted in the last year. (choose all that apply)
   - None__  Informal Discussion__  Lecture__  Skills Review__  Full Scale Exercise__

4. Do you feel you have the equipment or training necessary to handle an agroterrorism incident? (choose one)
   - Neither__  Equipment but no training__  Training but no equipment__
   - Both Equipment and training__

5. Does your crew understand their responsibilities on scene of an agroterrorism incident? (choose one)
   - No__  Little understanding__  Moderate Understanding__  Good understanding__

6. Describe your individual level of comfort in taking command of an agroterrorism incident. Would you feel comfortable taking command individually or would you benefit from joint command with others who may have more training/experience in this field?

  ________________________________________________________________________
   _______________________________________________________________________
   _______________________________________________________________________
   _______________________________________________________________________
   _______________________________________________________________________
   _______________________________________________________________________

7. Describe any other concerns or needs your crew have expressed in terms of preparedness, equipment, or training inadequacies to respond to acts involving agroterrorism.

   _______________________________________________________________________
   _______________________________________________________________________
   _______________________________________________________________________
   _______________________________________________________________________
   _______________________________________________________________________

8. Which one of the following preparedness categories best fits your crew’s level to respond? (choose one)
   - LIMITED CAPABILITY- Crew requires more training and/or equipment to respond to agroterrorism__
AWARENESS LEVEL- Crew can respond to agroterrorism as part of an initial response element or in support or response for the purpose of protecting nearby persons, the environment, and property in defensive fashion.

PERFORMANCE LEVEL- Crew can respond as part of the initial response element or in response for the purpose of reducing or stopping source of effects of agroterrorism weapons. There must be at least one available [certified] agricultural response team available in the county at this level.

ADVANCED OPS LEVEL- Meet all the requirements of performance level with advanced knowledge of all protocols for medical monitoring of all response personnel.

Basic Agroterrorism Knowledge. Answer questions to the best of your knowledge with no help from outside resources. Your answers will be used to develop a basic knowledge profile within the department. You will not be issued any grades and your names will not be associated with individual answers from this section.

1. Which of the following operations do you believe your crew may be assist with in an agroterrorism incident? (choose all that apply)
   - Establish/Maintain ICS
   - Diagnose Infected Animals
   - Carcass Disposal (open air burning)
   - Working in PPE around animals
   - Agent Identification
   - Decontamination (people, animals, equipment)
   - Animal Euthanasia
   - Animal Treatment

2. CBRNE is an acronym adopted by the military to identify Weapons of Mass Destruction. Define each class of weapon in CBRNE:
   - C
   - B
   - R
   - N
   - E

3. Who would assume primary investigative authority in an agriculture involving suspected terrorism. (choose one)
   - USDA
   - FBI
   - DHS
   - FDA
   - Local Police/Fire Marshall

4. In terms of Biosecurity, is it better to establish: (choose one)
   - One entrance/exit to monitor what moves on and off the farm
   - Separate entrance and exit to prevent cross contamination

5. After securing life and property, what is the first action your crew must conduct to support containment and investigative operations? (choose one)
   - Moving all infected animals to a central location
   - Slaughter animals to prevent disease spread
   - Isolate and control the scene with a perimeter with physical/human barriers
   - Begin to decontaminate all animals and equipment on farm

6. True/False: Agents which are used to attack animals do not affect humans so PPE is less of a concern.
7. A good area to place incident command and staging is a location near to (but not on) the farm in a direction that is _________ and _________ from the incident.

8. True/False: Domestic terrorists are considered one of the top threats to the agriculture industry.

9. Which of the following would not be an indicator of agricultural terrorism? (choose one)
   - Unusual illness or death among an entire population
   - Unscheduled spraying outdoors, especially at night
   - Disease presentation that’s not endemic (normally existing in that region)
   - Unusually high death from a “common” disease
   - None of the above, all of these are indicators

10. Most biological agents have a specified ____________ period. This period is important to responders because animals may have a disease hours or days before they start to show signs and symptoms.

11. Many argue the two top impacts of agricultural terrorism are fear of food contamination and potential for severe ___________ impact. (choose one)
   - Economic
   - Political
   - Environmental
   - Social

12. True/False: Because agroterrorism presents a unique and complex incident, the traditional ICS structure would not apply.

13. Agroterrorism incidents bring many different resources including non-traditional first responders which may not be familiar with standard operations within fire rescue. For this reason it is imperative to use ________ language with regards to radio traffic.

14. As with any potential crime scene it is important to note all observations and take every action possible to preserve potential ____________ for law enforcement.

15. Fire rescue crews may be requested for euthanasia operations, especially crews who have engines equipped with ____________ which may be used for mass suffocation.

16. Fire rescue crews may be requested for manpower to assist with animal _________ to help secure animals for testing and medication administration. The two most widely practiced methods are mechanical and chemical (sedative).

17. Fire crews may be requested to assist with on-site open air burning of animal carcasses. On-site open air burning is often preferred because:
   - It is cheaper to burn on site rather than transporting carcasses to one central location
   - Traditional incineration facilities do not accept carcasses exposed to agroterrorism agents
Open air burning reduces the chance of groundwater contamination. 
Disposing of carcasses on-site reduces the risk of disease spread.

18. True/False: Biological weapons are not advantageous against agriculture because they are expensive and difficult to acquire.

19. Which of the following would not be considered an agroterrorism attack? (all of these assume the political motive which qualifies a terrorist attack)
   - A foreign animal disease is introduced into a population of cattle
   - Salmonella is introduced into a salad bar at a public restaurant
   - An incendiary device is released in a poultry plant to shut down operation
   - ALL of the above would be considered agroterrorism
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